Advance Aquaculture Technology Professor Gourav Dhar Bhowmick Department of Agricultural and Food Engineering Indian Institute of Technology Kharagpur Lecture 58 Mitigation and Adaptive Strategies

(Refer Slide Time: 00:31)



Hello, everyone. Welcome to the third lecture material of the module 12 environmental considerations of aquaculture. My name is Professor Gourav Dhar Bhowmick, I am from agriculture and food engineering department of IIT, Kharagpur.

(Refer Slide Time: 00:37)



In this lecture material we will be discussing about mainly the different mitigation techniques and different adaptation strategies that we can follow. The same material we will be discussing for the next two lecture also, where we will be elaborately discussing about different climatological conditions which are affecting the aquaculture process aquaculture system.

And how this system how this sector is actually is adapting, what are the way by which it can adapt to these changes in the climate, climatic condition and also what are the different mitigating techniques that we can follow and that will be discussed in details in the next two lectures as well.

So, the concepts that I will be covering in this particular lecture are the impact of climate change on aquatic animal health, introduction to mitigation and adaptation strategies mitigation of climate change impacts on the aquaculture. (Refer Slide Time: 01:35)



So, to start with, you know this is not something very new to you, I can I am hundred percent sure, because, that how the climate change like, remember, we discussed in the last two lecture also, how different climatological factors are actually affecting the aquaculture sector like how they can affect the health how they can affect the habitat and how they can affect the overall behavior analysis, behavioral changes, it was already discussed in last two lecture material and here also, we will be discussing in details.

And the more in depth discussion on the aquatic animal health will also be done in this lecture. So, mainly, we will be discussing about the how these different the changes in this climatic condition how it can help to spread different kinds of pathogens for this aquatic microorganisms. They not only enhance the pathogenic prevalence in that, any sector like whether it be farm whether it be say like aquaculture in a surface water bodies.

So, how it is affecting this aquatic bodies, aquatic animals, like prevailing this pathogens, they are virulence and the host susceptibility and the disease transmission, these are the factors that are severely affected by the climate change. Especially this when the climatic condition is not up to the mark or not up to the same standard that those aquatic animal are actually well habituated with.

So, what will happen like especially, when it is in a very static sector that you are in a static medium by at which you are growing your aquatic animals, they will be in maximum danger, they will be in most vulnerable situations, because they cannot escape that situation, they cannot escape that particular land or particular pond or farm or something. So, for them this climatic change, these changes in the climate are actually having very drastic effect in their well being.

(Refer Slide Time: 03:56)



So, we will have to think about different strategies and different mitigation techniques or adaptive strategies for to get rid of this. To start with we will first discuss about the different examples of different microbiological infections like it can be parasitic, it can be viral, it can be bacteriological. I will be discussing in coming slides.

So, in this particular slides, I have discussed about I have given some examples of parasitic infections, which are affecting the aquatic animals because of the climatic change climate change dimensions. Do you have any idea about what is El Nino or La Nina? These are two actually two different climatic conditions. Two different kinds of event it is named as an El Nino and La Nina.

If you do not know you can Google it and it is this El Nino is something which is drastically changing the whole weather pattern or the whole climatic condition of the earth right now. Just

to start with just to give you one example like just to give you some brief about what is El Nino, El Nino it means little boy it is a Spanish word.

So, what does it mean what happen this Pacific region if you see this figure in the Pacific region in the western side of the USA, there normally what happened in a specific time of the year the hot air water it will move from one place to another the hot water it tends to move towards the more western side and towards the east side of the this Asia. So, it moves towards that and the cold water what is actually in general they come in place of this cold in this hot water bodies in the western side of the USA that is a general phenomenon.

Because of the climatic because of the change because of the global warming and change in different reason, this is not happening this effect is how to say it is changed it is not the same way it used to be even like 50 years back also.

The hot water that it is supposed to go towards more towards the western side it is not happening what happened instead the hot water that that hot water it is keep on accumulating in that specific zone only which can cause a very huge amount of cyclonic and typhoon events and very high amount of precipitation in the southern part of the America whereas the Pacific part of the America like Pacific West part of America, they will be warm and dry and they will there is facing severe drought situations. This is because of the El Nino this is related to this event called El Nino.

The same way there is another term called a La Nina, La Nina is like it is a Spanish word it is also it means the little girl to the best of my knowledge little boy and little girl. So, this La Nina event when it happens why I am giving you this extra information, it will help you understand the factor much nicer way that what is actually happening in our earth and how this changes in the oceanic behavior is actually affecting the landmass as well.

Though we can think like why do we have to worry about because whatever is happening in the ocean, it keeps it will be in the ocean only no it will have a very drastic effect on the environmental situation and the I mean like the climatic situation of your region as well. So, this is just one example.

In case of La Nina what happen, in that case hot water it will go towards the west, but the amount will of the hot water is much higher, which is moving towards the west and which can cause just the opposite effect in US condition if I say only about the condition which will prevail in the US.

In case of La Nina in a southern part of the US will be in drought condition and the west Pacific west part will be affected with the huge amount of rainfall, this is a very sudden changes in the climate which are not there even few years back few decades back also and this events this anomalies climatic this climate anomalies are keep on increasing year by year by another.

So, because of that, it has a drastic impact on the aquaculture as well, in order to start with before just to give you some example about how these climates, climatic conditions are affecting aquaculture, we will be discussing for the next two three slides that how it can affect.

Like I am giving one example to start with, like the oyster disease parasitic infection in case of oyster diseases, this Bonamiosis or Marteiliosis is or say like Parkinsiosis these are the different diseases or environmental risk factors that the oysters are actually facing, because of the event like El Nino, because what happened this El Nino which is occurred in the, it is actually very much correlated with this Mexican oyster pathogen outbreak and its range extend up to the western pathogens in the New England region as well.

So, that is why this specific event El Nino is not only affecting the landmass, but also landmass and the land like a species, but it is also affecting the aquatic species present there, because of the changes in the temperature changes in the this overall climatic behavior. (Refer Slide Time: 09:42)



The same way there are earlier example was about the parasitic infection like different kind of parasitic infection, we can discuss about the different bacterial load, in case of like, different types of streams, the culture streams, they are actually very much threatened with this Vibrio species of this bacteria and this Vibrio species they are very much, they started growing, I mean like they started affecting our culture farm affecting our typhoid farms in the way the streams are normally being cultured.

And this is considered as the reason of changes in the climatic situations like because of the climatic changes, the temperature, salinity, turbidity and the presence of zooplankton, crustaceans and mollusks are also changed and all these factors are actually affecting and causing this kind of bacterial pathogenic infection or like the disease outbreak in stream species.

Same way the viral diseases in El Nino event that happened in 1987, 88, 91, 92, 94, 95 and 97, 98, it is very much the experts say that it is very much associated with the emergence of different viral diseases like TSVs, TSV white spot syndrome disease like WSSV and all (()) (11:11) and they are the loss are in the range of millions to several billions of USD because of this climatic event.

So, you can understand like how our activities I will definitely say it is our activities, because of our anthropogenic activity only the chain the earth is experiencing in this improper situation and

this abnormalities in the anomalous is in the climate a condition. So, this is not only this is not only affecting the whole like ourselves, but also is affecting land animals aquatic animal, the whole ecosystem.

(Refer Slide Time: 11:49)

Disease	Environmental and other risk factors	Impacts	
'angi ipizotic ulevrative yndrome (EUS): ungi	Shipping movements, balliast water, fih migration, ocean corrents, varialla. EUS in wide seturative opulations (e.g. Australia and the Philippine) associated with didiler unrof Water from acid subplate ool areas. Heavy nainfall, flooding, low temperature between 18 °C to 2°C and after heavy nainfall – conditions which favour fungal sporulation. EUS outbracks have been associated with mes morbility of various species of freshwater in rice-fields, estuaries, lakes and version and for low temperatures (low for topical dioxes, associated across a broad temperature arage (10 °C to 15 °C to 33 °C)	EUS is one of the most serious aquaic disease affecting finite. Inside include threats to the environment and aquatic biodivensity through, for ecological direction, and aquatic biodivensity through, for ecological direction, and and distings through mortalities, market rejection and qualic heath concerns because of the presence of productivity of all susceptible fish species.	Table 3: Examples of fungal diseases affecting aquatic and that have climate change dimensions
	The spread from wild to cultured populations or vice versa can occur via several routes. Once an outbreak occurs in rivers/ canals, the disease can spread downstream as well as upstream where susceptible fish species over		

Fungal diseases are also getting outbreak like this in this because of this events and one specific type of this disease called this Epizootic Ulcerative syndromes or EUS we call in short. So, it is actually considered to be the reason behind the ballast water movement the shipping movements the fish migrations and the ocean current and the rainfall. You know what is shipping movement you know what is the fish migration ocean current and also the rainfall maybe you do not know about what is ballast water, ballast water is sometimes just to give you one example suppose you have a oil tanker.

So, in your oil tanker from oil tanker it is like say when it comes from the oil mine to your port. So, it in when it comes with the load of oils and in the port it will void itself so after then what will happen it is structured the ships are structured in such a way that it can carry up to that load of oil and that particular amount of weight, but when it will disperse when you will the containers and the these tankers they unload themselves like at the end they will be very light in a weight. So, because of that there is there will be changes in different factors the and drag forces (())(13:21) that is a different thing anyway the ship movement will be affected. So, because of that what we do we put instead of oil we simply replace it with the water we fill up the water of this tankers and from that region and then we go to the then that ships again going back to the oil mine and then they get rid of all the water and then they fill up with the oil.

Now, the thing is what do you think these waters are pure water freshwater no, this is the water which they can collect it from the near coastal region only when they are collecting this water from the near coastal regions what will happen it is very much reach in different faunas and flora and faunas.

So, once they are very much reach in this flora and faunas this which is like specific to that specific place, now it is moving say like hundreds of kilometers away and go to the oil mine then it will replace this water with the oil again and this water will come in contact with the that following water body right now.

And because of that what will happen those flora and fauna which is very much specific to that core that coastal region it will be replaced to that it will not be replaced it will come and it will enjoy a new environment but it will definitely not enjoy because the thing is like for them that environment that ecosystem is not built for them. Or suppose whatever you are carrying it from the coastal regions, maybe they are they are being considered as a predator for in the nearby water vicinity where you are discharging them.

So, anyway in the both way it is not good, for in the both way for both of the cultures, both of the species that was there in like, set a site A and site B, for both of them, it is a very, very much change, it is like the whole ecosystem can get collapsed, because of these changes in the because of this different movement of the species because of this ballast water.

So, now I think you I hope you will understand you understand, like, what is why this is something like not to be practiced and if you are practicing, you have to make sure that the water that you are carrying, it is like, free of any restricted migratory species, restricted species to be migrated. So, there are a lot of practices, lot of discussions, lot of expert's opinion are there it is floating in the air, but still there are a lot of work to be done in this particular sector. Anyway, so this EUS, this type of fungal diseases are prevalent because of these activities.

And it is like very, it is a one of the most serious aquatic disease which affects the finfish, and it has a indirect long term effect, like, it can threat the environment in the aquatic biodiversity and also it can decline the fish biomass and also irreversible ecological disruption can also happen. So, all these things are there, all these factors are there, which has to be properly taken care of otherwise, they will be a destruction in the whole ecosystem.

(Refer Slide Time: 16:36)



So, now we know about all this factors. Now, let us discuss about the mitigation and adaptation technologies, strategies that is there, majorly, the climate change related risks to aquaculture, food security and the water supply and the economic development will continue to increase unless until we really restrict our global warming limit up to 1 point 5 degrees Celsius.

So, and because of that, both the agriculture sector like as well as the capture, as well as the culture fisheries, as well as the communities, those are involved, they are required to mitigate and adapt to the changing climate situation by developing or using the advanced technologies and resources.

This mitigation and the adaptive adaptation, it together, it can help prepare the eco farming community population and the ecosystem to build resilience and effectively cope with the climatic situation on the climate changes in the climatic conditions.

(Refer Slide Time: 17:42)



So, to start with the mitigation to what do I mean by the mitigation to mitigation, it is like normally, we focus on reducing or reversing the rate of climate change, which is very hard to do, but it is possible, it is a collective effort of us definitely can do a major change. Mainly the aquaculture producers, as well as the stakeholders can play a substantial role in mitigating the climate change effect.

First of all, they can minimize the emission of greenhouse gas, they can start utilizing the environmental friendly practices and the technologies which is available and which is like experts are already provided, and it is already there in the pen and paper, but you just need to follow it and you just need to replicate it and make it introduce it to your new to your farm design.

In mitigation, it is actually a long term solution for climate change and it has to be implemented simultaneously with the adaptation strategies for better and more effective outcomes. So, only

mitigation will not do the job, you have to adapt with the change in situation as well. So, both are equally important.

(Refer Slide Time: 18:52)



So, what are the measures or what are the processes or like how we can, you can reduce the or mitigate the greenhouse gas emissions from aquaculture. To start with, suppose, in order to reduce the emission from reproduction of the feed materials, what you can do, you can compound this aquaculture feed and select the feeds with lower associated emissions, like, locally sourced oil seeds instead of fishmeal or fish oil, which is sourced from the capture fisheries which definitely cause certain it has also its carbon footprint.

I hope you guys know what is carbon footprint? Any product that is developed we can call it a green product, sustainable product it is not it does not matter that at that particular moment, you are using some sustainable technology and you are considering you are claiming it to be organic or claiming it to be carbon neutral.

No, suppose just to give you example, we say like electro most of the electric car and electric vehicles are very much good for the environment, it is only good at the moment when you start utilizing the energy source from the renewable energy like if you are harvesting the energy for that particularly EV car and EV cell from the renewable energy then you may call it somehow carbon neutral. Still the construction material is whichever is involved to harvest that renewable energy, it also has some carbon footprint, because in order to manufacture those, you need to involve some amount of energy.

So, you have to go up to the source for each and every instruments or each and every chemicals or whatever you have used, you have to go up to the source and you have to understand that what is its carbon footprint.

Then only you accumulatively come and go to and at the end, you will do this lifecycle analysis and at the end you will say, so, my product is carbon neutral, because whatever the key raw materials that I have used, they whatever the carbon footprint they are having that can be surplus that can be neutralized by the material that I have developed, this way we can call it carbon this way we can call it carbon neutral technology, so, sustainable technologies. So, but this carbon neutrality and carbon footprint is very important for you to understand.

So, this is the reason why we can go it is better to replace the fish oil fish meal with the locally sourced oil seeds because this fish meal for to capture this fish to prepare this fish meal and fish oil you have to go to the open sea for capture fisheries it will cost a lot of transportation the oil and involve people's involvement and all these things, it has a huge carbon footprint.

So, in order to reduce that carbon footprint or greenhouse gas emissions, what you can do you can start go with a locally produced material, it can reduce the emission from the feed meal energy just like you can improve the management efficiency of the feed meals, you can substitute the high emission intensity fuels with the low emission intensity alternatives, you can improve the food conversion ratio by optimizing the nutrition content you know how to do that we have already discussed you can improve the Feed Management Technology increase the dissolved oxygen level.

So, to increase the feeding efficiency you can improve the fish health, the better the fish the health of the fish and the better it will the more amount of food it will consume and the more amount of biomass conversion it will do from the feed.

So, how we can reduce how we can improve the fish health you have to improve the water quality management practice maintaining a proper fish stocking density it cannot be much higher implement efficient biosecurity measures and use the medicines properly and try to quarantine the fishes which are already in danger and so that it and treat it very cautiously so, that it will not go and damage your whole farm and also it will reduce your overall strategy overall, economic return as well.

So, these are the practice that you should follow you should have to reduce on from nitrous oxide emissions like you can reduce the amount of nitrogen available in for this conversion of this nitrous oxide to by like just an example you can add into the fertilization guidelines by provided by the local authorizing body for pond aquaculture and improve the feed management that targets the reducing the uneaten fish food because this uneaten food is actually converted into the waste materials. So, if you reduce this uneaten food consumption, you can definitely increase the productivity and also it you can definitely work on the environmental cleanliness.

(Refer Slide Time: 24:10)

- Typically, for capture fisheries, greenhouse gas emissions are primarily related to fuel use.
 The nature and levels of these emissions largely depend on technical
- aspects, like types of vessels/gear used (e.g. active/passive gear, dredge trawl, seine, longline, gillnet, traps, and light-attraction fishing).
- Fishing vessels are responsible for around 0.5% of global CO₂ emissions.
- As per data collected in 2012, fishing vessels consumed around 53.9 million tonnes of fuel and emitted around 172.3 million tonnes of CO₂.
- Thus, the generation of greenhouse gases can be further minimized by using:-
- Advanced fishing vessels that require less fuel for harvesting traditional species
- By using renewable sources (solar, wind, or tidal) of energy instead of fossil fuels.

So, typically, for capture fisheries, the greenhouse gas emission is actually mainly related to the primary fuel uses like I mean like the fuel that they use for the transportation it can be it is depending upon the type of the vessel or the gear they are using and majorly it is majorly depends on this kind of technical aspects only. And they are actually responsible for almost 0.5% of the global carbon dioxide emissions.

Can you imagine this fishing vessels, it is captured fishery still in this particular in this era also, we are talking about this where there are like very much advanced technologies already available

just because of the lack of initiation, initiation from our side we are losing we are actually generating these much of greenhouse gases.

This generation of these greenhouse gases can be further minimized by advanced fishing vessels that require less fuel for harvesting the traditional species by using the renewable sources of energy like instead of fossil fuels like solar, wind or tidal can be used.

(Refer Slide Time: 23:20)

| Low High fuel efficiency in exit L RELATED vessels, with typical range appendages Reduce/smooth/align appendages 2% 5% reported across vessels ULSION RELATED 10 m to 40 m in length. 10 m to 40 m in length. ael speed Reduction 5% 20-30% rine Replacement with new 7% 20% rine Correct design/installation including exhaust 4% rbox & propeller Replacement 5% 15% nee Correct design/installation including exhaust 4% rbox & propeller Replacement 5% 15% neeter Install 0% 15 - 20% raulics Upgrade compresons & pumps Improve insulation stilc loads such as pumps & motors Upgrade compresons & pumps 1.5% rational awareness Improve by training & record keeping <10% TIM Action 1 1 Tried Action 1 1 1 Tried Action 1 1 1 1 Tried Action | Low High fuel efficiency in existing vessels, with typical ranges o sous bow RetArED several source of the source of

 | L RELATED La Return Retro-fit installation 5% 15% fuel efficiency in existing vessels, with typical ranges of fuel savings calculated or reported across vessels from 10 m to 40 m in length. This set of the saving calculated or reported across vessels from 10 m to 40 m in length. This set of the saving calculated or reported across vessels from 10 m to 40 m in length. This set of the saving calculated or reported across vessels from 10 m to 40 m in length. This set of the saving calculated or reported across vessels from 10 m to 40 m in length. This set of the saving calculated or reported across vessels from 10 m to 40 m in length. This set of the saving calculated or reported across vessels from 10 m to 40 m in length. This set of the saving calculated or reported across vessels from 10 m to 40 m in length. This set of the saving calculated or reported across vessels from 10 m to 40 m in length. This set of the saving calculated or reported across vessels from 10 m to 40 m in length. This set of the saving calculated or reported across vessels from 10 m to 40 m in length. This set of the saving calculated or reported across vessels from 10 m to 40 m in length. This set of the saving calculated or reported across vessels from 10 m to 40 m in length. This set of the saving calculated or reported across vessels from 10 m to 40 m in length. This set of the saving calculated or reported across vessels from 10 m to 40 m in length. This set of the saving calculated or reported across vessels from 10 m to 40 m in length. This set of the saving calculated or reported across vessels from 10 m to 40 m in length. This set of the saving calculated or reported across vessels from 10 m to 40 m in length. This set of the saving calculated or reported across vessels from 10 m to 40 m in length. This set of the saving calculated or reported across vessels from 10 m to 40 m in length. This set of the saving calculated or reported across vessels from 10 m to 40 m to | L RELATED URLATED URLATED URLSON REtroft installation URLSON RELATED URLSON RELATED URLSON RELATED URLSON RELATED URLSON RELATED USON R | L RELATED URLATED URLSON RELATED Reduce/smooth/align appendages Reduce/smooth/align Reduce/smooth/align appendages Reduce/smooth/align Reduce/smooth/align appendages Reduce/smooth/align Reduce/smooth/align/smooth/align/smooth/align/smooth | L RELATED L RELOR Appendages Reduce/smooth/align appendages Reduce/smooth/align/smooth/align/smooth/align/smooth/align/smooth/align/smooth/align/smooth/align/smooth/align/smooth/ | L RELATED L RELOR Appendages Reduce/smooth/align appendages Reduce/smooth/align/smooth/align/smooth/align/smooth/align/smooth/align/smooth/align/smooth/align/smooth/align/smooth/ | L RELATED URLACED URLACED URLOW Retro-fit installation URLACED appendages Reduce/smooth/align appendages Reduce/smooth/align appendages Reduce/smooth/align appendages Reduce/smooth/align appendages Reduction S% S% reported across vessels from 10 m to 40 m in length. 10 | L RELATED URLARED URLARED URLSION RELATED URLSION RELATED URLSION RELATED URLSION RELATED The Correct design/installation including exhaust Propulsion Replacement Unstall & keep records PAPOPULSION RELATED Traulics Upgrade compressors & pumps Improve insulation Upgrade controls, switch off all above Upgrade controls, switch off | L RELATED URLATED URLATED URLSON REtATED URLSON RELATED URLSON RELATED URLSON RELATED URLSON RELATED URLSON RELATED This Concertion Unstall diversion Unstall diversion Unstall diversion Unstall diversion Upgrade compresons & pumps Improve insulation Upgrade controls Upgrade controls Upgrade controls, switch off all above Upgrade controls Upgrade controls, switch off all above Utation Umprove insulation Umprove insulation Umprove by training & record keeping <upre> TIEM ACTOM THUST COMPONENTS </upre> | L RELATED URLARED URLARED URLSON RELATED URLSON RELATED URLSON RELATED URLSON RELATED URLSON RELATED URLSON RELATED USON RELATED Treat Correct design/installation including exhaust 4% USON BEL S% 15% USON RELATED USON RELATED USON RELATED USON RELATED USON RELATED Treat USON RELATED Treat USON RELATED USON RELATED Treat USON UPgrade compressors & pumps Improve insulation Treational awareness Improve by training & record keeping 10% 115% 115% 115% 115% 115% 115% 115% | Low High fuel efficiency in existing L REATED vessels, with typical ranges of Jappendages Reduce/smooth/align appendages 2% 5% reported across vessels from JU SION RELATED 10 m to 40 m in length. 10 m to 40 m in length. 10 m to 40 m in length. el speed Reduction 5% 20-30% 15% 10 m to 40 m in length. ine Replacement with new 7% 20% 10 m to 40 m in length. 10 m to 40 m in length. ine Correct design/installation including exhaust 4% 4% 4% 4% ine Correct design/installation 0% 15 - 20% 15% 15% ine Correct design/installation 0% 15 - 20% 15% 15% ingeration Upgrade compresons & pumps
Improve insulation 15% 15% 15% ratics Upgrade compresons & pumps
Improve insulation 15% 15% 15% rational awareness Improve by
training & record keeping 10% 10% rational awareness Improve by training & record keeping 10% 10% TIMM Action <th>Low High
puel efficiency in existing
vessels, with typical ranges of
fuel savings calculated or
reported across vessels from
10 m to 40 m in length. Lex LATED 5% 20-30% PULSION RELATED 5% 20-30% rele speed Reduction 5% 20-30% rine Replacement with new 7% 20% rine Correct design/installation including exhaust 4% rbox & propeller Replacement 5% 15% rbox & propeller Replacement 5% 15% ineter Install 0% 15 - 20% igeration Upgrade pumps and controls 5% 15% ratilics Upgrade compressors & pumps
improve insulation 1.5% ting/cooling, electrical & lighting Utilise waste heat. Improve insulation 1.5% stick loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% rational awareness Improve insulation 10% 10% 10% rational awareness Upgrade controls, switch off all above 0.5% 1.5% rational awareness Improve insulation 10% 10%</th> <th>L RELATED L RELSION RELATED L I Stall ation Replacement with new Replacement with new Replacement Stall 0% 15% 15% 15% 15% 15% 10 m to 40 m in length. 10 m to 40 m in len</th> <th>L RELATED L RELSION RELATED L Relacement with new Replacement with new Replacement with new Replacement with new Replacement S% 15% I 5% I</th> <th>L RELATED L RELSION RELATED L RELSION RELATED L RELSION RELATED L Relacement with new T% 20% Ine Correct design/installation including exhaust 4% L Correction Correct design/installation S% 15% L S% L S</th> <th>Low High
puel efficiency in existing
vessels, with typical ranges of
vessels, with typical ranges of
fuel savings calculated or
reported across vessels from
10 m to 40 m in length. velsolw RELATED 5% 20-30% velsolw RELATED 5% 20-30% ine Replacement with new 7% 20% ine Correct design/installation including exhaust 4% rbox & propeller Replacement 5% 15% ine Correct design/installation 1% 15 - 20% is weight Correction 0% 15 - 20% igeration Upgrade pumps and controls 1% 1% ingeration Upgrade compresons & pumps
Improve insulation 1.5% 1.5% stic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% rational awareness Improve insulation 1.5% 1.5% rational awareness Improve by training & record keeping <10%</th> <th>L RELATED La Returner la savings calculated or reported across vessels, with typical ranges of vessels, with typical ranges of reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels</th> <th>L RELATED L RELSION RELATED L RELSION RELATED L RElacement with new Correct design/installation including exhaust Replacement 5% 15% reported across vessels from 10 m to 40 m in length. 15% 15% 15% 15% 15% 15% 15% 15% 15% 15%</th> <th>L RELATED
L RELATED
L RELATED
Appendages
Reduce/smooth/align appendages
Reduce/smooth/align appendages
Reduce/smooth/ali</th> <th>L RELATED
L RELATED
sous bow Retro-fit installation 5% 15% fuel savings calculated
appendages Reduce/smooth/align appendages 2% 5% reported across vessels fr
10 m to 40 m in length.
10 m to 4</th> <th>L RELATED tree designs of the set of the set</th> | Low High
puel efficiency in existing
vessels, with typical ranges of
fuel savings calculated or
reported across vessels from
10 m to 40 m in length. Lex LATED 5% 20-30% PULSION RELATED 5% 20-30% rele speed Reduction 5% 20-30% rine Replacement with new 7% 20% rine Correct design/installation including exhaust 4% rbox & propeller Replacement 5% 15% rbox & propeller Replacement 5% 15% ineter Install 0% 15 - 20% igeration Upgrade pumps and controls 5% 15% ratilics Upgrade compressors & pumps
improve insulation 1.5% ting/cooling, electrical & lighting Utilise waste heat. Improve insulation 1.5% stick loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% rational awareness Improve insulation 10% 10% 10% rational awareness Upgrade controls, switch off all above 0.5% 1.5% rational awareness Improve insulation 10% 10% | L RELATED L RELSION RELATED L I Stall ation Replacement with new Replacement with new Replacement Stall 0% 15% 15% 15% 15% 15% 10 m to 40 m in length. 10 m to 40 m in len | L RELATED L RELSION RELATED L Relacement with new Replacement with new Replacement with new Replacement with new Replacement S% 15% I 5% I
 | L RELATED L RELSION RELATED L RELSION RELATED L RELSION RELATED L Relacement with new T% 20% Ine Correct design/installation including exhaust 4% L Correction Correct design/installation S% 15% L S% L S | Low High
puel efficiency in existing
vessels, with typical ranges of
vessels, with typical ranges of
fuel savings calculated or
reported across vessels from
10 m to 40 m in length. velsolw RELATED 5% 20-30% velsolw RELATED 5% 20-30% ine Replacement with new 7% 20% ine Correct design/installation including exhaust 4% rbox & propeller Replacement 5% 15% ine Correct design/installation 1% 15 - 20% is weight Correction 0% 15 - 20% igeration Upgrade pumps and controls 1% 1% ingeration Upgrade compresons & pumps
Improve insulation 1.5% 1.5% stic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% rational awareness Improve insulation 1.5% 1.5% rational awareness Improve by training & record keeping <10% | L RELATED La Returner la savings calculated or reported across vessels, with typical ranges of vessels, with typical ranges of reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels from 10 m to 40 m in length. The savings calculated or reported across vessels | L RELATED L RELSION RELATED L RELSION RELATED L RElacement with new Correct design/installation including exhaust Replacement 5% 15% reported across vessels from 10 m to 40 m in length. 15% 15% 15% 15% 15% 15% 15% 15% 15% 15% | L RELATED
L RELATED
L RELATED
Appendages
Reduce/smooth/align appendages
Reduce/smooth/align appendages
Reduce/smooth/ali | L RELATED
L RELATED
sous bow Retro-fit installation 5% 15% fuel savings calculated
appendages Reduce/smooth/align appendages 2% 5% reported across vessels fr
10 m to 40 m in length.
10 m to 4 | L RELATED tree designs of the set |

--
--

--	--	---	--
--
--
---|--|--
--	--	---	--
L REJATED vessels, with typical range poous bow Retro-fit installation 5% 15% fuel savings calculated fuel speed Reduction 5% 20-30% fuel correct design/installation including exhaust 4% for A propeller Replacement 5% 15% poller nozzle/duct Install Repercords <i>LPROPULSION RELATED</i> raulics Upgrade compresons & pumps improve insulation fungrove insulation fungrove insulation fungrove insulation fungrove by training & record keeping <10%	LREATED vessels, with typical ranges o books bow Retro-fit installation 5% 15% fuel savings calculated on reported across vessels from 10 m to 40 m in length. sel speed Reduce/mooth/align appendages 2% 5% 15% fuel savings calculated on reported across vessels from 10 m to 40 m in length. sel speed Reduction 5% 20-30% 10 m to 40 m in length. ine Correct design/installation including exhaut 4% 5% 15% ine correct design/installation including exhaut 4% 5% 15% 15% pale rozzle/duct Install 0% 15 – 20% 5% 15% neter Install & keep records FRAPULSION RELATED Fraulics Upgrade compressors & pumps improve insulation 10 m to 40 m in length. ting/cooling, electrical & lighting Upgrade controls, switch off all above 0.5% 1.5% 1.5% rational awareness Improve by training & record keeping <10% 1.5% 1.5% rational awareness Improve size & speed is appropriate 1.5% 1.5% 1.5% 1.5% Rational awareness Improve by training & record keeping <10% <th>L RELATED vessels, with typical ranges of fuel savings calculated or reported across vessels from 10 m to 40 m in length. 10 m to 40 m in leng</th> <th>L REJATED vessels, with typical ranges of fuel savings calculated or reported across vessels from 10 m to 40 m in length. 10 m to 40 m in length. 15 - 20% 15 - 20%</th> <th>L REJATED vessels, with typical ranges of fuel savings calculated or reported across vessels from 10 m to 40 m in length. 10 m to 40 m in length. 15 - 20% 15 -</th> <th>L REJATED vessels, with typical ranges of fuel savings calculated or fuel savings ca</th> <th>L REJATED vessels, with typical ranges of fuel savings calculated or fuel savings ca</th> <th>L REJATED vessels, with typical ranges of fuel savings calculated or reported across vessels from 10 m to 40 m in length. 10 m to 40 m in leng</th> <th>L REJATED vessels, with typical ranges of fuel savings calculated or fuel savings calculated or relored across vessels from 10 m to 40 m in length. 10 m to 40 m in le</th> <th>L REJATED vessels, with typical ranges of fuel savings calculated or reported across vessels from 10 m to 40 m in length. 10 m to 40 m in length. 15 - 20% 15 - 20%</th> <th>L RELATED vessels, with typical ranges of fuel savings calculated or relorated across vessels from 10 m to 40 m in length. 10 m to 40 m in len</th> <th>L REJATED vessels, with typical ranges of fuel savings calculated or fuel savings ca</th> <th>L RELATED vessels, with typical ranges of fuel savings calculated or reported across vessels from 10 m to 40 m in length. Jappendages Reduce/smooth/align appendages 2% 5% reported across vessels from 10 m to 40 m in length. sels peed Reduction 5% 15% 10 m to 40 m in length. ine Correct design/installation including exhaust 4% 4% ine Correct design/installation including exhaust 4% rbox & propeller Replacement 5% 15% neter Install & keep records 6% 5% LPROPULSION RELATED Improve insulation 10% 15 – 20% Ingered insulation Upgrade compressors of pumps ind controls 5% 1.5% Lingrove insulation Upgrade compressors of pumps indicord keeping -10% rational awareness Improve by training & record keeping -10% ITEM ACTION </th> <th>L REJATED vessels, with typical ranges of fuel savings calculated or reported across vessels from 10 m to 40 m in length. 10 m to 40 m in leng</th> <th>L REJATED vessels, with typical ranges of fuel savings calculated or reported across vessels from 10 m to 40 m in length. 10 m to 40 m in length. 15% 15% 15% 15% 15% 15% 15% 15%</th> <th>L REJATED vessels, with typical ranges of fuel savings calculated or relappendages Reduce/smooth/align appendages 2% 5% reported across vessels from 10 m to 40 m in length. 10 m to 40 m in length. 15% 15% 15% 15% 15% 15% 15% 15% 15% 15%</th> <th>L REJATED vessels, with typical ranges of fuel savings calculated or reported across vessels from 10 m to 40 m in length. 10 m to 40 m in length. 15% 15% 15% 15% 15% 15% 15% 15%</th> <th>L RELATED vessels, with typical ranges of fuel savings calculated or reported across vessels from 10 m to 40 m in length. 10 m to 40 m in leng</th> <th>L REJATED vessels, with typical ranges of fuel savings calculated or fuel savings ca</th> <th>L REJATED vessels, with typical ranges i fuel savings calculated (lappendages Reduce/smooth/align appendages 2% 5% reported across vessels fror 10 m to 40 m in length. ael speed Reduction 5% 20-30% ine Replacement with new 7% 20% ine Correct design/installation including exhaust 4% thox & propeller Replacement 5% 15% abeller nozzle/duct Install 0% 15 - 20% of a weight Correction 0% 5% immeter Install & keep records <i>LPROPULSION RELATED</i> raulics Upgrade compressors & pumps improve insulation ting/cooling, electrical & lighting Utilise wase heat. Improve insulation sitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% rational awareness Improve by training & record keeping <10% training & record keeping <10% tr</th> <th>L REATED vessels, with typical ranges poous bow Retro-fit installation 5% 15% fuel savings calculated papendages Reduce/smooth/align appendages 2% 5% fuel savings calculated reported across vessels fn 10 m to 40 m in length. 10 m to 40 m in length. 10 m to 40 m in length. ine Replacement with new 7% 20% 15% ine Correct design/installation including exhaust 4% 4% thox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 - 20% meter Install & keep records 10 m to 40 m in length. <i>tPROPULSION RELATED</i> Vegrade compressors & pumps 10 m for our sublation tingrove insulation Uggrade compressors & pumps 10 mprove insulation tingrove by training & record keeping <10% Vegrade compressors & pumps ingrave mass Upgrade controls, switch off all above 0.5% 1.5% rational awareness Improve by training & record keeping <10%</th> <th>LREATED vessels, with typical range: Jous bow Retro-fit installation 5% 15% fuel savings calculated Jappendages Reduce/smooth/align appendages 2% 5% reported across vessels fr JUSION RELATED 0m to 40 m in length. 10m to 40 m in length. 10m to 40 m in length. sile speed Reduction 5% 20-30% ine Replacement with new 7% 20% ine Correct design/installation including exhaust 4% tbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% meter Install & keep records FROPULSION RELATED Foregrade pumps and controls rigeration Uggrade compressors & pumps Improve insulation 15% 15% rigeration Uggrade controls, switch off all above 0.5% 1.5% rigerational awareness Improve by training & record keeping <10%</th>	L RELATED vessels, with typical ranges of fuel savings calculated or reported across vessels from 10 m to 40 m in length. 10 m to 40 m in leng	L REJATED vessels, with typical ranges of fuel savings calculated or reported across vessels from 10 m to 40 m in length. 10 m to 40 m in length. 15 - 20% 15 - 20%
bous bow Retro-fit installation 5% 15% fuel savings calculated Il appendages Reduce/smooth/align appendages 2% 5% reported across vessels D/USION RELATED 10 10 to 40 m in length. sipne Replacement with new 7% 20% gine Correct design/installation including exhaust 4% arbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 - 20% in a weight Correction 0% 5% fineter Install & keep records <i>N-PROPULSION RELATED</i> fraulics Upgrade compressors & pumps Improve insulation astic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% relational awareness Improve by training & record keeping <10%	Data Bow Retrofit installation 5% 15% fuel savings calculated o Il appendages Reduce/smooth/align appendages 2% 5% reported across vessels from 10 m to 40 m in length. sel speed Reduction 5% 20-30% 10 m to 40 m in length. gine Replacement with new 7% 20% 10 m to 40 m in length. gine Correct design/installation including exhaust 4% 4% arbox & propeller Replacement 5% 15% arbox & propeller Replacement 5% 15% arbox & propeller Install 0% 15 – 20% Meter Install & keep records 5% 15% Meter Install & keep records 5% 1.5% Meter Install & keep records 1.5% 1.5% Artinos Upgrade controls pumps improve insulation 1.5% aitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% Engine election Advanced design, correct power selection 1.5% 1.5% 1.5% Engine election Advanced design, correct power s		

 | bous bow Retrofit installation 5% 15% fuel savings calculated or reported across vessels from 10 m to 40 m in length. If the service of the s | bous bow Retrofit installation 5% 15% fuel savings calculated or reported across vessels from 10 m to 40 m in length. I more than 10 m to 40 m in length. I on the interval of the int | bous bow Retrofit installation 5% 15% fuel savings calculated or reported across vessels from 10 m to 40 m in length. I more across vessels from 10 m to 40 m in length. I on the interval of | bous bow Retro-fit installation 5% 15% fuel savings calculated or reported across vessels from 10 m to 40 m in length. 20 m to 40 m to 40 m in length. 20 m to 40 m to 40 m in length. 20 m to 40 m to 40 m in length. 20 m to 40 m to 40 m in length. 20 m to 40 m to | bous bow Retrofit installation 5% 15% fuel savings calculated or reported across vessels from 10 m to 40 m in length. 10 m to 40 m to | Doors bow Refore fit installation 5% 15% fuel savings calculated or reported across vessels from 10 m to 40 m in length. I appendages Reduction 5% 20-30% PULSION RELATED 10 m to 40 m in length. ine Replacement with new 7% 20% ine Correct design/installation including exhaust 4% rbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% in a weight Correct design/installation 0% 5% ineter Install 0% 15 – 20% rayer on insulation 0% 5% 15% ingeration Upgrade pumps and controls 10m to 40 m in length. rigeration Upgrade compressors & pumps 15% ing/cooling, electrical & lighting Utilise waste heat. Improve insulation 15% indic loads such as pumps & motors Upgrade cords, switch off all above 0.5% 1.5% rational awareness Improve by training & record keeping <10% | Dotus bow Refore fit installation 5% 15% fuel savings calculated or reported across vessels from 10 m to 40 m in length. I lappendages Reduction 5% 20-30% 10 m to 40 m in length. gine Reduction 5% 20-30% 10 m to 40 m in length. gine Correct design/installation including exhaust 4% 4% wrbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% if meter Install & keep records V-PROPUSION RELATED Hraulics Upgrade pumps and controls 1mprove insulation rigeration Upgrade compressors & pumps 15% indic loads such as pumps & motors Upgrade contols, switch off all above 0.5% strational awareness Improve by training & record keeping <10% | bous bow Retrofit installation 5% 15% fuel savings calculated or reported across vessels from 10 m to 40 m in length. I more across vessels from 10 m to 40 m in length. I on the 40 | Dotus bow Refore fit installation 5% 15% fuel savings calculated or reported across vessels from 10 m to 40 m in length. I lappendages Reduction 5% 20-30% 10 m to 40 m in length. gine Reduction 5% 20-30% 10 m to 40 m in length. gine Correct design/installation including exhaust 4% 4% whox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% if meter Install & keep records VerROVLSION RELATED VerROVLSION RELATED Haulics Upgrade compressors & pumps
improve insulation 10 m to 40 m in length. 10 m to 40 m in length. asitic loads such as pumps & motors Upgrade compressors & pumps improve insulation 10 m to 40 m in length. 10 m to 40 m in length. Introf/colong.electrical & lighting Utilise wate heat. Improve insulation 10 m to 40 m in length. 10 m to 40 m in length. Introf/colong.electrical & lighting Upgrade controls, switch off all above 0.5% 1.5% rational awareness Improve by training & record keeping <10% | bous bow Retrofit installation 5% 15% fuel savings calculated or reported across vessels from 10 m to 40 m in length. 10 m to 40 m to
 | Dotus bow Retorefit installation 5% 15% fuel savings calculated or reported across vessels from 10 m to 40 m in length. I appendages Reduce/smooth/align appendages 2% 5% reported across vessels from 10 m to 40 m in length. sig speed Reduction 5% 20-30% nine Replacement with new 7% 20% nine Correct design/installation including exhaust 4% wtbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% i meter Install & keep records 5% 5% V-PROPULSION RELATED Improve insulation 10grade ompresors & pumps Improve insulation 15% tringscooling, electrical & lighting Utilise waste heat. Improve insulation 0.5% 1.5% astic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% rational awareness Improve by training & record keeping <10% | Dous bow Retro-fit installation 5% 15% fuel savings calculated or reported across vessels from 10 m to 40 m in length. Il appendages Reduction 5% 20-30% pine Reduction 5% 20-30% gine Correct design/installation including exhaust 4% arbox & propeller Replacement with new 7% 20% gine Correct design/installation including exhaust 4% arbox & propeller Replacement 5% 15% ne weight Correction 0% 15 – 20% an aweight Correction 0% 5% 15% and meter Install & keep records N-RAPOULSION RELATED Vagrade pumps and controls Vagrade compressors & pumps improve insulation 10m to 40 m in length. ating/cooling, electrical & lighting Utilise waste heat. Improve insulation 1.5% 1.5% 1.5% erational awareness Improve by training & record keeping <10% | Dous bow Retorefit installation 5% 15% fuel savings calculated or reported across vessels from 10 m to 40 m in length. Il appendages Reduce/smooth/align appendages 2% 5% reported across vessels from 10 m to 40 m in length. sig speed Reduction 5% 20-30% gine Replacement with new 7% 20% gine Correct design/installation including exhaust 4%
 atbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% in meter Install & keep records Improve insulation 15% NPROPULSION RELATED Upgrade opmps and controls Upgrade compressors & pumps Improve insulation 15% atting/cooling, electrical & lighting Utilise waste heat. Improve insulation 0.5% 1.5% atting/cooling, electrical & lighting Utilise waste heat. Improve insulation 0.5% 1.5% reational awareness Improve by training & record keeping <10% | Dous bow Retro-fit installation 5% 15% fuel savings calculated or
reported across vessels from
10 m to 40 m in length. Bypendages Reduction 5% 20-30% gine Reduction 5% 20-30% gine Correct design/installation including exhaust 4% arbox & propeller Replacement 5% 15% n & weight Correct design/installation 0% 15 – 20% n & weight Correct install & keep records N-RAPOULSION RELATED Arbanced design correct power insulation 0% 5% 15% frigeration Upgrade controls
Improve insulation 0.5% 1.5% trigeration Upgrade controls, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping <10% | bous bow Retrofit installation 5% 15% fuel savings calculated or
Il appendages Reduce/smooth/align appendages 2% 5% reported across vessels from
DPULSION RELATED 10 to 40 m in length.
Id m to 40 m in length.
Is speed Replacement with new 7% 20%
gine Correct design/installation including exhaust 4%
arbox & propeller Replacement 5% 15%
Install & Replacement 5% 15%
Install & Repercords
N-PROPULSION RELATED
traulics Upgrade compressors & pumps
Improve insulation
Upgrade compressors & pumps
Improve insulation
ating/cooling, electrical & lighting
utilise wate heat. Improve insulation
Upgrade controls, switch off all above 0.5% 1.5%
Improve by training & record keeping <10% | bous bow Retro-fit installation 5% 15% fuel savings calculated or reported across vessels from 10 m to 40 m in length. 10 m to 40 m to | Dous bow Retro-fit installation 5% 15% fuel savings calculated or reported across vessels from 10 m to 40 m in length. PULSION RELATED 10 m to 40 m in length. 10 m to 40 m in length. 10 m to 40 m in length. signe Reduction 5% 20-30% gine Correct design/installation including exhaust 4% arbox & propeller Replacement with new 7% 20% gine Correct design/installation including exhaust 4% arbox & propeller Replacement 5% 15% eller nozzle/duct Install 0% 15 – 20% n & weight Correction 0% 5% d meter Install & keep records N-ROPULSION RELATED draulics Upgrade compressors & pumps Improve insulation 15% atting/cooling, electrical & lighting Utilise wate heat. Improve insulation 1.5% atting/cooling, electrical & lighting Upgrade controls, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping <10% | bous bow Retrofit installation 5% 15% fuel savings calculated of
Il appendages Reduce/smooth/align appendages 2% 5% reported across vessels fro
DOPULSION RELATED 10 m to 40 m in length.
Sine Replacement with new 7% 20%
gine Correct design/installation including exhaust 4%
arbox & propeller Replacement 5% 15%
peller nozle/duct Install 0% 15 - 20%
n & weight Correction 0% 5%
Inneter Install & keep records
N-PROPULSION RELATED
traulics Upgrade ompressors & pumps
Improve insulation
ungrade compressors & pumps
improve insulation
ating/cooling, electrical & lighting
astic loads such as pumps & motors
Improve by training & record keeping <10%
 | bous bow Retro-fit installation 5% 15% fuel savings calculated Il appendages Reduce/smooth/align appendages 2% 5% reported across vessels fn DPULSION RELATED 10 m to 40 m in length. 10 m to 40 m in length. 10 m to 40 m in length. gine Replacement with new 7% 20% 15% 15% gine Correct design/installation including exhaust 4% 4% 4% arbox & propeller Replacement 5% 15% 15% peller nozzle/duct Install & keep records 5% 15% 15% h meter Install & keep records N N Approach compressors & pumps Improve insulation trailics Upgrade pumps and controls Improve insulation Upgrade compressors & pumps Improve insulation 1.5% ating/cooling, electrical & lighting Utilise waste heat. Improve insulation 0.5% 1.5% 1.5% erational awareness Improve by training & record keeping <10% | bous bow Reto-fit Installation 5% 15% fuel savings calculated reported across vessels fr 10 m to 40 m in length. Bipendages Reduction 5% 20-30% gine Replacement with new 7% 20% gine Correct design/installation including exhaust 4% arbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% If meter Install & keep records 5% 15% <i>NPROFULSION RELATED</i> Upgrade pumps and controls 5% 15% rigeration Upgrade controls switch off all above 0.5% 1.5% ating/cooling, electrical & lighting Utilise waste heat. Improve insulation atting/cooling, alectrical & lighting Upgrade controls, switch off all above 0.5% ating/cooling alwareness Improve by training & record keeping <10% |
| III appendages Reduce/smooth/align appendages 2% 5% reported across vessels 10 m to 40 m in length.
0PULSION RELATED 10 m to 40 m in length.
sel speed Reduction 5% 20-30%
gine Replacement with new 7% 20%
gine Correct design/installation including exhaust 4%
arbox & propeller Replacement 5% 15%
peller nozle/duct Install 0% 15 – 20%
m & weight Correction 0% 5%
el meter Install & keep records NN-ROPULSION RELATED
draulics Upgrade pumps and controls
Improve insulation
atting/cooling, electrical & lighting Utgrade compressors & pumps
improve insulation
atting/cooling, electrical & lighting Utgrade compressors & pumps
improve by training & record keeping <10%
TRM ACTION
TRUST COMPONENTS
Engine selection Advanced design, correct power selection
Engine installation Correct intake and exhaust design. Include fuel meter
Engine selection Advanced design, correct power selection
Engine installation Correct intake and exhaust design. Include fuel meter
Engine installation Correct intake and exhaust design. Include fuel meter
Engine installation Correct intake and exhaust design. Include fuel meter
Engine installation Correct intake and exhaust design. Include fuel meter
Engine installation Correct intake and exhaust design. Include fuel meter
Engine installation Correct intake and exhaust design. Include fuel meter
Engine installation Correct intake and exhaust design. Include fuel meter
Engine installation Correct intake and exhaust design. Include fuel meter
Engine installation Correct intake and exhaust design. Include fuel meter
Engine installation Correct intake and exhaust design. Include fuel meter
Engine installation Correct intake and exhaust design. Include fuel meter
Engine installation Correct intake and exhaust design. Include fuel meter
Engine installation
Engine installation
Engine installation
Engine installation
Engine installation
Engine installation
Engine installation
Engine installation
Engine installation
Engine installat | II appendages Reduce/smooth/align appendages 2% 5% reported across vessels from 10 m to 40 m in length. 10 m to 40 m to 40 m in length. 10 m to 40 m to 40 m in length. 10 m to 40 m t

 | Il appendages Reduce/smooth/align appendages 2% 5% reported across vessels from 10 m to 40 m in length.
10 m to 40 m in length.
11 m to 40 m in length.
15 - 20%
15 - 20%
15 - 20%
15 - 20%
15 - 20%
16 m ter Install & keep records
17 m ter Install & keep records
18 meter Install & keep records
19 meter Install & keep records
10 m to 40 m in length.
10 m to 40 m to 40 m in length.
10 m to 40 m to 40 m in length.
10 m to 40 m | Il appendages Reduce/smooth/align appendages 2% 5% reported across vessels from DPULSION RELATED 10 m to 40 m in length.
Seel speed Reduction 5% 20-30% gine Replacement with new 7% 20% gine Correct design/installation including exhaust 4% arbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% m & weight Correction 0% 5% interter Install & keep records <i>N-PROPULSION RELATED</i> fraulics Upgrade compressors & pumps Improve insulation utiling/cooling, electrical & lighting Utilise wate heat. Improve insulation astic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% reational awareness Improve by training & record keeping <10% | Il appendages Reduce/smooth/align appendages 2% 5% reported across vessels from DPULSION RELATED 10 m to 40 m in length.
DPULSION RELATED 10 m to 40 m in length.
Seelspeed Reduction 5% 20-30%
gine Correct design/installation including exhaust 4%
arbox & propeller Replacement 5% 15%
peller nozzle/duct Install 0% 15 – 20%
m & weight Correction 0% 5%
if meter Install & keep records
<i>NRAPQULSION RELATED</i>
fraulics Upgrade compressors & pumps
Improve insulation
atting/cooling, electrical & lighting Utilise wate heat. Improve insulation
astic loads such as pumps & motors Upgrade controls (so 1.5% 1.5% 1.5% 1.5% 1.5% 1.5% 1.5% 1.5% | Il appendages Reduce/smooth/align appendages 2% 5% reported across vessels from 10 m to 40 m in length. 10 m to 40 m in length. sel speed Reduction 5% 20-30% jine Replacement with new 7% 20% grine Correct design/installation including exhaust 4% arbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% n & weight Correction 0% 5% 4 meter Install & keep records + <i>NROPULSION RELATED</i> and the set of | Jappendages Reduce/smooth/align appendages 2% 5% reported across vessels from 10 m to 40 m in length. selspeed Reduction 5% 20-30% gine Replacement with new 7% 20% gine Correct design/installation including exhaust 4% wrbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% n & weight Correct design/installation 0% 5% rigeration Upgrade pumps and controls VerROVLISION RELATED VerROVLISION RELATED Hraulics Upgrade compressors & pumps improve insulation 15% 15% sticl loads such as pumps & motors Upgrade contols, switch off all above 0.5% 1.5% rational awareness Improve by training & record keeping <10% | appendages Reduce/smooth/align appendages 2% 5% reported across vessels from 10 m to 40 m in length. PULSION RELATED 10 m to 40 m in length. 10 m to 40 m in length. sel speed Reduction 5% 20-30% ine Replacement with new 7% 20% ine Correct design/installation including exhaust 4% rbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% Imeter Install & keep records 4 <i>PROPULSION RELATED</i> Improve insulation 5% 15% rigeration Upgrade pumps and controls 1 5% 1.5% rigeration Upgrade controls, switch off all above 0.5% 1.5% rational awareness Improve by training & record keeping <10%
 | I appendages Reduce/smooth/align appendages 2% 5% reported across vessels from 10 m to 40 m in length. sel speed Reduction 5% 20-30% gine Replacement with new 7% 20% gine Correct design/installation including exhaust 4% wrbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% n & weight Correction 0% 5% I meter Install keep records VerRoPULSION RELATED Araulics Upgrade pumps and controls Improve insulation strigeration Upgrade controls, switch off all above 0.5% 1.5% strikic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% strational awareness Improve by training & record keeping <10% | Il appendages Reduce/smooth/align appendages 2% 5% reported across vessels from
DPU/SION RELATED 10 m to 40 m in length.
Sel speed Reduction 5% 20-30%
gine Correct design/installation including exhaust 4%
arbox & propeller Replacement 5% 15%
peller nozzle/duct Install 0% 15 – 20%
a weight Correction 0% 5%
a meter Install & keep records
<i>V+ROPU/SION RELATED</i>
fraulics Upgrade pumps and controls
rigeration Upgrade compressors & pumps
Improve insulation
ting/cooling, electrical & lighting
utilise wate heat. Improve insulation
asitic loads such as pumps & motors
Improve by training & record keeping <10% | I appendages Reduce/smooth/align appendages 2% 5% reported across vessels from 10 m to 40 m in length. sel speed Reduction 5% 20-30% gine Replacement with new 7% 20% gine Correct design/installation including exhaust 4% urbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% n & weight Correction 0% 5% H meter Install & keep records VerRePULSION RELATED Hraulitis Upgrade pumps and controls Improve insulation sting/cooling, electrical & lighting ating/cooling, electrical & lighting ating/cooling, witch off all above 0.5% 1.5% stink (bads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% rational awarenees Improve by training & record keeping <10% | l appendages Reduce/smooth/align appendages 2% 5% reported across vessels from 10 m to 40 m in length.
sel speed Reduction 5% 20-30%
ine Replacement with new 7% 20%
ine Correct design/installation including exhaust 4%
rrbox & propeller Replacement 5% 15%
peller nozzle/duct Install 0% 15 – 20%
in & weight Correction 0% 5%
I meter Install & keep records
<i>V+ROPUSION RELATED</i>
Iraulics Upgrade pumps and controls
rigeration Upgrade compressors & pumps
improve insulation
stific loads such as pumps & motors
stific loads such as pumps & motors
rrational awareness Improve by training & record keeping <10%

 | I appendages Reduce/smooth/align appendages 2% 5% reported across vessels from 10 m to 40 m in length. sel speed Reduction 5% 20-30% gine Replacement with new 7% 20% nine Correct design/installation including exhaut 4% urbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% a weight Correction 0% 5% I meter Install & keep records NPROPULSION RELATED If mailics Upgrade pumps and controls Improve insulation stitic loads such as pumps & motors Upgrade compresors & pumps 1.5% indigooiling, electrical & lighting Utiles waste heat. Improve insulation 1.5% stratic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% Improve by training & record keeping <10% | Il appendages Reduce/smooth/align appendages 2% 5% reported across vessels from 10 m to 40 m in length. 10 m to 40 m in length. Sel speed Reduction 5% 20-30% pine Correct design/installation including exhaust 4% pine Correct design/installation including exhaust 4% arbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% m emeter Install & keep records <i>N-ROPUISION RELATED</i> arbox <i>NROPUISION RELATED</i> Upgrade pumps and controls Upgrade compressors & pumps Improve insulation asticl loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% regarded controls upgrade controls, switch off all above 0.5% 1.5% to 40% enter arbox above the substitution asticl loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% to 40% enter arbox above the substitution asticl loads such as pumps & motors Upgrade controls were insulation asticl loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% to 40% enter arbox above training & record keeping <10% to 40% the substitution arbox are above training & record keeping <10% to 40% to 40% enter arbox are above training & record keeping <10% to 40% to 40% to 40% enter arbox are above to 40% to 40% enter arbox are above to 40% enter arbox are above training & record keeping <10% to 40% enter arbox are above to 40% enter arbox are and exhaut detain. Include fuel meter arbox are and exhaut detain | Il appendages Reduce/smooth/align appendages 2% 5% reported across vessels from 10 m to 40 m in length. 10 m to 40 m t | III appendages Reduce/smooth/align appendages 2% 5% reported across vessels from 10 m to 40 m in length. DPULSION RELATED 10 m to 40 m in length. 10 m to 40 m in length. sels speed Reduction 5% 20-30% gine Replacement with new 7% 20% gine Correct design/installation including exhaust 4% arbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% m & weight Correction 0% 5% el meter Install & keep records N-ROPULSION RELATED draulics Upgrade pumps and controls Improve insulation ating/cooling, electrical & lighting Upgrade compressors & pumps 1.5% erational awarenees Improve by training & record keeping <10% | III appendages Reduce/smooth/align appendages 2% 5% reported across vessels from
DOPULSION RELATED 10 m to 40 m in length.
Sels speed Reduction 5% 20-30%
gine Replacement with new 7% 20%
gine Correct design/installation including exhaust 4%
arbox & propeller Replacement 5% 15%
opeller nozzle/duct Install 0% 15 – 20%
m & weight Correction 0% 5%
el meter Install & keep records W-RAPQUISION RELATED
draulics Upgrade compressors & pumps
Improve insulation
trigeration Upgrade compressors & pumps
Improve insulation
atting/cooling, electrical & lighting Utilise wate heat. Improve insulation
trastic loads such as pumps & motors Upgrade controls Upgrade controls,
werational awareness Improve by training & record keeping <10%
 | III appendages Reduce/smooth/align appendages 2% 5% reported across vessels from 10 m to 40 m in length. DPULSION RELATED 10 m to 40 m in length. 10 m to 40 m in length. sisel speed Reduction 5% 20-30% gine Replacement with new 7% 20% gine Correct design/installation including exhaust 4% arbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% m & weight Correction 0% 5% ell meter Install & keep records NPROPULSION RELATED frigeration Upgrade pumps and controls Upgrade compressors & pumps Improve insulation ating/cooling, electrical & lighting Utiles waste heat. Improve insulation 3.5% 1.5% reactional awareness Improve by training & record keeping <10% | III appendages Reduce/smooth/align appendages 2% 5% reported across vessels from DPULSION RELATED 10 m to 40 m in length. 11 m to 40 m to 40 m in length. 11 m to 40 m | III appendages Reduce/smooth/align appendages 2% 5% reported across vessels fro
DOPULSION RELATED 10 m to 40 m in length.
10 m to 40 m in length.
10 m to 40 m in length.
10 m to 40 m in length.
20-30%
gine Replacement with new 7% 20%
gine Correct design/installation including exhaust 4%
arbox & propeller Replacement 5% 15%
poeller nozzle/duct Install & Rep records 0% 5%
el meter Install & keep records
<i>NNPROPULSION RELATED</i>
draulics Upgrade compressors & pumps
Improve insulation
trigeration Upgrade compressors & pumps
Improve insulation
trastic loads such as pumps & motors
Improve by training & record keeping <10% | lil appendages Reduceśmooth/align appendages 2% 5% reported across vessels fr
OPULSION RELATED 10 m to 40 m in length.
sel speed Reduction 5% 20-30%
gine Replacement with new 7% 20%
gine Correct design/installation including exhaust 4%
arbox & propeller Replacement 5% 15%
opeller nozzle/duct Install 0% 15 – 20%
m & weight Correction 0% 5%
el meter Install & keep records
<i>N-RROPULSION RELATED</i>
draulics Upgrade compressors & pumps
Improve insulation
ating/cooling, electrical & lighting Utilize wase heat. Improve insulation
ating/cooling, electrical & lighting Utilize wase heat. Improve insulation
ating/cooling, electrical & lighting Utilize wase heat. Improve insulation
ating/approxe by training & record keeping <10% | III appendages Reduce/smooth/align appendages 2% 5% reported across vessels fr
10 m to 40 m in length.
10 m to 40 m in length.
11 m to 40 m in length.
12 m to 40 m in length.
13 m to 40 m in length.
14 m to 40 m in length.
15% 20-30%
15%
15%
15%
15%
15%
15%
15%
15%
15%
15
 |
| ssel speed Reduction 5% 20-30% gine Replacement with new 7% 20% gine Correct design/installation including exhaust 4% arbox & propeller Replacement 5% 15% oppeller nozzle/duct Install 0% 15 - 20% el meter Install & keep records W-PROPULSION RELATED draulics Upgrade opmps and controls W-PROPULSION RELATED draulics Upgrade compressors & pumps Improve insulation turgrove insulation turgrove insulation turgrove insulation turgrove insulation turgrove by training & record keeping <10% | ssel speed Reduction 5% 20-30% gine Replacement with new 7% 20% gine Correct design/installation including exhaust 4% arbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 - 20% el meter Install & keep records NPROPULSION RELATED draulics Upgrade pumps and controls Upgrade compressors & pumps improve insulation Upgrade compressors & pumps improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation Upgrade compressors & pumps improve insulation Correct intake and exhaut design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Propeller nozzle/duct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimension Increased length. Hull to suit speed, capacity, displacement & operation Tim & weight Correct balance to match hull design Tim & weight Correct shape especially bow & stem areas

 | ssel speed Reduction 5% 20-30% gine Replacement with new 7% 20% gine Correct design/installation including exhaust 4% arbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% m & weight Correction 0% 15 – 20% m a weight Correction 0% 5% el meter Install & keep records NPROPULSION RELATED Vultise waste heat. Improve insulation draulics Upgrade compressors & pumps
Improve insulation Upgrade controls, switch off all above 0.5% 1.5% atting/cooling, electrical & lighting Utilise waste heat. Improve insulation 1.5% 1.5% erational awareness Improve by training & record keeping <10% | ssel speed Reduction 5% 20-30% gine Replacement with new 7% 20% gine Correct design/installation including exhaust 4% arbox & propeller Replacement 5% 15% uppeller nozzle/duct Install 0% 15 - 20% at meter Install & keep records NPROPULSION RELATED traulics Upgrade pumps and controls trigeration Upgrade compressors & pumps improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation astic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping <10% | ssel speed Reduction 5% 20-30% gine Replacement with new 7% 20% gine Correct design/installation including exhaust 4% arbox & propeller Replacement 5% 15% uppeller nozzle/duct Install 0% 15 - 20% arb & weight Correction 0% 5% arb meter Install & keep records <i>NPROPULSION RELATED</i> Traulics Upgrade pumps and controls Upgrade compressors & pumps improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation astic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping <10% | sel speed Reduction 5% 20-30%
jine Replacement with new 7% 20%
jine Correct design/installation including exhaust 4%
arbox & propeller Replacement 5% 15%
peller nozzle/duct Install 0% 15 - 20%
it meter Install & keep records
WPROPULSION RELATED
Itaulics Upgrade compressors & pumps
improve insulation
uting/cooling, electrical & lighting
utilise waste heat. Improve insulation
asitic loads such as pumps & motors
rational awareness Improve by training & record keeping <10%
TIEM ACTION
 | sel speed Reduction 5% 20-30%
jine Replacement with new 7% 20%
inc Correct design/installation including exhaust 4%
urbox & propeller Replacement 5% 15%
peller nozzle/duct Install 0% 15 - 20%
if weter Install & keep records
W-PROPULSION RELATED
traulics Upgrade compressors & pumps
improve insulation
uting/cooling, electrical & lighting
utilise wase heat. Improve insulation
utilise wase heat. Improve insulation
uting/cooling, electrical & lighting
utilise wase heat. Improve insulation
utilise wase heat. Improve insulation
utilise wase heat. Improve by training & record keeping
<10%
Improve by training & record keeping
<10% | sel speed Reduction 5% 20-30% ine Replacement with new 7% 20% ine Correct design/installation including exhaust 4% rbox & propeller Replacement 5% 15% paleer nozzle/duct Install 0% 15 – 20% neter Install & keep records 15 – 20% raulics Upgrade compressors & pumps 15 – 20% raulics Upgrade compressors & pumps 15 – 20% raulics Upgrade compressors & pumps 15 – 20% ration Upgrade controls subtion 15 – 20% rational awareness Upgrade controls switch off all above 0.5% 1.5% rational awareness Improve by training & record keeping <10% | sel speed Reduction 5% 20-30%
jine Replacement with new 7% 20%
inc Correct design/installation including exhaust 4%
urbox & propeller Replacement 5% 15%
peller nozzle/duct Install 0% 15 – 20%
is weight Correction 0% 5%
in meter Install & keep records
W-PROPULSION RELATED
traulics Upgrade compressors & pumps
Improve insulation
ting/cooling, electrical & lighting
utilise wate heat. Improve insulation
sistic loads such as pumps & motors
Improve by training & record keeping <10% | sel speed Reduction 5% 20-30% pine Replacement with new 7% 20% pine Correct design/installation including exhaust 4% parbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 - 20% if meter Install & keep records wPROPULSION RELATED traulics Upgrade pumps and controls wPROPULSION RELATED traulics Upgrade compressors & pumps improve insulation uting/cooling, electrical & lighting Utilise waste heat. Improve insulation astic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% rational awareness Improve by training & record keeping <10% | sel speed Reduction 5% 20-30% inte Replacement with new 7% 20% inte Correct design/installation including exhaust 4% urbox & propeller
Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% i meter Install & kep records W-PROPULSION RELATED traulics Upgrade compressors & pumps Improve insulation Upgrade compressors & pumps Improve insulation ting/cooling, electrical & lighting Ulisie wate heat. Improve insulation astic loads such as pumps & motors Upgrade compressors & pumps Improve by training & record keeping <10% | sel speed Reduction 5% 20-30% inte Replacement with new 7% 20% inte Correct design/installation including exhaust 4% urbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 - 20% i meter Install & keep records wPROPULSION RELATED Itaulics Upgrade compressors & pumps Improve insulation uting/cooling, electrical & lighting Utilise waste heat. Improve insulation uting/cooling, electrical & lighting Utilise waste heat. Improve insulation uting/cooling, electrical & lighting Utilise waste heat. Improve insulation uting/cooling, electrical & lighting Utilise waste heat. Improve insulation uting/cooling, electrical & lighting Utilise waste heat. Improve insulation uting/cooling, electrical & lighting Utilise waste heat. Improve insulation uting/cooling, electrical & lighting Utilise waste heat. Improve insulation uting/cooling, electrical & lighting Utilise waste heat. Improve insulation uting/cooling, electrical & lighting Utilise waste heat. Improve insulation uting/cooling, electrical & lighting Utilise waste heat. Improve insulation uting/cooling, electrical & lighting Utilise waste heat. Improve insulation uting/cooling, electrical & lighting Utilise waste heat. Improve insulation uting/cooling, electrical & lighting Utilise waste heat. Improve insulation uting/cooling, electrical & lighting Utilise waste heat. Improve insulation Uting/cooling, electrical & lighting Utilise waste heat. Improve insulation Uting/cooling, electrical & lighting Utilise waste heat. Improve insulation Uting/cooling, electrical & lighting Utilise waste heat. Improve insulation Uting/cooling, electrical & lighting Utilise waste heat. Improve insulation Uting/cooling, electrical & lighting Utilise waste heat. Improve insulation Utilise waste heat. Improve i
 | sel speed Reduction 5% 20-30%
ine Replacement with new 7% 20%
into Correct design/installation including exhaust 4%
urbox & propeller Replacement 5% 15%
peller nozzle/duct Install 0% 15 – 20%
in & weight Correction 0% 5%
if meter Install & keep records
W-ROPULSION RELATED
thraulics Upgrade pumps and controls
improve insulation
uting/cooling, electrical & lighting
Utilise waste heat. Improve insulation
stific loads such as pumps & motors
upgrade controls, switch off all above 0.5% 1.5%
erational awareness Improve by training & record keeping <10% | sel speed Reduction 5% 20-30% jine Replacement with new 7% 20% jine Correct design/installation including exhaust 4% arbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% a weight Correction 0% 5% H meter Install & keep records NPROPULSION RELATED Upgrade compressors & pumps Improve insulation
trailics Upgrade compressors & pumps Improve insulation astic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% rational awareness Improve by training & record keeping <10% | sel speed Reduction 5% 20-30% jine Replacement with new 7% 20% jine Correct design/installation including exhaust 4% arbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% mak weight Correction 0% 5% effer Install 0% 15 – 20% mak weight Correction 0% 5% effer Install & keep records Friggeration Upgrade compressors & pumps improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation 1.5% 1.5% atitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping <10% | Image: Sel Speed Reduction 5% 20-30% gine Replacement with new 7% 20% gine Correct design/installation including exhaust 4% arbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% et meter Install & keep records 0% 5% et meter Install & keep records Vpgrade compressors & pumps Vpgrade compressors & pumps draulics Upgrade compressors & pumps Upgrade compressors & pumps 1.5% ating/cooling, electrical & lighting Utilise wate heat. Improve insulation 0.5% 1.5% astic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% improve by training & record keeping <10% | ssel speed Reduction 5% 20-30% gine Replacement with new 7% 20% gine Correct design/installation including exhaust 4% arbox & propeller Replacement 5% 15% oppeller nozzle/duct Install 0% 15 - 20% el meter Install & keep records W-PROPULSION RELATED draulitis Upgrade pumps and controls W-PROPULSION RELATED draulitis Upgrade compressors & pumps Improve insulation ating/cooling. electrical & lighting Utilise waste heat. Improve insulation upgrade controls, switch off all above 0.5% 1.5% repretional awareness Improve by training & record keeping <10% | ssel speed Reduction 5% 20-30% gine Replacement with new 7% 20% gine Correct design/installation including exhaust 4% arbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% m & weight Correction 0% 15 – 20% ell meter Install & keep records NPROPULSION RELATED 5% ell meter Install & keep records NPROPULSION RELATED Upgrade compressors & pumps Improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation 1.5% Improve by training & record keeping <10%
 | ssel speed Reduction 5% 20-30% gine Replacement with new 7% 20% gine Correct design/installation including exhaust 4% arbox & propeller Replacement 5% 15% speller nozzle/duct Install 0% 15 - 20% el meter Install & keep records NN-PROPULSION RELATED draulics Upgrade compressors & pumps frigeration Upgrade compressors & pumps frigeration Upgrade compressors & pumps atting/cooling, electrical & lighting Utilise wate heat. Improve insulation atting/cooling, electrical & lighting Utilise wate heat. Improve insulation atting/cooling, electrical & lighting Utilise wate heat. Improve insulation atting/cooling, electrical & lighting Utilise wate heat. Improve insulation atting/cooling, electrical & lighting Utilise wate heat. Improve insulation atting/cooling, electrical & lighting Utilise wate heat. Improve insulation atting/cooling, electrical & lighting Utilise wate heat. Improve insulation atting/cooling, electrical & lighting Utilise wate heat. Improve insulation atting/cooling, electrical & lighting Utilise wate heat. Improve insulation atting/cooling, electrical & lighting Utilise wate heat. Improve insulation atting/cooling, electrical & lighting Utilise wate heat. Improve insulation atting/cooling, electrical & lighting Utilise wate heat. Improve insulation atting/cooling, electrical & lighting Utilise wate heat. Improve insulation atting/cooling, electrical & lighting Utilise wate heat. Improve insulation atting/cooling, electrical & lighting Utilise wate heat. Improve insulation atting/cooling, electrical & lighting Utilise wate heat. Improve insulation atting/cooling, electrical & lighting Utilise wate heat. Improve insulation atting/cooling, electrical & lighting Utilise wate heat. Improve insulation | ssel speed Reduction 5% 20-30% gine Replacement with new 7% 20% gine Correct design/installation including exhaust 4% arbox & propeller Replacement 5% 15% oppeller nozzle/duct Install 0% 15 – 20% m & weight Correction 0% 5% el meter Install & keep records | ssel speed Reduction 5% 20-30% gine Replacement with new 7% 20% gine Correct design/installation including exhaust 4% arbox & propeller Replacement 5% 15% opeller nozzle/duct Install 0% 15 - 20% m & weight Correction 0% 5% el meter Install & keep records | ssel speed Reduction 5% 20-30% gine Replacement with new 7% 20% gine Correct design/installation including exhaust 4% arbox & propeller Replacement 5% 15% opeller nozzle/duct Install 0% 15 – 20% m & weight Correction 0% 5% el meter Install & keep records 5% draulics Upgrade pumps and controls 5% frigeration Upgrade compressors & pumps
Improve insulation 1.5% ating/cooling, electrical & lighting Utils ewaste heat. Improve insulation rasitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% erertional awareness Improve by training & record keeping <10% |
| Image: spine Replacement with new 7% 20% igine Correct design/installation including exhaust 4% barbox & propeller Replacement 5% 15% opeller nozzle/duct Install 0% 15 – 20% im & weight Correction 0% 5% el meter Install & keep records 0% 5% DN-PROPULSION RELATED Upgrade pumps and controls 0 1% rdraulics Upgrade pumps and controls Improve insulation 1 rating/cooling, electrical & lighting Utilis waste heat. Improve insulation 1 rating/cooling, electrical & lighting Upgrade controls, switch off all above 0.5% 1.5% berational awareness Improve by training & record keeping <10% | gine Replacement with new 7% 20% gine Correct design/installation including exhaust 4% arbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% arbox & propeller Correction 0% 5% al meter Install & keep records NV-PROPULSION RELATED draulics Upgrade compressors & pumps Improve insulation Upgrade compressors & pumps improve insulation upgrade controls, switch off all above 0.5% 1.5% rational awareness Improve by training & record keeping <10%

 | gine Replacement with new 7% 20%
gine Correct design/installation including exhaust 4%
arbox & propeller Replacement 5% 15%
upgeller nozzle/duct Install 0% 15 – 20%
a weight Correction 0% 5%
el meter Install & keep records
<i>NPROPULSION RELATED</i>
tratulics Upgrade pumps and controls
Upgrade compressors & pumps
improve insulation
ating/cooling, electrical & lighting
Utilise waste heat. Improve insulation
THEM ACTION
THEUST COMPONENTS
THEM ACTION | gine Replacement with new 7% 20%
gine Correct design/installation including exhaust 4%
arbox & propeller Replacement 5% 15%
inpeller nozzle/duct Install 0% 15 – 20%
a weight Correction 0% 5%
intere Install & keep records
<i>NPROPULSION RELATED</i>
traulics Upgrade compressors & pumps
improve insulation
ating/cooling, electrical & lighting
Utilise wate heat. Improve insulation
ating/cooling, electrical & lighting
Upgrade compressors & pumps
improve by training & record keeping <10%
THEM ACTION | gine Replacement with new 7% 20%
gine Correct design/installation including exhaust 4%
arbox & propeller Replacement 5% 15%
ngeller nozzle/duct Install 0% 15 – 20%
m & weight Correction 0% 5%
Install & keep records
<i>NPROPULSION RELATED</i>
traulics Upgrade compressors & pumps
improve insulation
atting/cooling, electrical & lighting
Utilise wate heat. Improve insulation
astic loads such as pumps & motors
improve by training & record keeping <10%
ITEM ACTION | pine Replacement with new 7% 20%
jine Correct design/installation including exhaust 4%
arbox & propeller Replacement 5% 15%
peller nozzle/duct Install 0% 15 – 20%
n & weight Correction 0% 5%
Install & keep records
W-PROPULSION RELATED
fraulics Upgrade compressors & pumps
Improve insulation
ting/cooling, electrical & lighting Utilise wate heat. Improve insulation
asitic loads such as pumps & motors
Improve by training & record keeping <10%
TIEM ACTION
THEMST COMPONENTS
 | Inite Replacement with new 7% 20% inne Correct design/installation including exhaust 4% whox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% n & weight Correction 0% 5% Ineter Install & keep records <i>N-PROPULSION RELATED</i> frageration Upgrade compressors & pumps
Improve insulation tring/cooling, electrical & lighting Uilise wate heat. Improve insulation stitic loads such as pumps & motor Upgrade controls, switch off all above 0.5% 1.5% trational awareness Improve by training & record keeping <10% | ine Replacement with new 7% 20%
ine Correct design/installation including exhaust 4%
thox & propeller Replacement 5% 15%
beller nozzle/duct Install 0% 15 – 20%
a weight Correction 0% 5%
inter Install & keep records
<i>LPROPULSION RELATED</i>
traulics Upgrade compressors & pumps
improve insulation
ting/cooling, electrical & lighting Utilise waste heat. Improve insulation
sitic loads such as pumps & motors
trational awareness Improve by training & record keeping <10% | Inter Replacement with new 7% 20% gine Correct design/installation including exhaust 4% whox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% n & weight Correction 0% 5% Inter Install & keep records Vpgrade compressors & pumps improve insulation triggration Upgrade compressors & pumps improve insulation Utilise waste heat. Improve insulation sticl loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% trational awareness Improve by training & record keeping <10% | pine Replacement with new 7% 20%
pine Correct design/installation including exhaust 4%
atbox & propeller Replacement 5% 15%
peller nozzle/duct Install 0% 15 – 20%
n & weight Correction 0% 5%
Install & keep records
WPROPULSION RELATED
traulics Upgrade compressors & pumps
improve insulation
atting/cooling, electrical & lighting
Utilise waste heat. Improve insulation
TIFEM ACTION
THRUST COMPONENTS
THEM ACTION | nine Replacement with new 7% 20%
ine Correct design/installation including exhaust 4%
whox & propeller Replacement 5% 15%
peller
nozzle/duct Install 0% 15 – 20%
n & weight Correction 0% 5%
Intere Install & keep records
<i>N-PROPULSION RELATED</i>
traulics Upgrade compressors & pumps
improve insulation
ting/cooling, electrical & lighting Utilise waste heat. Improve insulation
satic loads such as pumps & utilise waste heat. Improve insulation
ting/cooling, electrical & lighting Utilise waste heat. Improve insulation
trating/cooling, and controls version utilise waste heat. Improve insulation
trating/cooling, electrical & lighting Utilise waste heat. Improve by training & record keeping <10%
TIEM ACTION
THEMS ACTION | nine Replacement with new 7% 20% ine Correct design/installation including exhaust 4% whox & propeller Replacement 5% 15% peller nozzle/duct Install Correction 0% 15 – 20% n & weight Correction 0% 5% Intere Install & keep records wPROPULSION RELATED Iraulics Upgrade compressors & pumps Improve insulation Upgrade controls, switch off all above 0.5% 1.5% Irational awareness Improve by training & record keeping <10%
 | Initial Replacement with new 7% 20% inte Correct design/installation including exhaust 4% urbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% is weight Correction 0% 5% if meter Install & keep records Install & keep records WPROPULSION RELATED Improve insulation Improve insulation tringeration Upgrade compressors & pumps improve insulation Improve insulation atilitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% rational awareness Improve by training & record keeping <10% | pine Replacement with new 7% 20%
jine Correct design/installation including exhaust 4%
arbox & propeller Replacement 5% 15%
peller nozle/duct Install 0% 15 – 20%
m & weight Correction 0% 5%
Interer Install & keep records
<i>N-PROPULSION RELATED</i>
draulics Upgrade compressors & pumps
improve insulation
tingeration Upgrade controls version 5
tingeration Upgrade controls, switch off all above 0.5% 1.5%
erational awareness Improve by training & record keeping <10%
 | pine Replacement with new 7% 20%
pine Correct design/installation including exhaust 4%
subox & propeller Replacement 5% 15%
peller nozzle/duct Install 0% 15 – 20%
a weight Correction 0% 5%
Hereter Install & keep records
Hereter Install & keep recor | gine Replacement with new 7% 20% gine Correct design/installation including exhaust 4% arbox & propeller Replacement 5% 15% upeller nozzle/duct Install 0% 15 – 20% m & weight Correction 0% 5% Install & keep records <i>N-PROPULSION RELATED</i> draulics Upgrade compressors & pumps Improve insulation atting/cooling, electrical & lighting Utilise wate heat. Improve insulation astic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% reational awareness Improve by training & record keeping <10% | gine Replacement with new 7% 20%
gine Correct design/installation including exhaust 4%
arbox & propeller Replacement 5% 15%
papeller nozzle/duct Install 0% 15 – 20%
m & weight Correction 0% 5%
el meter Install & keep records
W-PROPULSION RELATED
draulics Upgrade compressors & pumps
Improve insulation
Upgrade compressors & pumps
Improve insulation
upgrade compressors & pumps
Improve insulation
Upgrade compressors & pumps
Improve by training & record keeping <10%
Improve by training & record keeping <10% | gine Replacement with new 7% 20%
gine Correct design/installation including exhaust 4%
arbox & propeller Replacement 5% 15%
peller nozle/duct Install 0% 15 – 20%
m & weight Correction 0% 5%
entere Install & keep records
<i>M-PROPULSION RELATED</i>
draulics Upgrade pumps and controls
trigeration Upgrade compressors & pumps
Improve insulation
atting/cooling, electrical & lighting
Utilse waste heat. Improve insulation
asticl loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
erational awarenees Improve by training & record keeping <10% | gine Replacement with new 7% 20%
gine Correct design/installation including exhaust 4%
arbox & propeller Replacement 5% 15%
opeller nozzle/duct Install & Rep records 0% 5%
I meter Install & keep records
<i>N-PROPULSION RELATED</i>
draulics Upgrade compressors & pumps
Improve insulation
tingrove insulation
tingrove insulation
tingrove insulation
tingrove by training & record keeping <10%
 | rgine Replacement with new 7% 20% rgine Correct design/installation including exhaust 4% sarbox & propeller Replacement 5% 15% opeller nozzle/duct Install 0% 15 – 20% im & weight Correction 0% 5% el meter Install & keep records WPROPULSION RELATED rdraulics Upgrade pumps and controls Timprove insulation rdraulics Upgrade compressors & pumps Improve insulation ratific loads such as pumps & motors Upgrade controls, switch off all above 0.5% reational awareness Improve by training & record keeping <10% | gine Replacement with new 7% 20% igine Correct design/installation including exhaust 4% sarbox & propeller Replacement 5% 15% opeller nozzle/duct Install 0% 15 – 20% im & weight Correction 0% 5% 1 el meter Install & keep records X X W-PROPULSION RELATED Vagrade compressors & pumps Improve insulation Vagrade compressors & pumps Improve insulation Vagrade compressors & pumps Improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation 1.5% 1.5% reational awareness Improve by training & record keeping <10% | gineReplacement with new7%20%gineCorrect design/installation including exhaust4%sarbox & propellerReplacement5%15%opeller nozzle/ductInstall0%15 – 20%im & weightCorrection0%5%el meterInstall & keep records5% <i>NPROPULSION RELATED</i> Upgrade pumps and controls5%rdraulicsUpgrade compressors & pumps
Improve insulation5%sating/cooling, electrical & lightingUtilise waste heat. Improve insulationrasitic loads such as pumps & motors0.5%1.5%perational awarenessImprove by training & record keeping<10% |
| gine Correct design/installation including exhaust 4%
farbox & propeller Replacement 5% 15%
opeller nozle/duct Install Correct in a la & expression 0% 5%
el meter Install & keep records
<i>NPROPULSION RELATED</i>
draulics Upgrade compressors & pumps
Improve insulation
traitic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
perational awareness Improve by training & record keeping <10%
TRMST COMPORENTS
Engine selection Advanced design, correct power selection
Engine installation Correct intake and exhaust design. Include fuel meter | gine Correct design/installation including exhaust 4%
arbox & propeller Replacement 5% 15%
poeller nozzle/duct Install & keep records
N-PROPULSION RELATED
draulics Upgrade compressors & pumps
Improve insulation
Upgrade compressors & pumps
Improve insulation
Utilise waste heat. Improve insulation
Trime Avanced design, correct power selection
Engine installation
Correct intake and exhaust design. Include fuel meter
Gearbox & propeller
Gearbox for largest possible propeller, RPM <1000
Propeller nozzle/duct
Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions
Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight
Hull shape
Correct shape especially box & item areas

 | gine Correct design/installation including exhaust 4% arbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% m & weight Correction 0% 5% ell meter Install & keep records <i>NPROPULSION RELATED</i> trigeration Upgrade pumps and controls frigeration Upgrade compressors & pumps improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation atting/cooling, electrical & lighting Utilise U | gine Correct design/installation including exhaust 4% arbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% m & weight Correction 0% 5% Install & keep records <i>N-PROPULSION RELATED</i> traulics Upgrade compressors & pumps Improve insulation upgrade compressors & pumps Improve insulation uting/cooling, electrical & lighting Utilise wate heat. Improve insulation asitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% rational awareness Improve by training & record keeping <10% | gine Correct design/installation including exhaust 4% arbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% m & weight Correction 0% 5% inter Install & keep records <i>N-PROPULSION RELATED</i> traulics Upgrade compressors & pumps tmprove insulation timprove insulation timprove insulation timprove insulation timprove by training & record keeping <10% | pine Correct design/installation including exhaust 4% arbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% n & weight Correction 0% 5% al meter Install & keep records <i>V+ROPUISION RELATED</i> traulics Upgrade compressors & pumps improve insulation timg/cooling, electrical & lighting Utilise wate heat. Improve insulation satic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% arational awareness Improve by training & record keeping <10%
 | nine Correct design/installation including exhaust 4% probus & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15–20% n & weight Correction 0% 5% I meter Install & keep records WKROPUSION RELATED Frageration Upgrade compressors & pumps fimprove insulation timp/cooling, electrical & lighting Utilise waste heat. Improve insulation stitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% rrational awareness Improve by training & record keeping <10% | ine Correct design/installation including exhaust 4% rbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% n & weight Correction 0% 5% Imeter Install & keep records HeROPULSION RELATED raulics Upgrade pumps and controls rigeration Upgrade compressors & pumps Improve insulation ting/cooling, electrical & lighting Utilise waste heat. Improve insulation sitic loads such as pumps & motors Upgrade compressors & pumps intro Upgrade compressors & 1.5% rational awareness Improve by training & record keeping <10% | Intend Correct design/installation including exhaust 4% wrbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% n & weight Correction 0% 5% # meter Install & keep records ++ # wROPUSION RELATED | pine Correct design/installation including exhaust 4% parbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% n & weight Correction 0% 5% Install & keep records W-PROPULSION RELATED traulics Upgrade compressors & pumps Improve insulation Upgrade compressors & pumps Improve insulation Upgrade controls, switch off all above 0.5% 1.5% rational awareness Improve by training & record keeping <10% | nine Correct design/installation including exhaust 4% problem Replacement 5% 15% peller nozzle/duct Install 0% 15–20% n & weight Correction 0% 5% meter Install & keep records W-RPCPUSION RELATED traulics Upgrade pumps and controls rigeration Upgrade compressors & pumps improve insulation tung/cooling, electrical & lighting Utilise waste heat. Improve insulation astici loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% arational awareness Improve by training & record keeping <10%
 | nine Correct design/installation including exhaust 4% problem Replacement 5% 15% peller nozzle/duct Install 0% 15–20% n & weight Correction 0% 5% a meter Install & keep records WARDPULSION RELATED Inaulics Upgrade compressors & pumps Improve insulation ringeration Upgrade controls rigeration Upgrade controls (Utilise waste heat. Improve insulation sticl loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% rrational awareness Improve by training & record keeping <10%
 | Inne Correct design/installation including exhaust 4% urbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% In meter Install & keep records | pine Correct design/installation including exhaust 4% arbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% n & weight Correction 0% 5% and weight Correction 0% 5% and weight Upgrade pumps and controls arbox <i>PROPULSION RELATED</i> draulics Upgrade compressors & pumps improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation asticl loads such as pumps & motors Upgrade corrols, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping <10%
 | pine Correct design/installation including exhaust 4% arbox & propeller Replacement 5% 15% peller nozzle/duct Install O% 15 – 20% m & weight Correction 0% 5% m weight Correction 0% 5% m exercise Install & keep records <i>N-RPOPULSION RELATED</i> traulics Upgrade pumps and controls rigeration Upgrade compressors & pumps improve insulation astic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% improve insulation improve by training & record keeping <10% | gine Correct design/installation including exhaust 4% arbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% m & weight Correction 0% 5% el meter Install & keep records M-ROPULSION RELATED draulics Upgrade pumps and controls trigeration Upgrade compressors & pumps improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation Utilise waste heat. Improve insulation Utilise waste heat. Improve insulation Correct intake and exhaut deign. Improve | gine Correct design/installation including exhaust 4%
arbox & propeller Replacement 5% 15%
ppeller nozzle/duct Install 0% 15 – 20%
m & weight Correction 0% 5%
el meter Install & keep records
W-PROPULSION RELATED
draulics Upgrade compressors & pumps
Improve insulation
tingrove insulation
ating/cooling, electrical & lighting Utilise wate heat. Improve insulation
turged controls, switch off all above 0.5% 1.5%
Improve by training & record keeping <10%
TRUST COMPORENTS
Engine selection Advanced design, correct power selection | gine Correct design/installation including exhaust 4%
arbox & propeller Replacement 5% 15%
peller nozzle/duct Install 0% 15 – 20%
m & weight Correction 0% 5%
ell meter Install & keep records
<i>NROPULSION RELATED</i>
draulics Upgrade pumps and controls
trigeration Upgrade compressors & pumps
Improve insulation
atting/cooling, electrical & lighting
Utilise waste heat. Improve insulation
astic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
Improve by training & record keeping <10% | gine Correct design/installation including exhaust 4%
arbox & propeller Replacement 5% 15%
ppeller nozle/duct Install 0%
15 – 20%
m & weight Correction 0% 5%
el meter Install & keep records
<i>NRROPULSION RELATED</i>
draulics Upgrade pumps and controls
frigeration Upgrade compressors & pumps
improve insulation
atting/cooling, electrical & lighting Utiles waste heat. Improve insulation
Improve by training & record keeping <10% | gine Correct design/installation including exhaust 4% harbox & propeller Replacement 5% 15% opeller nozle/duct Install 0% 15 – 20% im & weight Correction 0% 5% el meter Install & keep records | gine Correct design/installation including exhaust 4% arbox & propeller Replacement 5% 15% opeller nozle/duct Install 0% 15–20% im & weight Correction 0% 5% el meter Install & keep records <i>NN-PROPULSION RELATED</i> Upgrade compressors & pumps draulics Upgrade compressors & pumps Improve insulation ating/cooling, electrical & lighting Utilize waste heat. Improve insulation rational awareness Improve by training & record keeping | gine Correct design/installation including exhaust 4% harbox & propeller Replacement 5% 15% opeller nozzle/duct Install 0% 15–20% im & weight Correction 0% 5% el meter Install & keep records 5% 15% <i>NN-PROPULSION RELATED</i> Upgrade pumps and controls 5% 15% frigeration Upgrade compressors & pumps
Improve insulation 5% 1.5% aating/cooling, electrical & lighting Utilise waste heat. Improve insulation 1.5% serational awareness Improve by training & record keeping <10% |
| Parbox & propeller Replacement 5% 15% oppeller nozzle/duct Install 0% 15 – 20% m & weight Correction 0% 5% el meter Install & keep records Install & keep records <i>NN-PROPULSION RELATED</i> Vulgrade pumps and controls Install & keep records draulics Upgrade compressors & pumps Improve insulation ating/cooling, electrical & lighting Utiles waste heat. Improve insulation Improve insulation ating/cooling, electrical & lighting Utiles waste heat. Improve insulation Improve by training & record keeping <10% | arbox & propeller Replacement 5% 15% oppeller nozzle/duct Install 0% 15 – 20% m & weight Correction 0% 5% el meter Install & keep records N-PROPULSION RELATED draulics Upgrade pumps and controls Upgrade compressors & pumps
Improve insulation Upgrade compressors & pumps
Improve insulation 1.5% ating/cooling, electrical & lighting Utilise waste heat. Improve insulation 1.5% ration cloads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% Improve by training & record keeping <10%

 | arbox & propeller Replacement 5% 15% uppeller nozzle/duct Install 0% 15 – 20% m & weight Correction 0% 5% ell meter Install & keep records 15 – 20% N-PROPULSION RELATED Upgrade pumps and controls 10% triggeration Upgrade compressors & pumps Improve insulation 10% ating/cooling, electrical & lighting Utilise waste heat. Improve insulation 1.5% asitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% Improve by training & record keeping <10% | arbox & propeller Replacement 5% 15% uppeller nozzle/duct Install 0% 15 – 20% m & weight Correction 0% 5% el meter Install & keep records 5% M RAPROPULSION RELATED Jamin S Upgrade pumps and controls straulics Upgrade compressors & pumps
Improve insulation 5% ating/cooling, electrical & lighting Utilise wate heat. Improve insulation astic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping <10% | arbox & propeller Replacement 5% 15% uppeller nozzle/duct Install 0% 15 – 20% m & weight Correction 0% 5% el meter Install & keep records 5% M PROPULSION RELATED Staulics Upgrade pumps and controls gingeration Upgrade compressors & pumps
Improve insulation Upgrade controls, switch off all above 0.5% atilic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping <10% | arbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% n & weight Correction 0% 5% el meter Install & keep records
 | urbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% n & weight Correction 0% 5% I meter Install 0% 5% I meter Install 0% 5% I meter Install 0% 5% I meter Install & keep records Install Install VPRPVLISION RELATED Install Upgrade pumps and controls Install rigeration Upgrade compressors & pumps Installion Installion asticl loads such as pumps & motors Upgrade conclos, switch off all above 0.5% 1.5% rational awareness Improve by training & record keeping <10% | rbox & propeller Replacement 5% 15%
beller nozzle/duct Install 0% 15 – 20%
a weight Correction 0% 5%
Imeter Install & keep records
<i>LPROPULSION RELATED</i>
radius Upgrade pumps and controls
rigeration Upgrade compressors & pumps
Improve insulation
stitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5%
rational awareness Improve by training & record keeping <10% | Intext & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% n eweight Correction 0% 5% I meter Install 0% 5% I meter Install & keep records Install 0% 5% NPROPULSION RELATED Install & keep records Install 0% 5% rigeration Upgrade compressors & pumps improve insulation Improve insulation Improve insulation Improve insulation stick loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% Improve by training & record keeping <10% | arbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% n & weight Correction 0% 5% H meter Install & keep records NPROPUSION RELATED Italia Upgrade pumps and controls irigeration Upgrade compressors & pumps ting/cooling, electrical & lighting Utilise wate heat. Improve insulation astick loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping <10%
 | Action | Action The Action Advanced design, correct power selection
 | nrbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% n & weight Correction 0% 5% if meter Install & keep records v-PROPULSION RELATED Upgrade pumps and controls tringreation Upgrade compressors & pumps
Improve insulation stitic/cooling, electrical & lighting Utilise waste heat. Improve insulation astitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% rational awareness Improve by training & record keeping <10% | Arbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% n & weight Correction 0% 5% If meter Install & keep records Install 0% 5% NPROPULSION RELATED Upgrade pumps and controls Install Install< | arbox & propeller Replacement 5% 15% peller nozzle/duct Install 0% 15 – 20% n & weight Correction 0% 5% If meter Install & keep records 5% 15% NPROPULSION RELATED
Upgrade pumps and controls 5% 15% tatulics Upgrade compressors & pumps
Improve insulation 10% 15% ating/cooling, electrical & lighting Utilise waste heat. Improve insulation 1.5% ating/cooling, electrical & lighting Utilise waste heat. Improve insulation 1.5% asitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% Improve by training & record keeping <10% | arbox & propeller Replacement 5% 15% pepler nozzle/duct Install 0% 15 – 20% m & weight Correction 0% 5% el meter Install & keep records | arbox & propeller Replacement 5% 15% oppeller nozzle/duct Install 0% 15 – 20% m & weight Correction 0% 5% el meter Install & keep records 0% 5% <i>W-RPOVLSION RELATED</i> Upgrade pumps and controls 0% 5% draulics Upgrade compressors & pumps
Improve insulation 0.5% 1.5% ating/cooling, electrical & lighting Utilise waste heat. Improve insulation 0.5% 1.5% aratici loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping <10% | arbox & propeller Replacement 5% 15% pepler nozzle/duct Install 0% 15 – 20% m & weight Correction 0% 5% ell meter Install & keep records Install 0% 5% NPROPULSION RELATED Install & keep records Install Upgrade pumps and controls Install | arbox & propeller Replacement 5% 15% opeller nozzle/duct Install 0% 15 – 20% m & weight Correction 0% 5% el meter Install & keep records Install & keep records NPROPULSION RELATED Upgrade pumps and controls Install & keep records draulics Upgrade pumps and controls Improve insulation ating/cooling, electrical & lighting Utiles waste heat. Improve insulation astitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping <10% | harbox & propeller Replacement 5% 15% opeller nozzle/duct Install 0% 15 – 20% im & weight Correction 0% 5% el meter Install & keep records 5% ohr.PROPULSION RELATED Upgrade pumps and controls 5% draulics Upgrade pumps and controls 5% improve insulation Improve insulation 5% ating/cooling, electrical & lighting
Utilise waste heat. Improve insulation ratic loads such as pumps & motors Upgrade controls, switch off all above 0.5% ierational awareness Improve by training & record keeping <10% | arbox & propeller Replacement 5% 15% opeller nozzle/duct Install 0% 15 - 20% Im & weight Correction 0% 5% el meter Install & keep records 5% M-ROPULSION RELATED Upgrade pumps and controls 5% draulics Upgrade compressors & pumps 5% ating/cooling, electrical & lighting Utilise waste heat. Improve insulation 5% ratitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% rational awareness Improve by training & record keeping <10% | harbox & propeller Replacement 5% 15% oppeller nozzle/duct Install 0% 15 – 20% m & weight Correction 0% 5% el meter Install & keep records 5% <i>M-PROPULSION RELATED</i> Upgrade pumps and controls 5% draulics Upgrade compressors & pumps
Improve insulation 5% ating/cooling, electrical & lighting Utilise waste heat. Improve insulation 1.5% rasitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% verational awareness Improve by training & record keeping <10% |
| Image: Second | ppeller nozzle/duct Install 0% 15 – 20% m & weight Correction 0% 5% el meter Install & keep records 5% M-ROPULSION RELATED Upgrade pumps and controls Upgrade compressors & pumps
Improve insulation 15 – 20% ating/cooling, electrical & lighting Utilise waste heat. Improve insulation 15.5% 1.5% ating/cooling, electrical & lighting Utilise waste heat. Improve insulation 1.5% ratic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% retarional awareness Improve by training & record keeping <10%

 | peller nozzle/duct install 0% 15 – 20%
m & weight Correction 0% 5%
In meter Install & keep records
<i>N</i> PROPULSION <i>RELATED</i>
draulics Upgrade pumps and controls
Upgrade compressors & pumps
Improve insulation
ating/cooling, electrical & lighting
Utilise waste heat. Improve insulation
asitic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
Improve by training & record keeping <10%
TIRUST COMPONENTS
TIRUST COMPONENTS | peller nozzle/duct install 0% 15 - 20%
m & weight Correction 0% 5%
In meter Install & keep records
<i>N+PROPUSION RELATED</i>
graduics Upgrade pumps and controls
trigeration Upgrade compressors & pumps
Improve insulation
stitic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
rerational awareness Improve by training & record keeping <10% | peller nozzle/duct Install 0% 15 – 20%
m & weight Correction 0% 5%
In meter Install & keep records
<i>N+PROPUSION RELATED</i>
draulics Upgrade pumps and controls
trigeration Upgrade compressors & pumps
Improve insulation
atting/cooling, electrical & lighting
Utilise waste heat. Improve insulation
astic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
rerational awareness Improve by training & record keeping <10% | peller nozzle/duct Install 0% 15 – 20%
n & weight Correction 0% 5%
In meter Install & keep records
<i>N+RPOPULSON RELATED</i>
triagiration Upgrade compressors & pumps
improve insulation
uting/cooling, electrical & lighting
Utilise waste heat. Improve insulation
asitic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
arational awareness Improve by training & record keeping <10%
TIEM ACTION
THEUST COMPONENTS | peller nozzle/duct Install 0% 15 – 20%
n & weight Correction 0% 5%
If meter Install & keep records
N+PROPUSION RELATED
Ifraulics Upgrade compressors & pumps
improve insulation
uting/cooling, electrical & lighting
Utilise waste heat. Improve insulation
astic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
Improve by training & record keeping <10%
ITEM ACTION
 | peller nozzle/duct Install 0% 15 – 20%
a & weight Correction 0% 5%
Imeter Install & keep records
<i>LPROPULSION RELATED</i>
Traulics Upgrade pumps and controls
ting/cooling, electrical & lighting Utilis waste heat. Improve insulation
sistic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5%
rational awareness Improve by training & record keeping <10% | peller nozzle/duct Install 0% 15 – 20%
n & weight Correction 0% 5%
i meter Install & keep records
NPROPULSION RELATED
traulics Upgrade pumps and controls
trigeration Upgrade compressors & pumps
Improve insulation
stitic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
rrational awareness Improve by training & record keeping <10% | peller nozzle/duct Install 0% 15 – 20%
n & weight Correction 0% 5%
In meter Install & keep records
N+RPOPUSION RELATED
traulics Upgrade pumps and controls
rigeration Upgrade compressors & pumps
Improve insulation
stitic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
arational awareness Improve by training & record keeping <10%
TIEM ACTION | peller nozzle/duct Install 0% 15 – 20%
n & weight Correction 0% 5%
in meter Install & keep records
WPROPULSION RELATED
Itaulics Upgrade pumps and controls
Upgrade compressors & pumps
Improve insulation
atiting/cooling, electrical & lighting
Utilise waste heat. Improve insulation
astitic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
reational awareness Improve by training & record keeping <10%
ITEM ACTION
THEMST COMPONENTS
Empire adertion Advanced flation, correct power selection
 | peller nozzle/duct Install 0% 15 – 20%
n & weight Correction 0% 5%
imeter Install & keep records
VPROPULSION RELATED
triadics Upgrade pumps and controls
rigeration Upgrade compresors & pumps
Improve insulation
stitic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
rational awareness Improve by training & record keeping <10%
Improve by training & record keeping <10%
 | peller nozzle/duct Install 0% 15 – 20%
n & weight Correction 0% 5%
I meter Install & keep records
W-PROPUSION RELATED
Itraulics Upgrade pumps and controls
tingrove insulation
tingrove insulation
tingrove insulation
tingrove insulation
tingrove by training & record keeping <10%
TIEM ACTION
THRUST COMPONENTS
Engine selection Advanced design, correct power selection
10 Correct power selection | peller nozzlełduct Install 0% 15 – 20%
n & weight Correction 0% 5%
Immeter Install & keep records
NAPROPULSION RELATED
tarulics Upgrade pumps and controls
tarulyca compressors & pumps
Improve insulation
ating/cooling, electrical & lighting
Utilise waste heat. Improve insulation
asitic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
Improve by training & record keeping <10%
Improve by training & record keeping | peller nozzle/duct Install 0% 15 – 20%
n & weight Correction 0% 5%
In meter Install & keep records
N+PROPUSION RELATED
straulics Upgrade pumps and controls
tingreation Upgrade compressors & pumps
Improve insulation
astic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
Improve by training & record keeping <10%
TIRUST COMPONENTS
Engine selection Advanced design, correct power selection
Engine installation Correct imake and exhaust design. Include fuel meter
 | peller nozzle/duct install 0% 15 - 20%
m & weight Correction 0% 5%
ell meter Install & keep records
N-PROPULSION RELATED
trigeration Upgrade pumps and controls
trigeration Upgrade compressors & pumps
improve insulation
ating/cooling, electrical & lighting Utilise waste heat. Improve insulation
asitic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
reational awareness Improve by training & record keeping <10%
TIEM ACTION
TREMST COMPONENTS
Engine selection Advanced design, correct power selection
Engine installation Correct intake and exhaut design. Include fuel meter | Install 0% 15 - 20% m & weight Correction 0% 5% el meter Install & keep records 5% M-ROPULSION RELATED Upgrade pumps and controls 5% draulics Upgrade pumps and controls 5% improve insulation Upgrade compressors & pumps 5% atting/cooling, electrical & lighting Utilise waste heat. Improve insulation 1.5% astitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping <10% | peller nozzle/duct install 0% 15 - 20%
m & weight Correction 0% 5%
In meter Install & keep records
NPROPULSION RELATED
draulics Upgrade pumps and controls
Upgrade compressors & pumps
Improve insulation
ating/cooling, electrical & lighting
Utilise waste heat. Improve insulation
asitic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
Improve by training & record keeping <10%
Improve by training & record keeping <10% | ppeller nozzle/duct Install 0% 15 – 20%
m & weight Correction 0% 5%
ell meter Install & keep records
N-PROPULSION RELATED
draulics Upgrade pumps and controls
frigeration Upgrade compressors & pumps
Improve insulation
ating/cooling. electrical & lighting
Utilise waste heat. Improve insulation
assitic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
Improve by training & record keeping <10%
Improve by training & record keeping <10% | opeller nozzle/duct Install 0% 15 - 20% im & weight Correction 0% 5% el meter Install & keep records 5% <i>DN-PROPULSION RELATED</i> Uggrade pumps and controls 5% draulics Upgrade pumps and controls 5% improve insulation Improve insulation 5% rating/cooling, electrical &
lighting Utilise waste heat. Improve insulation rating/cooling, alectrical & lighting Upgrade controls, switch off all above 0.5% inprove by training & record keeping <10% | opeller nozzle/duct Install 0% 15 – 20% im & weight Correction 0% 5% el meter Install & keep records 5% DN-PROPULSION RELATED Upgrade pumps and controls 5% draulics Upgrade compressors & pumps 15 – 20% improve insulation 15 – 20% 15% ating/cooling, electrical & lighting Utilise waste heat. Improve insulation 15% raticle loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% reartional awareness Improve by training & record keeping <10% | opeller nozzle/duct Install 0% 15 – 20% im & weight Correction 0% 5% el meter Install & keep records 5% ow-RPOPULSION RELATED Upgrade pumps and controls 5% draulics Upgrade pumps and controls 15 – 20% ating/cooling, electrical & lighting Utilise waste heat. Improve insulation 1.5% rasitic loads such as pumps & Improve by training & record keeping 0.5% 1.5% |
| In & weight Correction 0% 5% elemeter Install & keep records NH-PROPULSION RELATED draulius Upgrade pumps and controls Upgrade compressors & pumps Improve insulation Improve insulation Advanced keeping 40% 1.5% 1.5% Improve by training & record keeping 40% 1.5% Improve insulation Improve insulation Improve insulation Improve insulation Improve insulation Improve insulation Improve by training & record keeping 40% 1.5% Improve 1.5% Improve by training & record keeping 40% 1.5% Improve 1.5% I | m & weight Correction 0% 5% In the set of th

 | m & weight Correction 0% 5%
el meter Install & keep records
<i>M-PROPULSION RELATED</i>
diraulics Upgrade pumps and controls
Upgrade compressors & pumps
Improve insulation
ating/cooling, electrical & lighting
Utilise waste heat. Improve insulation
asitic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
Improve by training & record keeping <10%
TIRUST COMPONENTS
Improve Insulation
TIRUST COMPONENTS
 | m & weight Correction 0% 5%
el meter Install & keep records
<i>M-PROPULSION RELATED</i>
diraulics Upgrade compressors & pumps
improve insulation
atting/cooling, electrical & lighting
Utilise waste heat. Improve insulation
astitic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
erational awareness Improve by training & record keeping <10%
THEM ACTION | m & weight Correction 0% 5%
el meter Install & keep records
<i>M-PROPULSION RELATED</i>
diraulics Upgrade compressors & pumps
improve insulation
atting/cooling, electrical & lighting
Utilise waste heat. Improve insulation
asitic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
erational awareness Improve by training & record keeping <10%
ITEM ACTION
THRUST COMPONENTS | m & weight Correction 0% 5%
H meter Install & keep records
M-RROPULSION RELATED
draulics Upgrade compressors & pumps
ingrove insulation
uting/cooling, electrical & lighting
Utilise waste heat. Improve insulation
astic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
Improve by training & record keeping <10%
ITEM ACTION
THRUST COMPONENTS | n & weight Correction 0% 5%
If meter Install & keep records
W-ROPULSION RELATED
thraulics Upgrade pumps and controls
rigeration Upgrade compressors & pumps
Improve insulation
titing/cooling, electrical & lighting
utilise waste heat. Improve insulation
astitic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
Improve by training & record keeping <10%
ITEM ACTION | n & weight Correction 0% 5% I meter Install & keep records I PROPULSION RELATED Taulics Upgrade pumps and controls rigeration
Upgrade compressors & pumps Improve insulation sitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% rational awareness Improve by training & record keeping <10% | n & weight Correction 0% 5%
I meter Install & keep records
N-PROPULSION RELATED
traulics Upgrade pumps and controls
rigeration Upgrade compressors & pumps
improve insulation
atting/cooling, electrical & lighting Utilise waste heat. Improve insulation
attic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
erational awareness Improve by training & record keeping <10%
ITEM ACTION | m & weight Correction 0% 5%
H meter Install & keep records
H-RROPULSION RELATED
draulics Upgrade compressors & pumps
ingrove insulation
uting/cooling, electrical & lighting
Utilise waste heat. Improve insulation
asitic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
rational awareness Improve by training & record keeping <10%
TIREM ACTION | n & weight Correction 0% 5%
If meter Install & keep records
W-ROPULSION RELATED
traulics Upgrade pumps and controls
rigeration Upgrade compressors & pumps
improve insulation
uting/cooling, electrical & lighting Utilise waste heat. Improve insulation
astitic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
erational awareness Improve by training & record keeping <10%
ITEM ACTION
THRUST COMPONENTS
Engine electrican Advanced flasion, correct power selection | n & weight Correction 0% 5%
If meter Install & keep records
W-ROPULSION RELATED
thraulics Upgrade pumps and controls
rigeration Upgrade compressors & pumps
improve insulation
ting/cooling, electrical & lighting
utilise waste heat. Improve insulation
sitic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
Improve by training & record keeping <10%
ITEM ACTION
THRUST COMPONENTS
Engine selection Advanced design, correct power selection

 | n & weight Correction 0% 5%
If meter Install & keep records
W-ROPULSION RELATED
Hraulics Upgrade compressors & pumps
improve insulation
uting/cooling, electrical & lighting
Utilise waste heat. Improve insulation
astic loads such as pumps & motors
pagrade controls, switch off all above 0.5% 1.5%
Improve by training & record keeping <10%
Improve by training & record keeping <10% | n & weight Correction 0% 5%
H meter Install & keep records
H-ROPULISION RELATED
draulics Upgrade pumps and controls
trigeration Upgrade compressors & pumps
improve insulation
atting/cooling, electrical & lighting
utilise waste heat. Improve insulation
THM
THM
ACTION
THUST COMPONENTS
Engine selection
Engine selection
Advanced design, correct power selection
Engine installation
Correct intake and exhaust desion. Include fuel meter
Utilise waste
H Device H | m & weight Correction 0% 5%
Hereter Install & keep records
Hereter Ustall & Upgrade compressors & pumps
Improve insulation
astic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
Improve by training & record keeping <10%
Improve by training & record keeping <10%
Improve Stall & | m & weight Correction 0% 5%
el meter Install & keep records
<i>N-PROPULSION RELATED</i>
draulics Upgrade pumps and controls
trigeration Upgrade compressors & pumps
improve insulation
ating/cooling, electrical & lighting
utilise waste heat. Improve insulation
astic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
erational awareness Improve by training & record keeping <10%
THEM ACTION
THEUST COMPONENTS
Engine selection Advanced design, correct power selection
Engine installation Correct intake and exhaust design. Include fuel meter | m & weight Correction 0% 5%
el meter Install &
keep records
NH PROPULSION RELATED
diraulitis Upgrade pumps and controls
Upgrade compressors & pumps
improve insulation
atting/cooling, electrical & lighting
Utilise waste heat. Improve insulation
rastic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
rerational awareness Improve by training & record keeping <10%
Improve insulation
TRUST COMPONENTS
Engine selection Advanced design, correct power selection | m & weight Correction 0% 5%
el meter Install & keep records
<i>M+ROPULSION RELATED</i>
draulics Upgrade pumps and controls
Upgrade compressors & pumps
Improve insulation
ating/cooling, electrical & lighting
Utilise waste heat. Improve insulation
asitic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
Improve by training & record keeping <10% | m & weight Correction 0% 5%
el meter Install & keep records
N-PROPULSION RELATED
drauliis Upgrade pumps and controls
Improve insulation
ating/cooling, electrical & lighting
Utilise waste heat. Improve insulation
astic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
Improve by training & record keeping <10%
ITEM ACTION | Im & weight Correction 0% 5% el meter Install & keep records <i>NP-PROPULSION RELATED</i> Upgrade pumps and controls trigeration Upgrade compressors & pumps
improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation rastic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% irretional awareness Improve by training & record keeping <10% | im & weight Correction 0% 5%
el meter Install & keep records
<i>N+PROPULSION RELATED</i>
trdraulics Upgrade pumps and controls
frigeration Upgrade compressors & pumps
Improve insulation
ating/cooling, electrical & lighting Utilise waste heat. Improve insulation
rastic loads such as pumps & motors
Improve by training & record keeping <10%
 | Image Correction 0% 5% el meter Install & keep records S% el meter Install & keep records S% <i>NH-ROQUISION RELATED</i> Upgrade pumps and controls S% draulics Upgrade compressors & pumps
Improve insulation S% ating/cooling, electrical & lighting Utilise waste heat. Improve insulation 0.5% rasitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% serational awareness Improve by training & record keeping <10% |
| el meter Install & keep records NN-PROPULSION RELATED Upgrade pumps and controls frigeration Upgrade compressors & pumps improve insulation upgrade controls, switch off all above 0.5% 1.5% 1.5% Improve by training & record keeping <10% Insuff Content of the second sec | el meter Install & keep records NPROPULSION RELATED drauliis Upgrade pumps and controls Upgrade compressors & pumps improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation upgrade controls, switch off all above 0.5% 1.5% rational awareness Improve by training & record keeping

 | eff meter Install & keep records <i>N-PROPULSION RELATED</i> Upgrade compressors & pumps and controls trigieration Upgrade compressors & pumps and controls improve insulation improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation astict loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping <10% | el meter Install & keep records N-PROPULSION RELATED Upgrade compressors & pumps improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation asitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping <10% ITEM ACTION THRUST COMPONENTS | el meter Install & keep records N-PROPULSION RELATED Upgrade pumps and controls Inigeration Upgrade compressors & pumps Inigrove insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation asitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping <10% ITEM ACTION THRUST COMPONENTS Dome | If meter Install & keep records N-PROPULSION RELATED Upgrade pumps and controls trigeration Upgrade compressors & pumps
improve insulation uting/cooling, electrical & lighting Utilise waste heat. Improve insulation asitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping <10% | If meter Install & keep records N-PROPULSION RELATED Upgrade pumps and controls fraigeration Upgrade compressors & pumps improve insulation Improve insulation astitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping <10%
 | Imeter Install & keep records LPROPULSION RELATED Upgrade pumps and controls ingeration Upgrade compressors & pumps
Improve insulation ting/cooling, electrical & lighting Utilise waste heat. Improve insulation stitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% rational awareness Improve by training & record keeping <10% | If meter Install & keep records N-PROPULSION RELATED Upgrade pumps and controls frageration Upgrade compressors & pumps improve insulation Improve insulation astitic loads such as pumps & motors Upgrade controls, switch off all above astitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% rational awareness Improve by training & record keeping <10% | Interer Install & keep records N-PROPULSION RELATED Upgrade pumps and controls traulics Upgrade compressors & pumps improve insulation Improve insulation stitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% astitic loads such as pumps & motors Improve insulation 1.5% astitic loads such as pumps & motors Improve by training & record keeping <10% | If meter Install & keep records N-PROPULSION RELATED Upgrade pumps and controls frageration Upgrade compressors & pumps improve insulation Improve insulation astic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% astic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% rational awareness Improve by training & record keeping <10%
 | If meter Install & keep records N-PROPULSION RELATED Upgrade pumps and controls fraigling Upgrade compressors & pumps improve insulation Upgrade controls, switch off all above nting/cooling, electrical & lighting Utilise waste heat. Improve insulation sitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% rational awareness Improve by training & record keeping <10%
 | If meter Install & keep records W-PROPULSION RELATED thaulics Upgrade compressors & pumps
Improve insulation uting/cooling, electrical & lighting Utilise waste heat. Improve insulation astici loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% astici loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% | If meter Install & keep records N-PROPULSION RELATED Upgrade pumps and controls trigeration Upgrade compressors & pumps
improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation asticl loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% asticl loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% rational awareness Improve by training & record keeping <10%
 | If meter Install & keep records W-PROPULSION RELATED Upgrade compressors & pumps and controls Upgrade compressors & pumps improve insulation Upgrade compressors & pumps improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation asitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping <10% | el meter Install & keep records NPROPULSION RELATED tradulics Upgrade pumps and controls Ingrove insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation astic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% rational awareness Improve by training & record keeping <10% THEM ACTION THEUST COMPONENTS Engine selection Engine installation Correct intake and exhaust deign. Include fuel meter | el meter Install & keep records NH-PROPULSION RELATED draulis Upgrade compressors & pumps improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation upgrade controls, switch off all above 0.5% 1.5% reartional awareness Improve by training & record keeping <10% | eff meter Install & keep records N-PROPULSION RELATED Upgrade pumps and controls draulits Upgrade compressors & pumps improve insulation Utilise waste heat. Improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation asitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping <10% | el meter Install & keep records NPROPULSION RELATED draulics Upgrade pumps and controls Improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation
ating/cooling, electrical & lighting Utilise waste heat. Improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation Action Ac | el meter Install & keep records <i>NH-PROPULSION RELATED</i> Upgrade pumps and controls draulics Upgrade compressors & pumps improve insulation Upgrade compressors & pumps rastic loads such as pumps & motors Upgrade controls, switch off all above operational awareness Upgrade controls, switch off all above nerrow by training & record keeping <10% | el meter Install & keep records
<i>NH-PROPULSION RELATED</i>
draulics Upgrade pumps and controls
frigeration Upgrade compressors & pumps Improve insulation
ating/cooling, electrical & lighting
Utilise waste heat. Improve insulation
rastitic loads such as pumps & motors
Upgrade controls, switch off all above
Upgrade controls, switch off all above
Improve by training & record keeping
 | el meter Install & keep records W-PROPULSION RELATED Upgrade pumps and controls draulics Upgrade compressors & pumps
Improve insulation vating/cooling, electrical & lighting Utilise waste heat. Improve insulation rastic loads such as pumps & motors Upgrade controls, switch off all above verational awareness Improve by training & record keeping |
| NN-PROPULSION RELATED draulics Upgrade compressors & pumps
Improve insulation atting/cooling. electrical & lighting Utilise wate heat. Improve insulation ratic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% perational awareness Improve by training & record keeping <10% | NH-PROPULSION RELATED
draulics Upgrade compressors & pumps
improve insulation
Upgrade compressors & pumps
improve insulation
Upgrade controls, switch off all above
erational awareness
Improve by training & record keeping
Controls, switch off all above
erational awareness
Improve by training & record keeping
Controls, switch off all above
erational awareness
Improve by training & record keeping
Controls, switch off all above
Controls, switch off all above
Con

 | NPROPULSION RELATED draulics Upgrade pumps and controls trigeration Upgrade compressors & pumps improve insulation Improve insulation atting/cooling, electrical & lighting Utilise waste heat. Improve insulation astic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping <10% | N-PROPULSION RELATED draulics Upgrade pumps and controls improve insulation Upgrade compressors & pumps ating/cooling, electrical & lighting Utilise wate heat. Improve insulation astic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping <10% | NPROPULSION RELATED draulics Upgrade pumps and controls improve insulation Upgrade compressors & pumps atting/cooling, electrical & lighting Utilise wate heat. Improve insulation astic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping <10% | N-PROPULSION RELATED traditiss Upgrade pumps and controls trigeration Upgrade compressors & pumps Improve insulation tring/cooling, electrical & lighting Utilise wate heat. Improve insulation asitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% Improve by training & record keeping <10% TIEM ACTION THEUST COMPONENTS | N-PROPULSION RELATED traulitis Upgrade pumps and controls ingeration Upgrade compressors & pumps Improve insulation Utilise wate heat. Improve insulation astitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping <10%
 | LPROPULSION RELATED traulics Upgrade pumps and controls igeration Upgrade compressors & pumps Improve insulation Improve insulation ting/cooling, electrical & lighting Utilise waste heat. Improve insulation stitle loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% trational awareness Improve by training & record keeping <10% | N-PROPULSION RELATED Iraquitis Upgrade compressors & pumps improve insulation ting/cooling, electrical & lighting Uilise wate heat. Improve insulation astic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% Improve by training & record keeping | N-PROPULSION RELATED traulics Upgrade opumps and controls trigeration Upgrade compressors & pumps improve insulation tingrcooling, electrical & lighting Utilise waste heat. Improve insulation astic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% improve by training & record keeping <10% ITEM ACTION THRUST COMPONENTS | N-PROPULSION RELATED Iraulias Upgrade compressors & pumps improve insulation ting/cooling, electrical & lighting Uilise wate heat. Improve insulation astic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% Improve by training & record keeping
 | N-PROPULSION RELATED Iraquities Upgrade opumps and controls rigeration Upgrade compressors & pumps Improve insulation ting/cooling, electrical & lighting Utilise wate heat. Improve insulation usitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% Improve by training & record keeping <10% IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
 | N-PROPULSION RELATED fraulics Upgrade ompressors & pumps
Improve insulation ting/cooling, electrical & lighting Utilise waste heat. Improve insulation astic loads such as pumps & motors Upgrade controls, switch off all above 0.5% astic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% arational awareness Improve by training & record keeping <10% | NPROPULSION RELATED draulics Upgrade compressors & pumps
Improve insulation tingeration Upgrade compressors & pumps
Improve insulation ating/cooling, electrical & lighting Utilise wate heat. Improve insulation asitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% rational awareness Improve by training & record keeping <10%
 | NPROPULSION RELATED traulics Upgrade ompressors & pumps
improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation asticl loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% asticl loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping <10% | NPROPULSION RELATED draulics Upgrade pumps and controls Ingrove insulation Upgrade compressors & pumps ting/cooling, electrical & lighting Utilise wate heat. Improve insulation asitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% erational awareness Improve by training & record keeping <10% | M-PROPULSION RELATED
draulics Upgrade pumps and controls
Upgrade compressors & pumps
improve insulation
thigeration Upgrade controls, switch off all above 0.5% 1.5%
improve by training & record keeping <10%
Improve by training & record keeping <10%
Improve by training & record keeping <10% | NPROPULSION RELATED draulics Upgrade pumps and controls trigeration Upgrade compressors & pumps improve insulation Improve insulation atting(cooling, electrical & lighting Ullise wate heat. Improve insulation astic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping <10% | N-PROPULSION RELATED draulics Upgrade ompressors & pumps improve insulation tingrove insulation tilige watse heat. Improve insulation taistic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping <10%
 | M-PROPULSION RELATED
draulics Upgrade compressors & pumps
improve insulation
auting/cooling. electrical & lighting Utilise waste heat. Improve insulation
rastic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
Improve by training & record keeping <10% | W-PROPULSION RELATED draulics Upgrade pumps and controls frigeration Upgrade compressors & pumps Improve insulation Upgrade controls, switch off all above atting/cooling, electrical & lightim Utilise waste heat. Improve insulation rasitic loads such as pumps & motors Upgrade controls, switch off all above nerational awareness Improve by training & record keeping | W-PROPULSION RELATED draulics Upgrade pumps and controls frigeration Upgrade compressors & pumps improve insulation hating/cooling, electrical & lighting Utilise waste heat. Improve insulation rastic loads such as pumps & motors Upgrade controls, switch off all above operational awareness Improve by training & record keeping |
| draulics Upgrade pumps and controls
frigeration Upgrade compressors & pumps
improve insulation
rastic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
perational awareness Improve by training & record keeping <10%
Interventional awareness Improve by training & record keeping <10% | draulics Upgrade compressors & pumps
Improve insulation
timprove insulation
atting/cooling, electrical & lighting
UUIIse waste heat. Improve insulation
Uggrade controls, switch off all above
Uggrade controls, switch off all above
upgrade controls, switch off all above
Uggrade controls, switch off all above
to Uggrade controls, switch off all above
upgrade controls, switch off all above
Uggrade controls, switch off all above
to Uggrade controls, switch off all above
upgrade controls, switch off all above
Uggrade controls, switch off all above
upgrade controls, switch off all above
Uggrade controls, switch off all above
upgrade controls, switch off all above
to Upgrade controls, switch off all above
upgrade controls, switch off all above
upgrade controls, switch off all above
to Upgrade controls, switch off all above
upgrade controls, switch off all abov

 | draulics Upgrade pumps and controls
trigeration Upgrade compressors & pumps
Improve insulation
ating/cooling, electrical & lighting
Utilise waste heat. Improve insulation
asitic loads such as pumps & motors
Upgrade controls, switch off all above
erational awareness Improve by training & record keeping <10%
ITEM ACTION
THRUST COMPONENTS | draulics Upgrade pumps and controls
trigeration Upgrade compressors & pumps
improve insulation
ating/cooling, electrical & lighting
Utilise waste heat. Improve insulation
asitic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
Improve by training & record keeping <10%
Improve by training & record keeping <10% | draulics Upgrade pumps and controls trigeration Upgrade compressors & pumps Improve insulation ating/cooling, electrical & lighting Ulifise wate heat. Improve insulation astic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% reational awareness Improve by training & record keeping <10% | draulics Upgrade pumps and controls
rigeration Upgrade compressors & pumps
improve insulation
atting/cooling, electrical & lighting
Utilise wate heat. Improve insulation
asticic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
improve by training & record keeping <10%
Improve by training & record keeping <10%
 | Irigeration Upgrade pumps and controls
rigeration Upgrade compressors & pumps
improve insulation
satistic loads such as pumps & motors
upgrade controls, switch off all above 0.5% 1.5%
Improve by training & record keeping <10%
Integrational awareness Action
Integrate Action | raulics Upgrade pumps and controls
rigeration Upgrade compressors & pumps
improve insulation
ting/cooling, electrical & lighting
utilise waste heat. Improve insulation
upgrade controls, switch off all above 0.5% 1.5%
rational awareness Improve by training & record keeping <10% | Internet Upgrade pumps and controls rigeration Upgrade compressors & pumps
improve insulation uting/cooling, electrical & lighting Utilise waste heat. Improve insulation astici loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping <10% | draulics Upgrade pumps and controls rigeration Upgrade compressors & pumps Improve insulation atting/cooling, electrical & lighting Ulilise wate heat. Improve insulation asitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% arational awareness Improve by training & record keeping <10% | Interview of the second device | Indexe in the second design, correct power selection

 | traulics Upgrade pumps and controls trigeration Upgrade compressors & pumps improve insulation ting/cooling, electrical & lighting Utilise waste heat. Improve insulation astic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% reational awareness Improve by training & record keeping ITEM ACTON TRUST COMPONENTS Engine selection Advanced design, correct power selection | draulics Upgrade pumps and controls
trigeration Upgrade compressors & pumps
improve insulation
ating/cooling, electrical & lighting
Utilise waste heat. Improve insulation
astici loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
irrational awarenees Improve by training & record keeping <10% | fraulics Upgrade pumps and controls Upgrade compressors & pumps
Improve insulation atting/cooling, electrical & lighting Utils waste heat. Improve insulation astitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% astitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% rational awareness Improve by training & record keeping <10%
 | draulics Upgrade pumps and controls
trigeration Upgrade compressors & pumps
improve insulation
ating/cooling, electrical & lighting
Utilise waste heat. Improve insulation
astic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
improve by training & record keeping <10%
Improve by training & record keeping <10% | draulitis Upgrade pumps and controls
frigeration Upgrade compressors & pumps
Improve insulation
atting/cooling, electrical & lighting
UUIIse waste heat. Improve insulation
Pugrade controls, switch off all above 0.5% 1.5%
Improve by training & record keeping <10%
Improve by training & record keeping <10%
Improve by training & record keeping <10%
Improve by training & record keeping <10% | draulics Upgrade pumps and controls
Upgrade compressors & pumps
Improve insulation
ating/cooling, electrical & lighting
Utilise waste heat. Improve insulation
asitic loads such as pumps & motors
Upgrade controls, switch off all above
erational awareness
Improve by training & record keeping
ITEM ACTION TIEM ACTION Integration of the standard standar | draulics Upgrade pumps and controls
frigeration Upgrade compressors & pumps
improve insulation
ating/cooling, electrical & lighting
UUggrade controls, switch off all above 0.5% 1.5%
erational awareness Improve by training & record keeping <10% | draulics Upgrade pumps and controls
frigeration Upgrade compressors & pumps
improve insulation
pating/cooling, electrical & lighting
Utilise waste heat. Improve insulation
Upgrade controls, switch off all above 0.5% 1.5%
Improve by training & record keeping <10%
 | draulits Upgrade pumps and controls frigeration Upgrade compressors & pumps
Improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation rasitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% ierational awareness Improve by training & record keeping <10% | draulics Upgrade pumps and controls Improve insulation frigeration Upgrade compressors & pumps
Improve insulation Improve insulation rasting/cooling, electrical & lighting Utilse waste heat. Improve insulation 1.5% rastitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% perational awareness Improve by training & record keeping <10% |
| frigeration Upgrade compressors & pumps
improve insulation ating/cooling, electrical & lighting Utils waste heat. Improve insulation rastic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% reational awareness Improve by training & record keeping <10% | frigeration Upgrade compressors & pumps
Improve insulation ating/cooling, electrical & lighting
astic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% astic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% reational awareness Improve by training & record keeping <10%

 | Irigeration Upgrade compressors & pumps
Improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation asitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% Improve by training & record keeping <10% | Irigeration Upgrade compressors & pumps
Improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation asitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% Inprove by training & record keeping <10% | Integration Upgrade compressors & pumps
Improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation asitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% Inprove by training & record keeping <10% | rigeration Upgrade compressors & pumps
Improve insulation
atting/cooling, electrical & lighting
utilise waste heat. Improve insulation
arational awareness Upgrade controls, switch off all above
erational awareness Improve by training & record keeping <10%
 | rigeration Upgrade compressors & pumps
Improve insulation
Utilise waste heat. Improve insulation
Upgrade controls, switch off all above 0.5% 1.5%
erational awareness Improve by training & record keeping <10% | rigeration Upgrade compressors & pumps
Improve insulation
ting/cooling, electrical & lighting
Ubits waste heat. Improve insulation
spitic loads such as pumps & motors
Upgrade controls, switch off all above
Improve by training & record keeping <10% | rigeration Upgrade compressors & pumps
Improve insulation
titing/cooling, electrical & lighting
stitic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
Improve by training & record keeping <10% | rigeration Upgrade compressors & pumps
Improve insulation
ating/cooling, electrical & lighting Utilise waste heat. Improve insulation
asitic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
Improve by training & record keeping <10%
 | rigeration Upgrade compressors & pumps
Improve insulation
titing/cooling, electrical & lighting
stitic loads such as pumps & motors
Upgrade controls, switch off all above 0.5% 1.5%
Improve by training & record keeping <10% | rigeration Upgrade compressors & pumps
Improve insulation
titing/cooling, electrical & lighting
Ubgrade controls, switch off all above 0.5% 1.5%
rrational awareness Improve by training & record keeping <10%
 | rigeration Upgrade compressors & pumps
Improve insulation
tring/cooling, electrical & lighting
astitic loads such as pumps & motors
upgrade controls, switch off all above 0.5% 1.5%
Improve by training & record keeping <10%
 | rigeration Upgrade compressors & pumps
Improve insulation
atting/cooling, electrical & lighting
utilise waste heat. Improve insulation
Upgrade controls, switch off all above 0.5% 1.5%
improve by training & record keeping <10%
Improve | rigeration Upgrade compressors & pumps
Improve insulation
atting/cooling, electrical & lighting
astic loads such as pumps & motors
upgrade controls, switch off all above 0.5% 1.5%
Improve by training & record keeping <10%
TRUST COMPONENTS
Engine selection Advanced design, correct power selection
Engine installation Correct intake and exhaust design. Include fuel meter | Integration Upgrade compressors & pumps
improve insulation ating/cooling, electrical & lighting
asitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% upprove by training & record keeping <10% | frigeration Upgrade compressors & pumps
Improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation rastic loads such as pumps & motors Upgrade controls, switch off all above 0.5% improve by training & record keeping <10% | Integration Upgrade compressors & pumps
improve insulation ating/cooling, electrical & lighting Utilise waste heat. Improve insulation asitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping <10% | frigeration Upgrade compressors & pumps
Improve insulation ating/cooling, electrical & lighting Utils waste heat. Improve insulation asitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% errational awareness Improve by training & record keeping <10%
 | frigeration Upgrade compressors & pumps
Improve insulation aating/cooling. electrical & lighting Utilise waste heat. Improve insulation rastic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% inprove by training & record keeping <10% | frigeration Upgrade compressors & pumps
Improve insulation aating/cooling, electrical & lighting Utilise waste heat. Improve insulation rasitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% serational awareness Improve by training & record keeping <10% | frigeration Upgrade compressors & pumps
Improve insulation nating/cooling, electrical & lighting Utilise waste heat. Improve insulation rastic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% perational awareness Improve by training & record keeping <10% |
| atting/cooling. electrical & lighting Utilise waste heat. Improve insulation rastic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% Improve by training & record keeping <10% | ating/cooling, electrical & lighting Utilise waste heat. Improve insulation upgrade controls, switch off all above 0.5% erational awareness Upgrade controls, switch off all above 0.5% erational awareness Improve by training & record keeping <10%

 | ating/cooling, electrical & lighting Utilise waste heat. Improve insulation
upgrade controls, switch off all above 0.5% 1.5%
Improve by training & record keeping <10% | ating/cooling, electrical & lighting Utilise waste heat. Improve insulation upgrade controls, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping <10% <10% | ating/cooling, electrical & lighting Utilise waste heat. Improve insulation upgrade controls, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping <10% THEM ACTION THEUST COMPONENTS | ating/cooling, electrical & lighting Utilise waste heat. Improve insulation
Upgrade controls, switch off all above 0.5% 1.5%
Improve by training & record keeping <10%
 | ting/cooling, electrical & lighting Utilise waste heat. Improve insulation Upgrade controls, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping <10% TIEM ACTION TREUST COMPONENTS | ting/cooling, electrical & lighting Utilise waste heat. Improve insulation Upgrade controls, switch off all above 0.5% 1.5% rational awareness Improve by training & record keeping <10% | titing/cooling, electrical & lighting Utilise waste heat. Improve insulation
asitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5%
Improve by training & record keeping <10% | ating/cooling, electrical & lighting Utilise waste heat. Improve insulation Upgrade controls, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping <10% TIEM ACTION THRUST COMPONENTS
 | titing/cooling, electrical & lighting Utilise waste heat. Improve insulation
upgrade controls, switch off all above 0.5% 1.5%
Improve by training & record keeping <10% | tring/cooling, electrical & lighting
astic loads such as pumps & motors
Upgrade controls, switch off all above
erational awareness
Improve by training & record keeping
COMPONENTS
Engine selection
Advanced design, correct power selection
 | atting/cooling, electrical & lighting
asitic loads such as pumps & motors
asitic loads such as pumps & motors
erational awareness Utilise waste heat. Improve insulation
Upgrade controls, switch off all above
Improve by training & record keeping 0.5% 1.5% ITEM ACTION
 | ating/cooling, electrical & lighting Utilise waste heat. Improve insulation Upgrade controls, switch off all above 0.5% 1.5% Improve by training & record keeping <10% ITEM ACTION TRRUST COMPONENTS Engine selection Advanced design, correct power selection Engine selection Advanced design, correct power selection Engine initialiation Correct initiate and exhaust design. Include fuel meter | ating/cooling, electrical & lighting
asitic loads such as pumps & motors
erational awareness Utilise waste heat. Improve insulation
Upgrade controls, switch off all above
Improve by training & record keeping 0.5% 1.5% ITEM ACTION | ating/cooling, electrical & lighting Utilise waste heat. Improve insulation Upgrade controls, switch off all above 0.5% 1.5% arational awareness Improve by training & record keeping <10% 10% 10% 10% 10% 10% 10% 10% 10% 10% | ating/cooling, electrical & lighting
rastic loads such as pumps & motors
Upgrade controls, switch off all above
mprove by training & record keeping <10%
Improve by training & record keeping <10% | ating/cooling, electrical & lighting
asitic loads such as pumps & motors
Upgrade controls, switch off all above
erational awareness
Improve by training & record keeping
<10%
 | ating/cooling, electrical & lighting
asitic loads such as pumps & motors
Upgrade controls, switch off all above
erational awareness
Improve by training & record keeping <10% | aating/cooling. electrical & lighting Utilise waste heat. Improve insulation
rastic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5%
Improve by training & record keeping <10% | aating/cooling, electrical & lighting Utilise waste heat. Improve insulation
rastitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5%
Improve by training & record keeping <10% | aating/cooling, electrical & lighting Utilise waste heat. Improve insulation
rasitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5%
perational awareness Improve by training & record keeping <10% |
| Institic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% 210% 210% 210% 210% 210% 210% 210% 210 | TEM ACTION THEM ACTION THEM ACTION THEM ACTION THEM ACTION THEM Advanced design, correct power selection Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaut design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000

 | astic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% crosses 0.5% | astic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% controls 0.5% 1.5% improve by training & record keeping controls 0.5% co | asitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping <10% <10% | asitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping <10% | astitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5%
Improve by training & record keeping <10% | ITEM ACTION
 | ACTION THEM ACTION THEM ACTION THEM ACTION | asitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping <10% <10% | Action THEM ACTION THRUST COMPONENTS Explore exploring Action Act | ACTION THEUST COMPONENTS Engine selection Advanced design, correct power selection

 | ITEM ACTION THRUST COMPONENTS Engine selection Advanced design, correct power selection 1.5% | Action Action Action Action Advanced design, correct power selection Engine selection Correct intake and exhaust design. Include fuel meter Include fuel meter Include fuel meter Include fuel meter Include fuel meter I | Action Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter | astic loads such as pumps & motors Upgrade controls, switch off all above
Improve by training & record keeping 0.5% 1.5% ITEM ACTION | asitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping 10% 10% 10% 10% 10% 10% 10% 10% 10% 10%
 | astic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% c10% c10% c10% c10% c10% c10% c10% c10 | asitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% erational awareness Improve by training & record keeping <10% | rastic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5% controls, switch off all above 0.5% 1.5% controls, switch off all above 0.5% 1.5% controls, switch off all above 0.5% control | rasitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5%
berational awareness Improve by training & record keeping <10% | rasitic loads such as pumps & motors Upgrade controls, switch off all above 0.5% 1.5%
berational awareness Improve by training & record keeping <10%
 |
| Improve by training & record keeping <10% | ITEM ACTION THEUST COMPONENTS Improve by training & record keeping Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000

 | erational awareness Improve by training & record keeping <10% | erational awareness Improve by training & record keeping <10% | erational awareness Improve by training & record keeping <10% | erational awareness Improve by training & record keeping <10%
 | erational awareness Improve by training & record keeping <10% | International awareness Improve by training & record keeping <10% | erational awareness Improve by training & record keeping <10% | erational awareness Improve by training & record keeping <10%
 | erational awareness Improve by training & record keeping <10% | erational awareness Improve by training & record keeping <10%
 | erational awareness Improve by training & record keeping <10% <table> ITEM ACTION THRUST COMPONENTS 10 Avanced design, correct power selection Engine selection Advanced design, correct power selection</table>
 | erational awareness Improve by training & record keeping <10% <table> ITEM ACTION THUST COMPONENTS Improve by training & record keeping Engine selection Advanced design, correct power selection Engine selection Correct intake and exhaust design, include fuel meter</table> | erational awareness Improve by training & record keeping <10% TEM ACTION THRUST COMPONENTS Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter | erational awareness Improve by training & record keeping <10% <table> ITEM ACTION TREUST COMPONENTS Information in the second design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter</table> | erational awareness Improve by training & record keeping <10% <table> ITEM ACTION THRUST COMPONENTS 10 Advanced design, correct power selection Engine selection Advanced design, correct power selection</table> | erational awareness Improve by training & record keeping <10%
 | erational awareness Improve by training & record keeping <10% | Derational awareness Improve by training & record keeping <10% | berational awareness Improve by training & record keeping <10% | perational awareness Improve by training & record keeping <10% |
| Interview Action THM Action THRUST COMPONENTS Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design, include fuel meter | ITEM ACTION THEUST COMPONENTS I) Durent Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000

 | ITEM ACTION
TRRUST COMPONENTS | | | TEM ACTION
THRUST COMPONENTS
 | ITEM ACTION THRUST COMPONENTS | | |
 | ITEM ACTION THRUST COMPONENTS Topics exterior Advanced design correct power selection | ITEM ACTION THRUST COMPONENTS Engine selection Advanced design, correct power selection
 | ITEM ACTION THRUST COMPONENTS Engine selection Advanced design, correct power selection Informed Infor | TEM ACTION THEM ACTION THRUST COMPONENTS If Junnel Engine selection Advanced design, correct power selection Engine selection Correct intake and exhaust design. Include fuel meter
 | ITEM ACTION TRAUST COMPONENTS Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter | ITEM ACTION THEM ACTION THRUST COMPONENTS Inverted design, correct power selection Engine selection Advanced design, correct power selection Engine installation Correct intake and exhautt design. Include fuel meter | ITEM ACTION THRUST COMPONENTS Engine selection Advanced design, correct power selection | TTEM ACTION
THRUST COMPONENTS | ITEM ACTION
DIRIGING COMPONENTS
 | | | портока и портока и портока у совити у и техной кесриту КТО и |
| ITEM ACTION 7HRUST COMPONENTS 1) Funder Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter | ITEM ACTION THRUST COMPONENTS I) Furnell Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Propeller nozzladuct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct shape especially bow & stern areas Hull shape Correct shape especially bow & stern areas

 | THEM ACTION 2
THRUST COMPONENTS 2) Seem | THEM ACTION THRUST COMPONENTS | THEM ACTION | THEM ACTION
 | THEM ACTION | THEM ACTION 2 | ITEM ACTION | THM ACTION THRUST COMPONENTS
 | ITEM ACTION TRRUST COMPONENTS Engine selection Advanced design correct nouser selection Informed Infor | ITEM ACTION THRUST COMPONENTS Engine selection Advanced design, correct power selection Dispeter Dispe
 | ITEM ACTION THRUST COMPONENTS 11 hornel Engine selection Advanced design, correct power selection | ITEM ACTION THRUST COMPONENTS Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design, include fuel meter | ITEM ACTION THRUST COMPONENTS 2) Semi-
2) Semi-
Engine selection Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter
 | ITEM ACTON THRUST COMPONENTS Engine selection Engine installation Correct intake and exhaust design, include fuel meter | ITEM ACTION THRUST COMPONENTS Engine selection Advanced design, correct power selection Incode Incod | ITEM ACTION ThiRUST COMPONENTS 11 Junnel 21 Semi-
21 Semi- 21 Semi-
21 Semi- | ITEM ACTION
THRIST COMPONENTS | ITEM ACTION |
 | |
| THRUST COMPONENTS 1) Fund Engine selection Advanced design, correct power selection 1) Anorel Engine installation Correct intake and exhaust design. Include fuel meter 1) Anorel | TREUST COMPONENTS Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000

 | THRUST COMPONENTS 1) Furnel 2) Stem | THRUST COMPONENTS | THRUST COMPONENTS | THRUST COMPONENTS
 | THRUST COMPONENTS | THRUST COMPONENTS | THRUST COMPONENTS | THRUST COMPONENTS
 | THRUST COMPONENTS Engine selection Advanced design correct rower celection I) Annel Strender II Annel | THRUST COMPONENTS In Advanced design, correct power selection In A
 | THRUST COMPONENTS Engine selection Advanced design, correct power selection Income selectio | THRUST COMPONENTS 1) Unrel Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design, include fuel meter | THRUST COMPONENTS Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Description | THRUST COMPONENTS 1) Unmel Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter | THRUST COMPONENTS Engine selection Advanced design, correct power selection Income In | THRUST COMPONENTS
 | THRUST COMPONENTS | | ITEM ACTION | ITEM ACTION
 |
| Engine selection Advanced design, correct power selection
Engine installation Correct intake and exhaust design. Include fuel meter | Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000

 | | 1 Stern | 2) Stern | 2) Stern
 | 23 Stern | Innosi comronenta | 1) Fornel 2) Stem | 2) Stern
 | Engine selection Advanced design correct power selection 3) Propeler | Engine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection
Engine installation Correct intake and exhaust design. Include fuel meter
Braine installation Correct intake and exhaust design. Include fuel meter
Braine installation Correct intake and exhaust design. Include fuel meter
Braine installation Correct intake and exhaust design. Include fuel meter
Braine installation Correct intake and exhaust design. Include fuel meter
Braine installation Correct intake and exhaust design. Include fuel meter
Braine installation Correct intake and exhaust design. Include fuel meter
Braine installation Correct intake and exhaust design. Include fuel meter
Braine installation Correct intake and exhaust design. Include fuel meter
Braine installation Correct intake and exhaust design. Include fuel meter
Braine installation Correct intake and exhaust design. Include fuel meter
Braine installation Correct intake and exhaust design. Include fuel meter
Braine installation Correct intake and exhaust design. Include fuel meter
Braine installation Correct intake and exhaust design. Include fuel meter
Braine installation
Braine installation | Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Toread Tor | Engine selection Advanced design, correct power selection
Engine installation Correct intake and exhaust design. Include fuel meter
Bow Sector Se | Engine selection Advanced design, correct power selection | 3) Doonalar | 2) Stem | THRUST COMPONENTS
 | | THRUST COMPONENTS |
| Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter Image: State

 | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection 3) Propeler | Engine selection Advanced design, correct power selection 3) Propeler
 | Engine selection Advanced design, correct power selection a 3) Propeler | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Autointed design, correct power serection
 | 4) Following States of Sta
 | Of WIRING | Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter
 | Engine installation Correct intake and exhaust design. Include fuel meter | | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection 3) Propeler | 2) Stern
 | THRUST COMPONENTS | 2) Stern |
| 7 Troward | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 IDec. Propeller nozzle/duct Included where vessel size & speed is appropriate IDec. IDEc. RESISTANCE COMPONENTS Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Trim & weight Correct shape especially bow & stern areas Correct shape especially bow & stern areas Tficincu in new and future vescels

 | 5) A/Entr | 5) Joshor | | Elizaber
 | El Jacker | | 4) Hul | NI ADDA
 | Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter
 | Engine installation Correct intake and exhaust design. Include fuel meter 71 Forward
 | 7 7) Forward | 8) Deck | 7 | Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intoke and exhaust design include first and the Statement of Design
 | | Engine selection Advanced design, correct power selection 23 Stronger 41 and 24 and 24 and 25 and 26 | THRUST COMPONENTS Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection |
| Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 81 Deck 9) Accomodation | Propeller nozzleiduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct shape especially bow & stern areas

 | Engine installation Correct intake and exhaust design. Include fuel meter 7) Forward | Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter 5 Archor
5 Brow
7 Forward
 | Engine installation Correct intake and exhaust design, include fuel meter 51 Archer
71 Forward | Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter
 | 7-7) Forward | 7 7) Forward
 | 8) Deck
 | Gearbox & propeller Gearbox for largest possible propeller. RPM <1000 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 9) Accompdation - BRidg | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 8) Deck: 9) Accomodation - Bilidg | | Engine instanation Correct intake and exhaust design, include fuel meter 7- 7- 71 Porward
 | Engine Installation Correct intake and exhaust design. Include fuel meter | Engine selection Advanced design, correct power selection
Engine installation Correct intake and exhaust design. Include fuel meter
7) Foreigner
8) Prodefier
8) Pr | THRUST COMPONENTS Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. include fuel meter | Engine selection Advanced design, correct power selection
Engine installation Correct intake and exhaust design. Include fuel meter
7 Forward |
| Propeller nozzle/duct Included where vessel size & speed is appropriate | RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct shape especially bow & stern areas

 | Engine installation Correct intake and exhaust design. Include fuel meter 71 Forward
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 81 Contract of the second 81 Contract of the | Engine installation Correct intake and exhaust design. Include fuel meter 7
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 9
Discontinuous Control and | Engine installation Correct intake and exhaust design. Include fuel meter Correct intake and exhaust d | Engine installation Correct intake and exhaust design. Include fuel meter Correct intake and exhaust d | Engine installation Correct intake and exhaust design. Include fuel meter Correct intake and exhaust d | Engine installation Correct intake and exhaust design. Include fuel meter Engine installation Correct intake and exhaust design. Include fuel meter Engine installation Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Biocommon Biology Biolog | Engine installation Correct intake and exhaust design. Include fuel meter Engine installation Correct intake and exhaust design. Include fuel meter correct | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Bock down-teniag | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 7 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 7 00 00 00 00 00 00 00 00 00 00 00 0

 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 9) Accomodation - BRidg | dealbox a propertier dealbox for hargest possible propertier, in in vitro |
 | | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 8) Deck 9) Accomodation - Bridge | engine instansioon Correct intake and exhauss design. Include fuel metter 1 | Engine installation Correct intake and exhaust design. Include fuel meter Engine installation Correct intake and exhaust design. Include fuel meter intake and exhaust design. Include fuel meter intake and exhau | Engine selection Advanced design, correct power selection 3 Second
4 Hal Engine installation Correct intake and exhaust design. Include fuel meter 4 Hal Gearbox & propelier Gearbox & for largest possible propelier, RPM <1000
 | THRUST COMPONENTS Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection
Engine installation Correct intake and exhaust design, include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 |
| RESISTANCE COMPONENTS | Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Table 3: Options for improving fuel Hull shape Correct shape especially bow & stern areas efficiency in new and future vessels

 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter Torowal Bioeck
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller
Gearbox & for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate
 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Propeller nozzle/duct Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzledkuct Included where vessel size & speed is appropriate
Propeller nozzledkuct Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Propeller nozzledkuct Included where vessel size & speed is appropriate | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Propeller nozzledkuct Included where vessel size & speed is appropriate
 | Gearbox & propeller Gearbox of largest possible propeller, RPM <1000 9) Accompation - Billing Propeller nozzleduct Included where vessel size & speed is appropriate 1
 | Propeller nozzleduct Included where vessel size & speed is appropriate | Propeller nozzle/duct Included where vessel size & speed is appropriate | Propeller nozzle/duct Included where vessel size & speed is appropriate | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 II Decc. Propeller nozzleiduct Included where vessel size & speed is appropriate II Decc. III Decc. | engine instansion Correct infance and exhaust design. Include fuel meter Constant design. Include fuel meter Constant design. Include fuel meter Constant design. Constant design. Constant design and constant design and constant design. Constant design and constant design and constant design. Constant design and constant design and constant design and constant design. Constant design and consta | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate
 | Engine selection Advanced design, correct power selection 2 9 sem Engine installation Correct intake and exhaust design. include fuel meter 4 Had Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | THRUST COMPONENTS Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection 21 seminary Engine installation Correct intake and exhaust design, include fuel meter 10 breaker Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 |
| Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation | Trim & weight Correct balance to match hull design Table 3: Options for improving fuel Hull shape Correct shape especially bow & stern areas efficiency in new and future vessels

 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzlołduct Included where vestel size & speed is appropriate
 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzledduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Propeller nozled/duct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Propeller nozlodkuct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS
 | Gearbox & propeller Gearbox (or largest possible propeller, RPM <1000 9) Accompation - Billing
Propeller nozzleduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
 | Propeller nozzleduct Included where vesel size & speed is appropriate RESISTANCE COMPONENTS | Propeller nozzloduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS | Propeller nozzleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS | crighter instantion Correct inflate and exhaust design. Include fuel meter 1 7 <th7< th=""> 7
 <th7< th=""> <</th7<></th7<> | Engine installation Correct intake and exhaust design. Include fuel meter 9 Informed Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection 2) Seminary Engine installation Correct intake and exhaust design. include fuel meter 4) Hall Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | THRUST COMPONENTS Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection 21 stem Engine installation Correct intake and exhaust design, include fuel meter 31 hard Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 |
| Trim & weight Correct balance to match hull design Table 3: Options for improving fuel | Hull shape Correct shape especially bow & stern areas efficiency in new and future vessels

 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vestel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation | Engine installation Correct intake and exhaust design. Include fuel meter 9 Action Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter 9 forward Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter 1) Brow Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Engine installation Correct intake and exhaust design. Include fuel meter 1) accorr Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzlediuct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Propeller nozzleduct included where vessel size & speed is appropriate RESISTANCE COMPONENTS Increased length. Hull to suit speed, capacity, displacement & operation | Propeller nozzieduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation | Propeller nozzločkuct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine instanation Correct intake and extrains design. Include fuel meter 9 Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & | Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | THRUST COMPONENTS Engine selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox for largest possible propeller, RPM <1000 |
| Hull shape Correct shape especially bow & stern areas efficiency in new and future vessels | and a state of the

 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzločduct Included where vestel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design Table 3: Options for improving fuel | Engine installation Correct intake and exhaust design. Include fuel meter Include Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter 9 for and 10 for an an and 10 for an an an and 10 for an | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Table 3: Options for improving fuel | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzled/uct Included where vessel size & speed is appropriate
RESSTANCE COMPONENTS
Hull dimensions Increased length, Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Table 3: Options for improving fuel | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vestel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Table 3: Options for improving fuel | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Gearbox & propeller Gearbox & for largest possible propeller, RPM <1000

 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Propeller nozzleduct included where vessel size & speed is appropriate RESSTANCE COMPONENTS Hull dimensions increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Table 3: Options for improving fuel | Propeller nozziedukt Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Table 3: Options for improving fuel
 | Propeller nozzločkuct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Table 3: Options for improving fuel | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | cargine instantation Correct intake and extrains design. Include fuel meter 9 Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection Engine installation
 Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | THRUST COMPONENTS Engine relection Engine relection Engine relection Engine relection Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 |
| Bulbous bow Included where vessel size & speed is appropriate | Bulbous bow Included where vessel size & speed is appropriate

 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzkóduct Included where vesel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter 9 metric Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox & for largest possible propeller, RPM <1000
 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaut design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Correct shape especially bow & stern areas | Engine installation Correct intake and exhaust design. Include fuel meter Include Include Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape specially bow & stern areas
Correct shape specially bow & stern areas
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Gearbox & propeller Gearbox & for largest possible propeller, RPM <1000
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Proceeding and the construction of the | Contract of properties Contract of the greet position is properties of the greet position is properties of the greet position is properties. Propeller nozzielduct Included where vessel size & speed is appropriate ##355TANCE COMPORENTS Increased length. Hull to suit speed, capacity, displacement & operation Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct thape specially bow & stern areas
 | Propeller nozladbut Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct thape especially bow & stern areas | Propeller nozzloduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct shape specially bow & stern areas | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 III Dect Propeller nozzleduct Included where vessel size & speed is appropriate III Dect III Dect RESISTANCE COMPONENTS Increased length, Hull to suit speed, capacity, displacement & operation III Dect III Dect Trim & weight Correct balance to match hull design Table 3: Options for improving fuel efficiency in new and future vessels | cargine instanation Correct infance and extraust design. Include fuel meter Image: Spread and an extraust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | THRUST COMPONENTS Engine relection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 |
| Hull appendages Reduce appendage number & size. Smooth shapes for water flow |

 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller noszkółduct Included where vessel size & speed is appropriate
RESSTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Bulbous bow Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter 9 norwal Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter Grazhox & propeller Gearbox for largest possible propeller, RPM <1000
 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESSTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & Operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Bulbous bow Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaut design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Bulbous bow Included where vessel size & speed is appropriate
Bulbous bow Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzled/uct Included where vessel size & speed is appropriate
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Bulbous bow Included where vessel size & speed is appropriate
Bulbous bow Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzloiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Bulbous bow Included where vessel size & speed is appropriate
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Gearbox & propeller Gearbox & for largest possible propeller, RPM <1000
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Proceeding Propeller nozzlódukt Included where vessel size & speed is appropriate Proceeding RESISTANCE COMPONENTS Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct balance to match hull design Bulbous bow Included where vessel size & speed is appropriate
 | Contract of properties Contract of the group operation Propeller nozzledduct Included where vessel size & speed is appropriate #ESSTANCE COMPORENTS Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct thape specially bow & stern areas Bulbous bow Included where vessel size & speed is appropriate | Propeller nozladbut Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct shape especially bow & stern areas Bulbous bow Included where vessel size & speed is appropriate | Propeller nozzloduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct shape especially bow & stern areas Bulbous bow Included where vessel size & speed is appropriate | Gearbox & propeller Gearbox & for largest possible propeller, RPM <1000 | cargine instanation Correct infance and extraust design. Include fuel meter Improved Improved Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | THRUST COMPONENTS Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 |
| | Hull appendages Reduce appendage number 8 size. Smooth shapes for water

 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Bulbous bow Included where vessel size & speed is appropriate
Hull appendages Reduce appendage number & size. Smooth shapes for water | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Popeller nozzled/uct Included where vesel size & speed is appropriate
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & Operation
Trim & weight Correct shape especially bow & stern areas
Bulbous bow Included where vesel size & speed is appropriate
Hull appendages Reduce appendage number & size. Smooth shapes for water
Hull appendages Reduce appendage number & size. Smooth shapes for water | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozlotkut Included where vesel size & speed is appropriate
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Hull shape Correct shape especially bow & stern areas
Bulbous bow Included where vesel size & speed is appropriate
Hull appendages Reduce appendage number & size. Smooth shapes for water
Hull appendages Reduce appendage number & size. Smooth shapes for water | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Gearbox & propeller Gearbox & propeller Gearbox & for largest possible propeller, RPM <1000 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Calculation of properties Concent of any experiment of a properties Propeller nozzled/uct included where vessel size & speed is a ppropriate RUII dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct shape especially bow & stern areas Bulbous bow included where vessel size & speed is a ppropriate Hull appendages Reduce appendage number & size. Smooth shapes for water | Propeller nozzleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct balance to match hull design Correct balance to match hull design Edition of the speed state of the speed sta | Propeller nozleduct Induded where vessel size & speed is appropriate RESSTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct shape especially bow & stern areas Bulbous bow Induded where vessel size & speed is appropriate Hull appendages Reduce appendage number & size. Smooth shapes for water flow | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 III Jong Propeller nozzleduct Included where vesuel size & speed is appropriate III Jong Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trable 3: Options for improving fuel efficiency in new and future vessels Hull shape Correct shape especially bow & stern areas Efficiency in new and future vessels Bulbous bow Included where vessel size & speed is appropriate Efficiency in new and future vessels Hull appendages Reduce appendage number & size. Smooth shapes for water flow Efficiency in new and future vessels | engine instantion Correct infance and extration design. Include fuel infeter If Dender Gearbox & propeller Gearbox for largest possible propeller, IFPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaut design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | THRUST COMPORENTS Engine veloction Advanced design, correct power selection Engine veloction Engine installation Correct intake and exhaust design, include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 |
| ADDITIONAL CONSUMERS | Hull appendages Reduce appendage number & size. Smooth shapes for water
flow Control (Control) Control (Control) Control)

 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stem areas
Bulbous bow Included where vessel size & speed is appropriate
Hull appendages Reduce appendage number & size. Smooth shapes for water
flow | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vesel size & speed is appropriate
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
Gorrect shape especially bow & stern areas
Bulbous bow Included where vesel size & speed is appropriate
Hull appendages Reduce appendage number & size. Smooth shapes for water
Hull appendages Reduce appendage number & size. Smooth shapes for water
Hull Appendages Increased | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozlotkut Included where vesel size & speed is appropriate
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Hull shape Correct shape especially bow & stern areas
Buibous bow Included where vesel size & speed is appropriate
Hull appendages Reduce appendage number & size. Smooth shapes for water
Hull appendages Reduce appendage number & size. Smooth shapes for water
How I how I I I I I I I I I I I I I I I I I I I | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Gearbox & propeller Gearbox & propeller Gearbox & for largest possible propeller, RPM <1000
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Calculation of propertion Concent of any group potential properties Propeller nozzled/duct included where vessel size & speed is appropriate RESTSTANCE COMPONENTS Increased length. Hull to suit speed, capacity, displacement & operation Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Hull shape Correct shape especially bow & stern areas Bulbous bow included where vessel size & speed is appropriate Hull appendages Reduce appendage number & size. Smooth shapes for water flow
 | Propeller nozzleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct balance to match hull design Hull shape Correct shape especially bow & stern areas Bulbous bow Included where vessel size & speed is appropriate Hull appendages Reduce appendage number & size. Smooth shapes for water flow | Propeller nozzleduct Included where vessel size & speed is appropriate RESITANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct shape especially bow & stern areas Bulbous bow Included where vessel size & speed is appropriate Hull appendages Reduce appendage number & size. Smooth shapes for water flow | Gearbox & propeller Gearbox for largert possible propeller, RPM <1000 | engine instantion Correct infance and extration design. Include fuel infeter If Dender Gearbox & propeller Gearbox for largest possible propeller, IFM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzlelduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim &
weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Bulbous bow Included where vessel size & speed is appropriate
Hull appendages Reduce appendage number & size. Smooth shapes for water
flow | Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | DRRUST COMPONENTS Engine selection Engine installation Correct intake and exhaust design, include fuel meter Gearbox & propeller Gearbox & for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 |
| ADDITIONAL CONSUMERS Hydraulics Upgrade pumps and controls | Hull appendages Reduce appendage number & size. Smooth shapes for water
flow ADDITIONAL CONSUMERS Hydraulics Upgrade pumps and controls

 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleidukt Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Bulbous bow Included where vessel size & speed is appropriate
Hull appendages Reduce appendage number & size. Smooth shapes for water
flow
ADDITIONAL CONSUMERS
Hydraulics Upgrade pumps and controls | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzled/dut Included where vesel size & speed is appropriate
RestSTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
Gorrect shape especially bow & stern areas
Builbous bow Included where vesels ize & speed is appropriate
Hull appendages Reduce appendage number & size. Smooth shapes for water
How
ADDITIONAL CONSUMERS
Hydraulics Upgrade pumps and controls | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozleditut Included where vesel size & speed is appropriate
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Hull shape Correct shape especially bow & stern areas
Buibous bow Included where vesel size & speed is appropriate
Hull appendages Reduce appendage number & size. Smooth shapes for water
How ADDITIONAL CONSUMERS
Hydraulics Upgrade pumps and controls | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Calabase properties Concessed length. Hull to suit speed, capacity, displacement & operation This & weight Correct balance to match hull design Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Hull shape Correct balance to match hull design Hull shape Correct balance to match hull design Included where vestel size & speed is appropriate Builbous bow Included where vestel size & speed is appropriate Hull appendages Reduce appendage number & size. Smooth shapes for water flow ADDITIONAL CONSUMERS Upgrade pumps and controls | Propeller nozzleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct balance to match hull design Hull appendages Correct shape especially bow & stern areas Bulbous bow Included where vessel size & speed is appropriate Hull appendages Reduce appendage number & size. Smooth shapes for water flow ADDITIONAL CONSUMERS Upgrade pumps and controls | Propeller nozzleduct Included where vessel size & speed is appropriate RESITANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct shape especially bow & stem areas Bulbous bow Included where vessel size & speed is appropriate Hull appendages Reduce appendage number & size. Smooth shapes for water flow | Gearbox & propeller Gearbox & for largest possible propeller, RPM <1000 | cargine instantion Correct inflate and extrator design. Include the finder Improve the finder Gearbox for largest possible propeller, RPM <1000
 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaut design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | THRUST COMPONENTS Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 |
| ADDITIONAL CONSUMERS Hydraulics Upgrade pumps and controls Refrigeration Upgrade compressors & pumps. Good insulation | Hull appendages Reduce appendage number & size. Smooth shapes for water
flow ADDITIONAL CONSUMERS Hydraulics Upgrade pumps and controls Refrigeration Upgrade compressors & pumps. Good insulation

 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzled/ut Included where vessel size & speed is appropriate
RESSTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Hull shape Correct shape especially bow & stern areas
Builbous bow Included where vessel size & speed is appropriate
Hull appendages Reduce appendage number & size. Smooth shapes for water
flow
ADDITIONAL CONSUMERS
Hydraulics Upgrade pumps and controls
Refrigeration Upgrade compressors & pumps. Good insulation | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozleditut Included where vesel size & speed is appropriate
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct shape especially bow & stern areas
Builbous bow Included where vesel size & speed is appropriate
Hull appendages Reduce appendage number & size. Smooth shapes for water
Hold controls
Refrigeration Upgrade compressors & pumps. Good insulation | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Calabase properties Concerns the trigget postmary run roted Propeller nozzledduct Included where vessel size & speed is appropriate RESTSTANCE COMPONENTS Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct shalance to match hull design Hull shape Correct shalance to match hull design Hull shape Correct shape especially bow & stem areas Buibous bow Included where vestel size & speed is appropriate Hull appendages Reduce appendage number & size. Smooth shapes for water flow ADD/TIONAL CONSUMERS Upgrade pumps and controls Refrigeration Upgrade compressors & pumps. Good insulation | Propeller nozzleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct balance to match hull design Hull appendages Correct shape especially bow & stern areas Bulbous bow Included where vessel size & speed is appropriate Hull appendages Reduce appendage number & size. Smooth shapes for water flow ADDITIONAL CONSUMERS Upgrade pumps and controls Refrigeration Upgrade compressons & pumps. Good insulation | Propeller nozzleduct Included where vessel size & speed is appropriate RESSTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct shape especially bow & stem areas Bulbous bow Included where vessel size & speed is appropriate Hull appendages Reduce appendage number & size. Smooth shapes for water flow ADDITIONAL CONSUMERS Upgrade compressors & pumps. Good insulation | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | cargine instantion Correct make and extrains design. Include the finder Provide Provide | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM
<1000 | Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaut design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | THRUST COMPONENTS Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 |
| ADDITIONAL CONSUMERS Hydraulics Upgrade pumps and controls Refrigeration Upgrade compressors & pumps. Good insulation Heating/cooling, electricity and lighting Utilise wate heat. Good insulation. Good controls, switch off | Hull appendages Reduce appendage number & size. Smooth shapes for water
flow ADDITIONAL CONSUMERS Hydraulics Upgrade pumps and controls Refrigeration Upgrade compressors & pumps. Good insulation Heatingcooling, electricity and lighting Utilise wate heat. Good insulation. Good controls, switch off

 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largert possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzled/uct Included where vessel size & speed is appropriate
RESSTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Hull shape Correct shape especially bow & stern areas
Builbous bow Included where vessel size & speed is appropriate
Hull appendages Reduce appendage number & size. Smooth shapes for water
flow
ADDITIONAL CONSUMERS
Hydraulics Upgrade pumps and controls
Refrigeration Upgrade compressors & pumps. Good insulation
Heating/cooling, electricity and lighting
Utilise wate heat. Good insulation. Good controls, switch off | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Propeller nozzleiduct Included where vesel size & speed is appropriate RESTARXE COMPORENTS Hull dimensions Increased length, Hull to suit speed, capacity, displacement & operation Hull shape Correct shape especially how & stern areas Builbous bow Included where vesel size & speed is appropriate Hull appendages Reduce appendage number & size. Smooth shapes for water flow ADDITIONAL CONSUMERS Hydraulics Upgrade pumps and controls Refrigeration Upgrade compressons & pumps. Good insulation Heating/cooling, electricity and lighting Utilise waste heat. Good insulation. Good controls, writch off
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Calabase properties Control to large to positive properties Propeller nozzledduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct balance to match hull design Hull shape Correct balance to match hull design Hull shape Correct shape especially bow & stem areas Bulbous bow Included where vestel size & speed is appropriate Hull appendages Reduce appendage number & size. Smooth shapes for water flow ADD/TIONAL CONSUMERS Upgrade pumps and controls Hydraulics Upgrade compressors & pumps. Good insulation Heating/cooling, electricity and lighting Utilise waste heat. Good insulation. Good controls, switch off | Propeller nozzleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct shape especially bow & stern areas Bulbous bow Included where vessel size & speed is appropriate Hull appendages Reduce appendage number & size. Smooth shapes for water flow ADDITIONAL CONSUMERS Upgrade compressons & pumps. Good insulation Hydraulics Upgrade compressons & pumps. Good insulation Heatingroooling, electricity and lighting Utilise waste heat. Good insulation. Good controls, switch off | Propeller nozzleduct Included where vessel size & speed is appropriate RESSTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct shape especially bow & stern areas Bulbous bow Included where vessel size & speed is appropriate Hull appendages Reduce appendage number & size. Smooth shapes for water flow ADDITIONAL CONSUMERS Upgrade compressors & pumps. Good insulation Hydraulics Upgrade compressors & pumps. Good insulation Heating/cooling, electricity and lighting Utilise waste heat. Good insulation. Good controls, switch off | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | cargine instanation Correct inflate and extration design. Include the finder Gearbox for largest possible propeller, RPM <1000
 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaut design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | THRUST COMPONENTS Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 |
| Hull appendages Reduce appendage number & size. Smooth shapes for water |

 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzle/duct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Bulbous bow Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter
 | Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzledłuct Included where vessel size & speed is appropriate
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Bulboux bow Included where vessel size & speed is appropriate
Bulboux bow Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Trim & weight Correct shape especially bow & stern areas
Bulbous bow Included where vessel size & speed is appropriate
Bulbous bow Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzle/duct Included where vessel size & speed is appropriate
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct shape especially bow & stern areas
Bulbous bow Included where vessel size & speed is appropriate
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Included where vessel size & speed is appropriate Propeller nozzledduct Included where vessel size & speed is appropriate Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct shape especially bow & stern areas Bulbous bow Included where vessel size & speed is appropriate
 | Calibration of properties Control to included where vessel size & speed is appropriate Propeller nozzielduct Included where vessel size & speed is appropriate Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct shape especially bow & stern areas Bulbours bow Included where vessel size & speed is appropriate | Propeller nozladůut Included vhere vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct shape especially bow & stern areas Bulbous bow Included vhere vessel size & speed is appropriate | Propeller nozzleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct shape especially bow & stern areas Bulbous bow Included where vessel size & speed is appropriate | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 IDec Propeller nozzle/duct Included where vessel size & speed is appropriate IDec IDEc RESISTANCE COMPONENTS Increased length. Hull to suit speed, capacity, displacement & operation IDEc IDEc Trim & weight Correct balance to match hull design Table 3: Options for improving fuel efficiency in new and future vessels Hull shape Correct shape especially bow & stern areas Included where vessel size & speed is appropriate | cargine instantion Correct intake and exhaust design. Include fuel meter 9 Forward 10 For | Engine installation Correct intake and exhaust design. Include fuel meter Budrow Budro
 | Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | THRUST COMPONENTS Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design, include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection 3) Propeller Engine installation Correct intake and exhaust design. Include fuel meter 4) Hull to the propeller Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 |
| Hull appendages Reduce appendage number & size. Smooth shapes for water | included where vesser size a speed is appropriate

 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzle/duct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation.
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Included where weared is the forced is encorronitie. | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
opration
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Ended to super special properliste | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Editors have used is a formed is repropriate
Figure and the stern areas | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzloiduct Included where vestel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Buthow how Correct shape especially bow & stern areas
 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vestel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stem areas
Included where vestel is a generative a second is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Popeller nozlotikut Included where vesel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stem areas
Bithour how Included where vesels is a correct that arearching the correct that areas and future vessels | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzlodukt Included where vesel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stem areas
Buthow how under the supercrist to the supe | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
opration
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Ended to super special properliste | Gearbox & propeller Gearbox & propeller Gearbox & for largest possible propeller, RPM <1000
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 ?? forward Propeller nozzlódukt Included where vesel size & speed is appropriate ?? forward ?? forward RESISTANCE COMPONENTS Increased length. Hull to suit speed, capacity, displacement & operation ?? forward ?? forward Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation ?? forward ?? forward Trim & weight Correct shape especially bow & stem areas Correct shape expecially bow & stem areas Efficiency in new and future vessels
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 With Commonstance Propeller nozzledkuct Included where vessel size & speed is appropriate Included where vessel size & speed is appropriate RESSTANCE COMPONENTS Increased length. Hull to suit speed, capacity, displacement & operation Increased length. Hull to suit speed, capacity, displacement & efficiency in new and future vessels Trim & weight Correct balance to match hull design Table 3: Options for improving fuel efficiency in new and future vessels | Propeller nozzleduct in Induded where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct balance expecially bow & stern areas Correct shape especially bow & stern areas Correct shape especially bow & stern areas Correct shape especially bow & stern areas
 | Propeller nozzledukt Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct shape especially bow & stern areas Editory: how Included where were lists & aread larged is proportiate | Propeller nozzleiduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct shape especially bow & stern areas Bithow how | Gearbox & propeller Gearbox for largert possible propeller, RPM <1000 | Engine instansion Correct infance and extration design. Include fuel metter Included where vessel size & speed is appropriate Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzeldaut Included where vesel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern
areas
Editors have used in the scored it is proceed to proceed | Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Granbox & propeller Gearbox for fargest possible propeller, RPM <1000 | THRUST COMPONENTS Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design, include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection 3) Regeter Engine installation Correct intake and exhaust design. Include fuel meter 3) Regeter Gearbox & propeller Gearbox for largest possible propeller, RPM c1000 0) Provided Propeller nozlodukt Included where vessel size & speed is appropriate 0) Recompanient |
| pulicous oviv included where vessel size & speed is appropriate | bulbous bow included where vessel size & speed is appropriate

 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzledduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation.
Trim & weight Correct balance to match hull design
Hull shape Correct balance to match hull design to for improving fuel
efficiency in new and future vessels and for exercisite to the description. | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzielduct Included where vessel size & speed is appropriate
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stem areas
Botheru bor. | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stem areas
Bullow how Increased is appropriate Efficiency in new and future vessels | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleidukt Included where vesel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stem areas
Bulburg hore.
Table 3: Options for improving fuel
efficiency in new and future vessels.
 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vesel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stem areas
Bulburg hom. | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Proved
BESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design
Hull shape Correct intake and exhape especially bow & stern areas
Correct shape especially bow & stern areas | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzlódukt Included where vesel size & speed is appropriate
RESSTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
oppration
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stem areas
Bullow how Correct shape especially bow & stem areas
Bullow how Correct shape especially bow & stem areas | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stem areas
Bullows how Increased is appropriate Increased is appropriate
 | Gearbox & propeller Gearbox & propeller Gearbox & propeller Reparted Propeller nozzloiduct Included where vesel size & speed is appropriate Restruction RESTRUCE COMPORENTS Increased length. Hull to suit speed, capacity, displacement & operation Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct shape especially bow & stern areas Bullen kom Explore and the second in | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 If provide Propeller nozzlóduct Included where vesel size & speed is appropriate If provide If provide RESSTANCE COMPONENTS Increased length. Hull to suit speed, capacity, displacement & operation Trible 3: Options for improving fuel efficiency in new and future vessels Hull dimensions Correct shape especially bow & stem areas Table 3: Options for improving fuel efficiency in new and future vessels
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 With secondation - Bits; Propeller nozzledkuct Included where vessel size & speed is appropriate With secondation - Bits; RESSTANCE COMPONENTS Increased length, Hull to suit speed, capacity, displacement & operation Trim & weight Trim & weight Correct balance to match hull design Table 3: Options for improving fuel efficiency in new and future vessels | Propeller nozziełduct induded where vesel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct hape especially bow & stern areas Correct hape especially bow & stern are | Propeller nozzidduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct thape specially bow & stern areas Editors hore Efficiency in new and future vessels
 | Propeller nozzleiduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct shape especially bow & stem areas Bolhum hum Extension is included diverse and is appropriate | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 ID Dec. Propeller nozzleduct Included where vessel size & speed is appropriate ID Dec. ID Dec. RESISTANCE COMPONENTS Increased length. Hull to suit speed, capacity, displacement & operation. Increased length. Hull do suit speed, capacity, displacement & operation. Table 3: Options for improving fuel efficiency in new and future vessels. Hull shape Correct shape especially bow & stem areas Efficiency in new and future vessels. | engine instansion Correct intake and exhaust design. Include fuel meter Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozlokukt Included where vesel size & speed is appropriate
RESSTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
oppration
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Bullen how Correct shape especially bow & stern areas
Bullen how Correct shape especially bow & stern areas
 | Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | THRUST COMPONENTS Engine selection Engine installation Correct intake and exhaust design, include fuel meter Gearbox & propeller Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection
Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozification in the intervention of the interventing of the interventio |
| Hull appendages Reduce appendage number & size. Smooth shapes for water |

 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox of largest possible propeller, RPM <1000
Propeller nozzledukt Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Trim & weight Correct balance to match hull design
Trim & weight Correct shape especially bow & stern areas
Bulbous bow Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, IPM <1000
Propeller nozzioduct Included where vessel size & speed is appropriate
RESSTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Hull shape Correct thape especially bow & stern areas
Bulbous bow Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct shape especially bow & stern areas
Bulbous bow Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter
 | Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzledłuct Included where vessel size & speed is appropriate
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Bulbous bow Included where vessel size & speed is appropriate
Bulbous bow Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation.
Trim & weight Correct balance to match hull design
Thus & weight Correct shape especially bow & stern areas
Bulbous bow Included where vessel size & speed is appropriate
Bulbous bow Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozziciduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Bulbous bow Included where vessel size & speed is appropriate
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Included where vessel size & speed is appropriate Propeller nozzlóduxt Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & oppration Trim & weight Correct balance to match hull design Hull shape Correct shape especially bow & stern areas Bulbous bow Included where vessel size & speed is appropriate
 | Propeller nozzleduct included where vessel size & speed is appropriate
Hull dimensions increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Bulbous bow included where vessel size & speed is appropriate | Propeller nozladůut Indiuded where vessel size & speed is appropriate RESISTANCE COMPORENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct shape especially bow & stern areas Bulbous bow Induded where vessel size & speed is appropriate | Propeller nozzleiduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct shape especially bow & stern areas Bulbous bow Included where vessel size & speed is appropriate | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | correct imake and exhaust design. Include fuel meter 9 Forward 10 For | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Thus a speed is appropriate
Bulbous bow Included where vessel size & speed is appropriate
 | Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | THRUST COMPONENTS Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection 3) Repeter Engine installation Correct intake and exhaust design. Include fuel meter 3) Repeter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 |
| Hull appendages Reduce appendage number & size. Smooth shapes for water |

 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzle/duct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stem areas
Bulbous bow Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vestel size & speed is appropriate
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
rrim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Bulbous bow Included where vestel size & steed is appropriate
 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzielduct Included where vessel size & speed is appropriate
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation.
Hull shape Correct balance to match hull design
Hull shape Correct shape especially bow & stem areas
Bubous bow Included where vessel size & steed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Bulbous bow Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Bulbous bow Included where vestel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Gearbox & propeller Gearbox of largest possible propeller, RPM <1000 Included where vessel size & speed is appropriate Propeller nozzloźduct Included where vessel size & speed is appropriate Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct shape especially bow & stern areas Bulbous bow Included where vessel size & speed is appropriate
 | Propeller nozzleduct induded where vessel size & speed is appropriate
Hull dimensions induded where vessel size & speed is appropriate
Hull dimensions increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Bulbous bow included where vessel size & speed is appropriate
Bulbous bow included where vessel size & speed is appropriate
Hull shape Correct shape especially bow & stern areas
Bulbous bow included where vessel size & speed is appropriate
Hull shape Correct shape especially bow & stern areas
Bulbous bow included where vessel size & speed is appropriate
Hull shape Correct shape especially bow & stern areas
Bulbous bow included where vessel size & speed is appropriate
Hull shape Correct shape especially bow & stern areas
Bulbous bow included where vessel size & speed is appropriate
Hull shape Correct shape especially bow & stern areas
Hull shape Correct shape especially bow & stern areas
Hull shape Correct shape especially bow & stern areas
Bulbous bow included where vessel size & speed is appropriate
Hull shape Correct shape especially bow & stern areas
Hull shape Correct shape es | Propeller nozzleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct shape especially bow & stern areas Bulbous bow Included where vestel size & speed is appropriate | Propeller nozzlečkut Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct space specially bow & stem areas Bulbous bow Included where vessel size & speed is appropriate | Gearbox & propeller Gearbox & for largest possible propeller, RPM <1000 | cingme instantion Correct intake and exhaust design. Include fuel meter Included where vessel size & speed is appropriate Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Engine installation Correct intake and exhaust design. Include fuel meter Included where vessel size & speed is appropriate Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | THRUST COMPONENTS Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection 21 Series Engine installation Correct intake and exhaust design. Include fuel meter 31 Argeler Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 |
| rrui snape correct shape especially bow & stern areas efficiency in new and future vessels
Bulbous bow Induded where vessel size & speed is appropriate | Bulbous bow Included where vessel size & speed is appropriate

 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design
Table 3: Options for improving fuel | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design
Table 3: Options for improving fuel | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design
Table 3: Options for improving fuel | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzle/duct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design Table 3: Options for improving fuel
 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vestel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design
Table 3: Options for improving fuel | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Popeller nozzlośduct Included where vesel size & speed is appropriate
RESSTANCE COMPORENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
Operation
Trim & weight Correct balance to match hull design
Table 3: Options for improving fuel | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduxt Included where vesel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design Table 3: Options for improving fuel | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Table 3: Options for improving fuel
 | Gearbox & propeller Gearbox & propeller Gearbox & propeller Proved Propeller nozzloiduct Included where vessel size & speed is appropriate Proved RSSTANCE COMPORENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Table 3: Options for improving fuel | Gearbox & propeller Gearbox & propeller Gearbox & propeller Included where vessel size & speed is appropriate Propeller nozzle/duct Included where vessel size & speed is appropriate Included where vessel size & speed is appropriate Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Table 3: Options for improving fuel
 | Gearbox & propeller Gearbox of largest possible propeller, RPM <1000 Picket Propeller nozzledbuct included where vessel size & speed is appropriate Picket | Propeller nozzleduct in ruger, pontin preprint in reaction in a preprint in the ruger interval | Propeller nozzleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Table 3: Options for improving fuel
 | Propeller nozzlečkuct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Table 3: Options for improving fuel | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Correct make and extratio design. Include fuel meter Thermost fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzle/duct Included where vesel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation Trim & weight Correct balance to match hull design Table 3: Options for improving fuel
 | Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | THRUST COMPONENTS Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design, include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection 3) Regeler Engine installation Correct intake and exhaust design. Include fuel meter 3) Regeler Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 |
| Hull shape Correct shape especially bow & stern areas efficiency in new and future vessels | Considered and the first of the second

 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzłołduct Included where vessel size & speed is appropriate
RESSTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design Table 3: Options for improving fuel | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation Operation Trim & weight Correct balance to match hull design Table 3: Optioner for improving fuel | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzle/duct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design Table 3: Optioner for improving fuel | Engine installation Correct intake and exhaust design. Include fuel meter 6) Bec Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzled/uct Included where vesel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design Table 3: Options for improving fuel
 | Engine installation Correct initake and exhaust design. Include fuel meter
Gearbox for largest possible propeller, RPM <1000
Propeller noczleduct Included where vesel size & speed is appropriate
ESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Tim & weight Correct balance to match hull design | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
The Average Structure of the struct | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzle/duct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation Trim & weight Correct balance to match hull design Table 3: Outjoon: for increasing fuel | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000

 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Propeller nozzleduct Induded where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Table 3: Options for improving fuel | Propeller nozziedluct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design
 | Propeller nozzločkuct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | crigine instansion Correct intake and exhaust design. Include fuel meter 9) Forward Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter 9 Bore Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection Engine installation Correct
intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | THRUST COMPONENTS Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection 2) Series Engine installation Correct intake and exhaust design. Include fuel meter 3) Brogeler Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 |
| Hull shape Correct shape especially bow & stern areas efficiency in new and future vessels | a content of the statute tessels

 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design Table 3: Options for improving fuel | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vestel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design Table 3: Options for improving fuel | Engine installation Correct intake and exhaust design. Include fuel meter 9 for and 10 for an an an and 10 for an and 10 for an | Engine installation Correct intake and exhaust design. Include fuel meter Grazhox & propeller Gearbox for largest possible propeller, RPM <1000
 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESSTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design Table 3: Options for improving fuel | Engine installation Correct intake and exhaut design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzle/duct Included where vessel size & speed is appropriate
RESSTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Table 3: Options for improving fuel | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzled/uct Included where vessel size & speed is appropriate
RESTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design Table 3: Options for improving fuel | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzloiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design Table 3: Options for improving fuel | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Gearbox & propeller Gearbox & for largest possible propeller, RPM <1000
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 9) Secondation - Billing Propeller nozzleduct Included where vessel size & speed is appropriate 9) Secondation - Billing RESISTANCE COMPONENTS Increased length. Hull to suit speed, capacity, displacement & operation 9) Secondation - Billing Trim & weight Correct balance to match hull design Table 3: Options for improving fuel | Propeller nozzledłuct included where vesel size & speed is appropriate
#ESSTANCE COMPONENTS
Hull dimensions increased length. Hull to suit speed, capacity, displacement &
Operation
Trim & weight Correct balance to match hull design Table 3: Options for improving fuel
 | Propeller nozzlóduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Table 3: Options for improving fuel | Propeller nozzločkuct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Table 3: Options for improving fuel | Gearbox & propeller Gearbox K for largest possible propeller, RPM <1000 | Engine instantion Correct intake and extrains design. include fuel meter 9 Topenet Gearbox for largest possible propeller, RPM <1000 |
Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | THRUST COMPONENTS Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaunt design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection 3) Brogetter Engine installation Correct intake and exhaust design. Include fuel meter 3) Brogetter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 |
| Bulkeur heur | Pullaus hau Indudad ukan untal din & mang-inte

 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate
<u>RESISTANCE COMPONENTS</u>
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation.
Trim & weight Correct balance to match hull design
Tim & weight Correct balance to match hull design | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
opration
Trim & weight Correct balance to match hull design
Tim & weight Correct balance and the balance to match hull design
Tim & Correct balance and the balance to match hull design
Tim & Correct balance and the balance to match hull design
Table 3: Options for improving fuel | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Time & correct these amendality how & tern apact | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzloiduct Included where vestel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design
Hull theme Correct theme areas in the stars areas
 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design Table 3: Options for improving fuel | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate
RESSTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Trim & weight Correct balance to match hull design
Hull dage Correct balance to match hull design | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzlodukt Included where vesel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Hull dimensions Correct these sensel is then a page | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design
Tim & weight Correct balance area islue boy & ters areas
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Propeller nozzleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Table 3: Options for improving fuel | Propeller nozzleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Table 3: Options for improving fuel | Propeller nozzleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Table 3: Options for improving fuel | Gearbox & propeller Gearbox for largert possible propeller, RPM <1000 Propeller nozzleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & Trim & weight Correct balance to match hull design Table 3: Options for improving fuel | crighter instantion Correct infance and extration design. Include fuel metter 97 (append) Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduat Included where vesel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Table 3: Options for Improving fuel | Engine selection Advanced design, correct power selection 3 Seminary Engine installation Correct intake and exhaust design. Include fuel meter 3 Seminary Granbox & propeller Gearbox for largest possible propeller, RPM <1000 | THRUST COMPONENTS Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design, include fuel meter Gearbox & propeller Gearbox (a propeller, RPM < 1000 | Engine selection Advanced design, correct power selection 3) Register Engine installation Correct intake and exhaust design. Include fuel meter 3) Register Gearbox & propeller Gearbox for largest possible propeller, RPM 1000 9) Reconcilence Propeller nozzlodukt Included where vesel size & speed is appropriate 9) Reconcilence Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation 9) Reconcilence Trim & weight Correct binase smeridible bare & then same Table 3: Options for improving fuel |
| Bulbous bow Included where vessel size & speed is appropriate | Bulbous bow Included where vessel size & speed is appropriate

 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzledłuct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation Orrect balance to match hull design
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stem areas | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzle/duct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation Ocrrect balance to match hull design
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stem areas | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox for largest possible propeller, RPM <1000
Propeller noczleduct Included where vessel size & speed is appropriate
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
personal correct balance to match hull design
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Correct shape especially bow & stern areas | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct shape especially bow & stern areas
Hull shape Correct shape especially bow & stern areas | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzle/duct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation Orrect balance to match hull design
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stem areas
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Increased length, full to suit speed, capacity, displacement & operation Propeller nozzlódłuct Included where vessel size & speed is appropriate Increased length, Hull to suit speed, capacity, displacement & operation Hull dimensions Increased length, Hull to suit speed, capacity, displacement & operation Trim & weight Trim & weight Correct shape especially bow & stern areas Table 3: Options for improving fuel efficiency in new and future yessels
 | Contract of properties Contract of the registry formation properties Propeller nozzleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct shape especially bow & stern areas | Propeller nozzleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct shape especially bow & stern areas | Propeller nozzloduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct shape especially bow & stern areas | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 ID Dec. Propeller nozzle/duct Included where vessel size & speed is appropriate ID Dec. ID Dec. RESISTANCE COMPONENTS Increased length. Hull to suit speed, capacity, displacement & operation Dec. ID Dec. Trim & weight Correct balance to match hull design Table 3: Options for improving fuel efficiency in new and future vessels | engine insumation Correct imake and exhaust design. Include fuel meter 9 Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Engine installation Correct intake and exhaust design. Include fuel meter 9 before Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | THRUST COMPONENTS Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection 3) Propeller Engine installation Correct intake and exhaust design. Include fuel meter 4) and the propeller Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 |
| Bulbous bow Included where vessel size & speed is appropriate | Bulbous bow Included where vessel size & speed is appropriate

 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzłaśduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stem areas | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate
<u>RESISTANCE COMPONENTS</u>
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct shape especially bow & stern areas
Hull shape Correct shape especially bow & stern areas | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation.
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzielduct Included where vessel size & speed is appropriate
RESSTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stem areas | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox for largest possible propeller, RPM <1000
Propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Correct shape especially bow & stern areas | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzielduct Included where vessel size & speed is appropriate
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Hull shape Correct shape especially bow & stern areas | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
#SSSTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct shape especially bow & stern areas
Hull shape Correct shape especially bow & stern areas
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Propeller nozzleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct shape especially box & stern areas | Propeller nozzlóduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct shape especially bow & stern areas | Propeller nozzleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct balance expectably bow & stern areas | Gearbox & propeller Gearbox for largert possible propeller, RPM <1000
Propeller nozzleduct included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stem areas
Figure 2010 - | cingme instantion Correct infance and extration design. Include fuel metter 9 Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Engine installation Correct intake and exhaust design. Include fuel meter 9 Income Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | THRUST COMPONENTS Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection 2) Series Engine installation Correct intake and exhaust design. Include fuel meter 3) Angeler Gearbox for largest possible propeller, RPM <1000 |
| Hull shape Correct shape especially bow & stern areas efficiency in new and future vessels |

 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design Table 3: Options for improving fuel | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzloiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Table 3: Options for improving fuel | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, IPM <1000
Propeller nozzlołduct Included where vestel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design Table 3: Options for improving fuel | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzled/uct Included where vessel size & speed is appropriate
RESSTANCE COMPONENTS
Hull dimensions Increased length, Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Table 3: Options for improving fuel | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzlośduct Included where vesel size & speed is appropriate
ESSTANCE COMPORENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design Table 3: Options for improving fuel | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Gearbox & propeller Gearbox & for largest possible propeller, RPM <1000
 | Gearbox & propeller Gearbox of largest possible propeller, RPM <1000 Propeller nozzleduct Included where vessel size & speed is appropriate Propeller nozzleduct Included where vessel size & speed is appropriate Increased length. Hull to suit speed, capacity, displacement & operation Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Table 3: Options for improving fuel
 | Propeller nozzleduct include where vessel size & speed is appropriate RESSTANCE COMPONENTS Hull dimensions increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Table 3: Options for improving fuel | Propeller nozzlódukt Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Table 3: Options for improving fuel | Propeller nozzlołduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Table 3: Options for improving fuel | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | engine misuanauon Correct balance to match hull design Increased length. Hull to suit speed, capacity, displacement & operation
 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleśduct include where vessel size & speed is appropriate
RESTSTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design Table 3: Options for improving fuel | Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RFM <1000 | THRUST COMPONENTS Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection 31 Propeller Engine installation Correct intake and exhaust design. Include fuel meter 31 Propeller Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 |
| Hull shape Correct shape especially bow & stern areas efficiency in new and future vessels |

 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzle/duct Included where vessel size & speed is appropriate
RESSTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation Trim & weight Correct balance to match hull design Table 3: Options for improving fuel | Engine installation Correct intake and exhaust design. Include fuel meter 9 Formula Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Propeller nozzleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Table 3: Options for improving fuel | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Trim & weight Correct balance to match hull design | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 III consider and the set of | Contract properties Contract properties Propeller nozzledduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Table 3: Options for improving fuel
 | Propeller nozziedukt Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Table 3: Options for improving fuel | Propeller nozzločkuct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Table 3: Options for improving fuel | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | crigine instantion Correct intake and exhaust design. Include fuel meter 9) Forward Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter 9 Brow Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | THRUST COMPONENTS Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design, include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection 3) Propeller Engine installation Correct intake and exhaust design. Include fuel meter 4) and the correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 |
| Hull shape Correct shape especially bow & stern areas efficiency in new and future vessels | Children of the second se

 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleidluct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design Table 21. Optioner for improving fuel | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Trim & weight Correct balance to match hull design | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzle/duct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Trim & weight Correct balance to match hull design | Engine installation Correct intake and exhaust design. Include fuel meter Include In | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzledłuct Included where vesel size & speed is appropriate
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Trim & weight Correct balance to match hull design
 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIORCK
BIO | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzielduct Included where vessel size & speed is appropriate
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Trim & weight Correct balance to match hull design | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzle/duct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Trim & weight Correct balance to match hull design | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000

 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Propeller nozzleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design The Aveight Correct balance to match hull design | Propeller nozzielduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design
 | Propeller nozzloduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Propeller nozzle/duct Included where vessel size & speed is appropriate RESSTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design The design Table 2: Options for improving fuel | Engine instansion Correct inflace and exhaust design. Include fuel meter 7) Forward Gearbox & propeller Gearbox for largest possible propeller, IPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter 9 brow Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Engine selection Advanced design, correct power selection Engine selection Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | THRUST COMPONENTS Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection 2) Series Engine installation Correct intake and exhaust design. Include fuel meter 3) Advanced Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 |
| Hull shape Correct shape especially bow & stern areas efficiency in new and future vessels |

 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzledbuct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design The State St | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
BISSTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design The State Sta | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design The State St | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzielduct Included where vessel size & speed is appropriate
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design Table 2: Optiones foo is provided for a functional for the speed of the speed | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzielduct Included where vessel size & speed is appropriate
RESSTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design Table 2: Options for language fuel | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Propeller nozzleduct Included where vessel size & speed is appropriate ESSTAINCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design The Weight The Weight Correct balance to match hull design The Weight Correct balance to match hull design The Weight | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzielduct Included where vessel size & speed is appropriate
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Trim & weight Correct balance to match hull design
 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design The State St | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Propeller nozzleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design This weight Correct balance to match hull design | Propeller nozzieduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design | Propeller nozzleiduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine instansion Correct imake and exhaust design. Include fuel meter 97 Foreid Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Engine installation Correct intake and exhaust design. Include fuel meter 9 Incore Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection Engine selection Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | THRUST COMPONENTS Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection 2) Series Engine installation Correct intake and exhaust design. Include fuel meter 3) Arceler Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 |
| Trim & weight Correct balance to match hull design Table 3: Options for improving fuel | run snape correct snape especially bow & stern areas efficiency in new and future vessels

 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzloiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzloduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vestel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzloiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Popeller nozzled/uct Included where vesel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozlocitikut Included where vesel size & speed is appropriate
RESSTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzloduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
 | Gearbox & propeller Gearbox & for largest possible propeller, RPM <1000 | Gearbox & propeller Gearbox & for largest possible propeller, RPM <1000 Propeller nozald/duct Propeller nozald/duct Propeller nozal/duct Propeller nozal
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 9) Accompation - Billing Propeller nozzledkuct Included where vessel size & speed is appropriate 9) Accompation - Billing RESISTANCE COMPONENTS Increased length. Hull to suit speed, capacity, displacement & operation 9) | Propeller nozzledłuct included where vesel size & speed is appropriate RESSTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
 | Propeller nozzlóduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS | Propeller nozzloduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | engme misuanauon Correct make and exhaus design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzledduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vesel size & speed is appropriate
RESISTANCE
COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation | Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | THRUST COMPONENTS Engine selection Engine installation Correct intake and exhaust design, include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection 21 Setent Engine installation Correct intake and exhaust design. Include fuel meter 31 Propeller Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 |
| Trim & weight Correct balance to match hull design Table 3: Options for improving fuel | Hull shape Correct shape especially bow & stern areas efficiency in new and future vessels

 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzloiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vestel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation | Engine installation Correct intake and exhaust design. Include fuel meter 1) Brow Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Engine installation Correct intake and exhaust design. Include fuel meter 1) accorr Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzlediuct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzlediuct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vestel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Propeller nozzleduct included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation | Propeller nozzieduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation | Propeller nozzloduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Propeller nozzloduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation | engine instanation Correct intake and exhaust design. Include fuel meter
Gearbox for largest possible propeller, RPM <1000
Propeller nozzlołduct Included where vesel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzielduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & | Engine selection Advanced design, correct power selection 2 Seminary Engine installation Correct intake and exhaust design. Include fuel meter 3 Seminary Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | THRUST COMPONENTS Engine selection Engine installation Correct intake and exhaust design, include fuel meter Gearbox & propeller Gearbox & propeller Bropeller nozzledduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation | Engine selection Advanced design, correct power selection 21 Speed Engine installation Correct intake and exhaust design. Include fuel meter 31 Speed Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 |
| Trim & weight Correct balance to match hull design Table 3: Options for improving fuel | Hull shape Correct shape especially bow & stern areas efficiency in new and future vessels

 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzledłuct Included where vesel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation | Engine installation Correct intake and exhaust design. Include fuel meter 9 Metric Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzledduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation | Engine installation Correct intake and exhaust design. Include fuel meter 1) Bit door Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox for largest possible propeller, RPM <1000 Propeller noczleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzielduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Image: Control of Control o | Propeller nozzleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
 | Propeller nozzleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation | Propeller nozzleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Propeller nozzleduct Included where vessel size & speed is appropriate RESSTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation | Engine instanation Correct make and exhaust design. Include fuel meter 7) Torverd Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzledduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
 | Engine selection Advanced design, correct power selection 3 Second
1 And
Engine installation Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | THRUST COMPONENTS Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection 2) Series Engine installation Correct intake and exhaust design. Include fuel meter 3) Appendent Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 |
| Trim & weight Correct balance to match hull design | Hull shape Correct shape especially bow & stern areas efficiency in new and future vessels

 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzledbuct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
<u>RESISTANCE COMPONENTS</u>
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
#SSSTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzledkuct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESSTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
operation | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
coperation | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
#SISSTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Propeller nozzleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Increased length. Hull to suit speed, capacity, displacement & operation | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 9) Accompation - Billing Propeller nozzle/duct Included where vessel size & speed is appropriate 9) Accompation - Billing RESISTANCE COMPONENTS Increased length. Hull to suit speed, capacity, displacement & operation 9) Accompation - Billing
 | Propeller nozzleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation | Propeller nozzleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation | Propeller nozzleiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
operation | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Propeller nozzledduct Included where vessel size & speed is appropriate RESSTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation | engine instansion Correct make and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzledduct Included where vestel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzlodduct Included where vestel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation | Engine selection Advanced design, correct power selection 2 9 mm Engine installation Correct intake and exhaust design. Include fuel meter 4 Hal Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | THRUST COMPONENTS Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection 2) Series Engine installation Correct intake and exhaust design. Include fuel meter 3) Accord Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 |
| operation Trim & waight Corract halance to match hull during | Hull shape Correct base epecially box & stern areas efficiency in new and future vessels

 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzlołduct Included where vestel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzle/duct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Propeller nozzlodluct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & | Propeller nozzlóduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS | Propeller nozzleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Propeller nozzleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & | cingme instansion Correct infance and extration design. Include fuel metter 77 proved Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Engine installation Correct intake and exhaust design. Include fuel meter 9 and over Gearbox & propeller Gearbox for largest possible propeller, IPM <1000 | Engine selection Advanced design, correct power selection 3 Seminary Engine installation Correct intake and exhaust design. Include fuel meter 3 Seminary Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | THRUST COMPONENTS 10 famel Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design, include fuel meter Gearbox & propeller Gearbox (a propeller, RPM < 1000 | Engine selection Advanced design, correct power selection 3) Bregeter Engine installation Correct intake and exhaust design. Include fuel meter 3) Bregeter Gearbox & propeller Gearbox for largest possible propeller, RPM c1000 3) Bregeter Propeller nozzloduct Included where vessel size & speed is appropriate 3) Bregeter Hull dimensions Increased length. Hull to suit speed, capacity, diplacement & |
| operation | Imm a weight Correct balance to match hull design Table 3: Options for improving fuel Hull shape Correct shape especially bow & stern areas efficiency in new and future vessels

 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzlołduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity. displacement & | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vestel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzlołduct Included where vestel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity. displacement & | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vesel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity. displacement &
 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzlołduct Included where vessel size & speed is appropriate
RESSTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity. displacement & | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzled/uct Include where vesel size & speed is appropriate
RESTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vesel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity. displacement & | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vestel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity. displacement &
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Propeller nozzlelduct Included where vessel size & speed is appropriate RSSTANCE COMPONENTS Hull dimensions Increased length, Hull to suit speed, capacity, displacement & | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Propeller nozzleiduct Included where vessel size & speed is appropriate RESISTANCE COUPONENTS Hull dimensions Increased length. Hull to suit speed, capacity. displacement &
 | Gearbox & propeller Gearbox (a propeller RPM <1000 9) Accompation - Bilago
Propeller nozzleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length, Hull to suit speed, capacity, displacement &
 | Propeller nozzledkut included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity. displacement & | Propeller nozzlóduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & | Propeller nozzloduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity. displacement & | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Propeller nozzloduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity. displacement & | engine instansion Correct initiate and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzielduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzlediuct Included where vesel size & speed is appropriate
RSISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & | Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Propeller nozzled/tut Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & | THRUST COMPONENTS Engine selection Engine installation Correct intake and exhaust design, include fuel meter Gearbox & propeller Gearbox & propeller Gearbox & propeller Gearbox Korl argest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox for largest possible propeller, RPM <1000 Propeller nozzled/uct Included where vessel size & speed is appropriate RSISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & |
| nun unnensions increasea iengin. nun to suit speed, capaCity, displacement & operation | Trim & weight Correct balance to match hull design Table 3: Options for improving fuel Hull shape , Correct shape especially bow & stern areas efficiency in new and future vessels

 | Engine installation Correct intake and exhaust design. Include fuel meter effective for largest possible propeller, RPM <1000 Propeller nozzleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS EXAMPLE COMPONENTS | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
UII dimensional largest, built to public gened capacity direction and the second capacity direction and the | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vestel size & speed is appropriate
RESISTANCE COMPONENTS
Util dimensional largest, built and speed conscip_dimension | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzlediuct Included where vesel size & speed is appropriate
RESISTANCE COMPONENTS | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzled/uct Included where vesel size & speed is appropriate
#ESSTANCE COMPONENTS
Included interviewed leventh. Will be usile seend coastific if inclusions in the second coastifi
 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Propeller nozzleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Included searching for the speed of the s | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzledduct Included where vessel size & speed is appropriate
#SSSTANCE COMPONENTS
International Included in the international constitution of the internation | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Propeller nozzleduct Included where vessel size & speed is appropriate RESSTANCE COMPONENTS | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Propeller nozzleduct Included where vessel size & speed is appropriate RESSTANCE COMPONENTS

 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 99 Accemotation - Bridge Propeller nozzleiduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS | Propeller nozzielduct included where vessel size & speed is appropriate RESISTANCE COMPONENTS | Propeller nozzledluct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Well dimensions Increased levels Multiplication and approximation | Propeller nozzleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS | Gearbox & propeller Gearbox for largest possible propeller,
RPM <1000 Propeller nozzleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS | Correct makes and extraux design. Include fuel meter Topeler Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS Included where vessel size & speed is appropriate | Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | THRUST COMPONENTS Engine selection Engine installation Correct intake and exhaust design, include fuel meter Gearbox & propeller Gearbox & propeller Gearbox & propeller Gearbox Tor largest possible propeller, RPM <1000
 | Engine selection Advanced design, correct power selection
Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozziedkuct Included where vesel size & speed is appropriate
RESISTANCE COMPORENTS |
| Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation | Trim & weight Correct balance to match hull design Table 3: Options for improving fuel Hull shape Correct shape especially box & stern areas efficiency in new and future vessels

 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzlołduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS | Engine installation Correct intake and exhaust design. include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzle/duct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzlołduct Included where vesel size & speed is appropriate
RESSTANCE COMPONENTS | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Propeller nozloduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Propeller nozzloduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS
 | Gearbox & propeller Gearbox (or largest possible propeller, RPM <1000 9) Accompation -Bilago
Propeller nozzledkuct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS
 | Propeller nozzleduct Included where vesel size & speed is appropriate RESSTANCE COMPONENTS | Propeller nozzloduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS | Propeller nozzleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS | Correct Infance and extratus design. Include fuel meter 1 <th1< th=""> 1
1</th1<> | Engine installation Correct intake and exhaust design. Include fuel meter 9 Informed Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection 2) Seminary Engine installation Correct intake and exhaust design. Include fuel meter 3) Model Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | THRUST COMPONENTS Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection 2) Series Engine installation Correct intake and exhaust design, include fuel meter 3) Archite Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 |
| RESISTANCE COMPONENTS | Huil amensions Increase length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Table 3: Options for improving fuel Hull shape Correct shape especially bow & stern areas efficiency in new and future vescels

 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate
Propeller nozzleduct Section (Section (Sect | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller
Gearbox & for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
 | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Propeller nozzle/duct Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Propeller nozzledkuct Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Propeller nozzledkuct Included where vessel size & speed is appropriate
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Propeller nozzledkuct Included where vessel size & speed is appropriate
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 99 Accompation - BNAC
Propeller nozzleduct Included where vessel size & speed is appropriate | Propeller nozzleduct Included where vessel size & speed is appropriate
 | Propeller nozzle/duct Included where vessel size & speed is appropriate | Propeller nozzle/duct Included where vessel size & speed is appropriate | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 II Decc. Propeller nozzleiduct Included where vessel size & speed is appropriate II Decc. III Decc. | engine instansion Correct infance and exhaust design. Include fuel meter Correct infance and exhaust design. Include fuel | Engine installation Correct intake and exhaust design. Include fuel meter Image: Correct intake and exhaust design. Include fuel meter Image: Correct intake and exhaust design. Include fuel meter Image: Correct intake and exhaust design. Include fuel meter Image: Correct intake and exhaust design. Include fuel meter Image: Correct intake and exhaust design. Include fuel meter Image: Correct intake and exhaust design. Include fuel meter Image: Correct intake and exhaust design. Include fuel meter Image: Correct intake and exhaust design. Include fuel meter Image: Correct intake and exhaust design. Include fuel meter Image: Correct intake and exhaust design. Include fuel meter Image: Correct intake and exhaust design. Include fuel meter Image: Correct intake and exhaust design. Include fuel meter Image: Correct intake and exhaust design. Include fuel meter Image: Correct intake and exhaust design. Include fuel meter Image: Correct intake and exhaust design. Include fuel meter Image: Correct intake and exhaust design. Image: Correct intake and exhau | Engine selection Advanced design, correct power selection 2 9 sem Engine installation Correct intake and exhaust design. include fuel meter 4 Had Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | THRUST COMPONENTS Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection 31 seminary Engine installation Correct intake and exhaust design, include fuel meter 10 projecter 31 sector Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 |
| RESISTANCE COMPONENTS | Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Table 3: Options for improving fuel Hull shape Correct shape especially bow & stern areas efficiency in new and future vessels

 | Engine installation Correct intake and exhaust design. Include fuel meter
From the set of the set | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller
Gearbox & propeller
Propeller nozzleduct Included where vestel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzloduct Included where vessel size & speed is appropriate
 | Engine installation Correct intake and exhaust design. Include fuel meter Engine installation Correct intake and exhaust design. Include fuel meter Engine installation Gearbox & propeller Gearbox & propeller Gearbox or largest possible propeller, RPM <1000 Propeller nozzleiduct Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter
6 Gearbox & propeller
Gearbox & propeller
Propeller nozzleduct Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vestel size & speed is appropriate | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 7 Proved 8 9) Accompation - Bildg Propeller nozzleiduct Included where vessel size & speed is appropriate
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 99 Accompation - Bildy
Propeller nozzleiduct Included where vessel size & speed is appropriate | Propeller nozzle/duct Included where vessel size & speed is appropriate
 | Propeller nozzle/duct Included where vessel size & speed is appropriate | Propeller nozzle/duct Included where vessel size & speed is appropriate | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 B Deck 91 Accompany on the state of the | engme instansioon Correct intake and exhauss design. Include fuel meter 1 forwald
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 9 forwald 8 Dec.
Propeller nozzleiduct Included where vestel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller
Propeller nozzleduct Included where vessel size & speed is appropriate | Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for popeller Gearbox for popeller, RPM <1000 Propeller nozzleduct Included where vestel size & speed is appropriate
 | THRUST COMPONENTS 10 nmet Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox (a propeller, RPM < 1000 | Engine selection Advanced design, correct power selection
Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM c1000
Propeller nozeduct Included where wessel size & speed is appropriate |
| RESISTANCE COMPONENTS | Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Table 3: Options for improving fuel Hull shape Correct shape especially bow & stern areas efficiency in new and future vessels

 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzle/duct Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller
Propeller nozzledduct Included where vessel size & speed is appropriate
Propeller nozzledduct Included where vessel size & speed is appropriate
 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzledłuct Included where vesel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox for largest possible propeller, RPM <1000 Propeller nozzle/duct Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzled/duct Included where vessel size & speed is appropriate
Propeller nozzled/duct Section 2010
Propeller nozzled/duct Section 2010 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzle/duct Included where vessel size & speed is appropriate | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 71 Forward 80 91 Accomocation - Bridge Propeller nozzledkuct Included where vessel size & speed is appropriate
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 71 loward 81 91 Accompany
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 9) Accompation - Billing Propeller nozzle/duct Included where vessel size & speed is appropriate 1 | Propeller nozzleduct Included where vessel size & speed is appropriate | Propeller nozzle/duct Included where vessel size & speed is appropriate
 | Propeller nozzle/duct Included where vessel size & speed is appropriate | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | crighter instantion Correct inflate and exhaust design. Include fuel meter 1 <th1< th=""> 1 <th1< th=""> <</th1<></th1<> | Engine installation Correct intake and exhaust design. Include fuel meter 9 Annov Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection 2 Seminary Engine installation Correct intake and exhaust design. Include fuel meter 3 Model Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | THRUST COMPONENTS Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection 2) Series Engine installation Correct intake and exhaust design, include fuel meter 3) Advine Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 |
| RESISTANCE COMPONENTS | Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Table 3: Options for improving fuel Hull shape Correct shape especially bow & stern areas efficiency in new and future vessels

 | Engine installation Correct intake and exhaust design. Include fuel meter 7 forwar
7 forwar
7 forwar
7 forwar
7 forwar
8 Dect
8 Dect
9 Jacomodelon - Bridg | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller
Gearbox & for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate
 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzloduct Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter Engine installation Correct intake and exhaust design. Include fuel meter Engine installation Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Bit Secondation - Bit Seco | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox & propeller
Propeller nozzleduct Included where vessel size & speed is appropriate | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 7 1 forward 8 9 Accomptation - Bilds 9 Accom | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 7 forward 8 9 Accompation - Bilds
Propeller nozzleiduct Included where vessel size & speed is appropriate

 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 91 Accompation - Billing Propeller nozzleiduct Included where vessel size & speed is appropriate 91 Accompation - Billing | Propeller nozzle/duct Included where vessel size & speed is appropriate | Propeller nozzle/duct Included where vessel size & speed is appropriate
 | Propeller nozzle/duct Included where vessel size & speed is appropriate | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 B Dect
9) Accompation - Bridge
Propeller nozzledduct Included where vessel size & speed is appropriate | engine instansioon Correct intake and exhauss design. Include fuel meter 1 forward 1 f | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleiduct Included where vessel size & speed is appropriate | Engine selection Advanced design, correct power selection 3 Seminary Engine installation Correct intake and exhaust design. Include fuel meter 5 Accine Grathox & propeller Gearbox & propeller, RPM <1000 | THRUST COMPONENTS 110 mmet Engine selection Advanced design, correct power selection 20 dem Engine installation Correct intake and
exhaust design. Include fuel meter 30 dem Gradhox & propeller Granhox & propeller, RPM <1000 | Engine selection Advanced design, correct power selection 21 Setent Engine installation Correct intake and exhaust design. Include fuel meter 31 Arbor Gearbox & propeller Gearbox & propeller, RPM <1000 |
| Propeller nozzle/duct Included where vessel size & speed is appropriate | RESISTANCE COMPONENTS Increased length. Hull to suit speed, capacity, displacement & operation Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct shape especially bow & stern areas

 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
10 cm
 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
9) Accommodation - Bridge | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 9) Accompation - Bildg
 | | | | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | engine instantion Correct infance and exhaust design. Include fuel meter , Toronal Gearbox & propeller Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 91 Accomptibility of the set of the | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
 | Engine selection Advanced design, correct power selection 2 Seminary Engine installation Correct intake and exhaust design. Include fuel meter 3 Archive Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | THRUST COMPONENTS 11 Introf Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Engine selection Advanced design, correct power selection 21 Series Engine installation Correct intake and exhaust design, include fuel meter 9 Monte 9 Monte Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 |
| Proneller nozzle/duct Included where yestel size & speed is approvate | Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Table 3: Options for improving fuel efficiency in new and future vessels

 | Engine installation Correct intake and exhaust design. Include fuel meter 71 Formed
Gearbox & proceller Gearbox for Jarcest possible proceller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter 1 Subcorr
Gearbox & proceller Gearbox for Jarcest possible proceller. RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter 7 Participation 20 Participation 2 | Engine installation Correct intake and exhaust design. Include fuel meter 1) Andor
Gearbox & proceller Gearbox for Largest possible proceller, RPM <1000 | Engine installation Correct intake and exhaust design. Include fuel meter () 2014/001 ()
2014/001 () 2014/0001 () 2014/00001 () 2014/0001 () 2014/0001 () 2014/00001 () 2014/00001 () 2014/00001 () 2014/00001 () 2014/0000000000000000000000000000000000 | Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter 1 Si Morar 6 Box 6 Down 7 | Gearbox & propeller Gearbox for largest possible propeller. RPM <1000 | Gearbox & propeller Gearbox for largest possible propeller RPM <1000

 | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | SUBCOTIONED - 1900 |
 | and the magent for indigent lowing biokenet, in its (1000 a) a) we control and a) we control and a) we control and a set of the set | Gearbox & propeller Gearbox for largest possible propeller. RPM <1000 | Engine instantiation Correct intake and exhaust design. Include fuel meter 7-Forward
Gearbox & propeller Gearbox for largest possible propeller, RPM +1000 7-C-20-00-00-00-00-00-00-00-00-00-00-00-00- | Engine installation Correct intake and exhaust design. Include fuel meter | Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & Roneller Gearbox & Roneller Gearbox Roneler Gearbox Roneler Gearbox | THRUST COMPORENTS Engine selection Advanced design, correct power selection Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & Roneller Gearbox Renneller Gearbox for | Engine selection Advanced design, correct power selection
Engine installation Correct intake and exhaust design, include fuel meter
Gearbox & propeller
Gearbox & for Larone taxosible noncomplier, BPM_1000
 |
| Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 | Propeller nozzleiduct Included where vessel size & speed is appropriate Included where vessel size & speed is app

 | Engine installation Correct intake and exhaust design Indude further attending to Correct intake and exhaust design Indude further attending to Correct intake and exhaust design Indude further attending to Correct intake and exhaust design Indude further attending to Correct intake and exhaust design Indude further attending to Correct intake attending to Correct | Exclusion installation Correct intake and exhaust device Induce Collector II S) Anchor | Engine installation Correct intoke and exhaust dering Indude for Landon II | Engine installation Sharehow and advanced daying include for instance I | Engine installation Engratistation and exhaust design installed for instance II 5) Archor
 | Engine jastallation Engine tratale and averaged during tackeds first meters II | Engine installation Correct into he and exhaust design include first arts I | Engine installation Correct intake and exhaust design include first and a | change installation Correct intake and exhaust design, include fuel meter 6,80% | correct intake and exhaust design, include fuel meter 6, Bow

 | Engine installation Correct intake and exhaust design, include fuel meter 7 Forward 80 peek | Gearbox & propeller Gearbox for largest possible propeller RPM <1000 | Gearbox & propeller Gearbox for largest possible propeller, RPM < 1000
 | Gearbox & propeller Gearbox for largest possible propeller. RPM <1000 | Engine installation Correct intake and exhaust design. include fuel meter 77 Forward | | Pagina installation Derent intake and exhaust derine ladude for lander 1
 | Engine selection Advanced design, correct power selection 3 Provider
4 Hull
Status | THRUST COMPONENTS Engine selection Advanced design, correct power selection U to find the selection U | Engine selection Advanced design, correct power selection 31 Propelar
41 ad
51 Advanced design, correct power selection 51 Advanced 45 Adv |
| Tillanard | Gearbox & propeller Gearbox for largest possible propeller, RPM <1000

 | Engine selection Advanced design, correct power selection 4) Hull 5) Anchor | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection
 | Engine installation Correct intake and exhaust design, include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter
 | Engine installation Correct intake and exhaust design. Include fuel meter 61 Bow
 | | 7) Forward Bi Deck | | Engine installation Correct intake and exhaust design. Include filed meter | Engine selection Advanced design, correct power selection 0 40 kd
Si Accord Si Accord | Engine selection Advanced design, correct power selection
 | 2) Stem
3) Proceller | THRUST COMPONENTS | 2) Stem
3) Proceiler |
| Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox for largest possible propeller, RPM <1000

 | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection 3) Propeler
 | Engine selection Advanced design, correct power selection 33 Propeler | Engine selection Advanced design, correct power selection 3 Propeler | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection
 | Automated design, contest power selection | 4)Hui
 | 5) Anchar
 | Engine installation Correct intake and exhaust design. Include fuel meter | Engine Installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter P 6. Bow | | Engine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection | 2) Stern | THRUST COMPONENTS | 2) Stern |
| Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter Image: State

 | Engine selection Advanced design, correct power selection 39 Propeler | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection a selection a propeler | Engine selection Advanced design, correct power selection 3 Propeler | Engine selection Advanced design, correct power selection | angine rescuent Aurainee design, context power selection 4Hui
 | 4) Profiler
 | 57 Andread | Engine installation Correct intake and exhaust design. Include fuel meter
 | Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter P 63 Provide A | K12/2/K0 | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection 33 Propeler
 | 2) Stern | THRUST COMPONENTS | 2) Stem |
| Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct infake and exhaut design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzledduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Correct shape especially bow & stern areas

 | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection 33 Propeter | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection
 | Auranced design, conect power selection | 4) hui
 |
 | Engine installation Correct intake and exhaust design. Include fuel meter 6) Bow | Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter 61 Bow | 5) Anchor | Engine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection | 2) Stem | THRUST COMPONENTS | 2) Stem |
| Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzle/duct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas

 | Engine selection Advanced design, correct power selection 3 Propeler
4) hult | Engine selection Advanced design, correct power selection 3) Propeler
4)Hull | Engine selection Advanced design, correct power selection 3) Propeler | Engine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection 8 | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection 3) Propeler 4) Hull
 | Autorited design, contex power selection | 5) Anchor
 |
 | Engine installation Correct intake and exhaust design, Include fuel meter 6 Bow | Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter P 61 Bow | 5J Anchor | Engine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection | 2) Stem | THRUST COMPONENTS | 2) Stem |
| Engine installation Correct intake and exhaust design. Include fuel meter P 30 Bow and Correct intake and exhaust design. | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzledduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas

 | Engine selection Advanced design, correct power selection 3 Propeler
0 Hul | Engine selection Advanced design, correct power selection 3) Propeter | Engine selection Advanced design, correct power selection 3) Propeler 4) Hul | Engine selection Advanced design, correct power selection 3 Propeler
4) Hul
 | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection 3) Propeter
4) Hul
 | angene versaterin Aurentee design, correct porret selection | 4) nui
5) Archor
 |
 | Engine installation Correct intake and exhaust design. Include fuel meter 60 Bow | Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter 61 Bow | 5) Anchor | Engine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection 3) Propeler | 2) Stern | THRUST COMPONENTS | 2) Sem |
| Engine installation Correct intake and exhaust design. Include fuel meter 0100000000000000000000000000000000000 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzledduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Correct shape especially bow & stern areas

 | Engine selection Advanced design, correct power selection 3 Propeler
0 Hul | Engine selection Advanced design, correct power selection 3) Propeter | Engine selection Advanced design, correct power selection 3) Propeler | Engine selection Advanced design, correct power selection 3 Propeler
 | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection 3) Propeter
4) Hul
 | angine selection Aurantee design, conect power selection | 4) neu
 |
 | Engine installation Correct intake and exhaust design. Include fuel meter 6) Bow | Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter 63 Bow | 5) Anchor | Engine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection 3) Propeler | 2) Stern | THRUST COMPONENTS | 2) Stern |
| Engine installation Correct intake and exhaust design. Include fuel meter Ci Box | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzledduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas

 | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection 33 Propeter | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection
 | angine selection Aurantee design, conect power selection | 4) nou
 |
 | Engine installation Correct intake and exhaust design. Include fuel meter 60 Bow | Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter 61 Bow | 5) Anchor | Engine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection | 2) Stem | THRUST COMPONENTS | 2) Stern |
| Engine installation Correct intake and exhaust design. Include fuel meter 5) Bowerd | Engine instaliaidon Correct intake and exhautit design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzle/duct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Figure 1

 | Engine selection Advanced design, correct power selection 4) Hull 5) Archar | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection 4) Hul | angine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection 4) Hul | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection
 | Autorized design, conset ported senset diales to diale to diale attention | English intelligities and the second se
 | Paulos installation Connect intoles and subscut design technics for another Connection Connectica C | Engine installation Correct intake and exhaust design. Include fuel meter 6/80w | Engine installation Correct intake and exhaust design. Include fuel meter 7 Porward 80 Deck 80 Deck
 | Engine installation Correct intake and exhaust design. Include fuel meter 6180w | Social installation Exception in the section of the | Engine selection Advanced design, correct power selection 4)hull 5) Archor | Advanced design, correct power selection | Engine celestion Advanced design correct nouse celestion 20 Sem | THRUST COMPONENTS
 | Engine colorting Advanced during correct neuron colorting 20 Sem |
| conjune instanation Correct intake and exhaust design, include rulei meter 70 Energed | Larger ensummon Correct image and extend construct include the interest 7) Forward Gearbox & propeller Gearbox for largest possible propeller, RPM <1000

 | Auranced design, conect power selection | Aurantee design, correct power selection | angine sectori Auvanced design, contect power serection | Aurancea design, conect power selection
 | Autorice design, conection | Automatic and a second and a se | Auranced design, conect power selection | Auranced design, curren power serection | Engine installation Correct intake and exhaut dering Include fuel mater.
 | Engine installation Correct intake and exhaust design lackude fuel meter D Shocker Si Bow
 | Engine installation Correct intake and exhaust design Include fuel meter | contect intake and exhaust design, include ruer meter
 | Engine instanation Correct intake and exhaust design. Include fuel meter 7- 31 4 80 Deck | contect intake and exhaust design, include fuel meter | Engine installation Correct intake and exhaust design Include fuel mater D Sharkon | Engine Answert in the sector of the sector o | Automotion | Engine selection Advanced design correct power selection 1 3 Stem 3) Propeler | THRUST COMPONENTS
 | Engine selection 2) Stem |
| conjune instanation Correct intake and exhaust design, include rulei meter 70 Energed | Larger ensummon Correct image and extend construct include the interest 7) Forward Gearbox & propeller Gearbox for largest possible propeller, RPM <1000

 | 4)Hull | Autorized design, conset porter solection | Automatic design, conset porte selection | All Hul
 | All and a start of the second start of the sec | | | Autoriced warging context porter solection | Engine installation Correct intake and exhaut derion Include fuel mater
 | Engine installation Correct intake and exhaust design lackude fuel meter D Shocker Si Bow
 | Engine installation Correct intake and exhaust design Include fuel meter | contect intake and exhaust design, include ruer meter
 | Engine instanation Correct intake and exhaust design. Include fuel meter 7- 31 4 80 Deck | contect intake and exhaust design, include fuel meter | Engine installation Correct intake and exhaust design Include fuel mater D Sharkon | Engine installation Correct instals and alknut daring ledude for installation |
 | Engine selection Advanced design, correct power selection 1 23 Stem 3) Propeler | THRUST COMPONENTS | Engine selection Advanced design, correct power selection 2) Stem 3) Propeler |
| Engine installation Correct intake and exhaust design. Include fuel meter 6.0000 | Engine installation Correct infake and exhauit design. Include fuel meter Gearbox & propeller Gearbox & propeller Gearbox & propeller RPM <1000 Propeller nozzleduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct shape especially bow & stern areas Correct shape especially

 | Engine selection Advanced design, correct power selection 4) Hull 5) Action | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Autorities designi, contest portes serection
 | S) Anchor
 | Record and the set of | Engine installation Correct intake and exhaust design, include fuel meter 6) Bow | Engine installation Correct intake and exhaust design. Include fuel meter 7-01 61 Bow
71 Forward B) Deck
 | Engine installation Correct intake and exhaust design. Include fuel meter 6.Bow | 5) Anchor | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | 2) Stem
3) Proceller
 | THRUST COMPONENTS | 2) Stem
3) Proceller |
| Engine installation Correct intake and exhaust design. Include fuel meter 0100000000000000000000000000000000000 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largert possible propeller, RPM <1000
Propeller nozzledduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas

 | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection 3 property | Engine selection Advanced design, correct power selection 33 Propeter | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection
 | Autorited design, correct power serection | 4) neu
 |
 | Engine installation Correct intake and exhaust design. Include fuel meter 6) Bow | Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter 6) Bow | 5) Anchar | Engine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection | 2) Stem | THRUST COMPONENTS | 2) Stem |
| Engine installation Correct intake and exhaust design. Include fuel meter 61 Bow | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzłośłuct Included where vessel size & speed is appropriate
RESSTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas

 | Engine selection Advanced design, correct power selection 3) froeler
4) hull | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection
 | Autorited design, context power selection | 5) Archor
 | Stranding Stranding
 | Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter | 51 APERD | Engine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection | 2) Stem | THRUST COMPONENTS | 2) Stem |
| Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzłośłuct Included where vessel size & speed is appropriate
RESSTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas

 | Engine selection Advanced design, correct power selection 3) Propeler | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection 3) Propeter | Engine selection Advanced design, correct power selection
 | Autoriced uesign, correct power selection | 4) Poul
 | ST AND
 | Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter | SLAPEROF | Engine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection | 2) Stem | THRUST COMPONENTS | 2) Stern |
| Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct infake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzledduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Correct shape especially bow & stern areas

 | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection
 | Autorited design, conect power serection | 4) Pull
Sharkbor
 |
 | Engine installation Correct intake and exhaust design. Include fuel meter 6) Bow | Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter 61 Bow | 5) Archor | Engine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection | 2) Stem | THRUST COMPONENTS | 2) Stem |
| Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct infake and exhauit design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzladuct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Correct shape especially bow & stern areas

 | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection
 | Autorited design, context power selection | 1 Poul
S) Anchor
 |
 | Engine installation Correct intake and exhaust design. Include fuel meter 6) Bow | Engine installation Correct intake and exhaust design. Include fuel meter 7-01 Forward B) Deck | Engine installation Correct intake and exhaust design. Include fuel meter 6.Bow | 5) Archor | Engine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection | 2) Stem
3) Provider | THRUST COMPONENTS | 2) Stem
2) Deconfer |
| Engine installation Correct intake and exhaust design. Include fuel meter 6.80% | Engine installation Correct inflate and exhautit design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzle/duct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Correct shape especiall

 | Engine selection Advanced design, correct power selection 4) Hull 5) Action | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Autorized design, conscional advected datase to data to the second datase to the second dataset datas | English Internet Annual Annual Annual Annual Annual State Annual Sta

 | Paulos installation Connect intoles and schematic inductor II | Engine installation Correct intake and exhaust design. Include fuel meter 60 Bow | Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter 6) Bow
 | Social installation El Si Archor | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | 2) Stem
3) Proceller
 | THRUST COMPONENTS | 2) Stem
3) Proceller |
| Engine Installation Correct Intake and exhaust design. Include fuel meter 5) Bowerd | Engine instaliaidon Correct intake and exhautit design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller inozde/duct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Figure 1

 | Engine selection Advanced design, correct power selection 4) Hull 5) Archar | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection 4) Hul | angine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection 4) Hul | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection
 | Autorized design, conset ported senset diales to diale to diale attention and a sense of the sen | English intelligities and interventional advect for a start of the sta
 | Paulos installation Connect intoles and subscut design technic factors and a factor and a factors and a factors and a factor and a | Engine installation Correct intake and exhaust design. Include fuel meter 6/80w | Engine installation Correct intake and exhaust design. Include fuel meter 7 Porward 80 Deck 80 Deck | Engine installation Correct intake and exhaust design. Include fuel meter 6180w
 | Social installation Exception in the section of the | Engine selection Advanced design, correct power selection 4)hull 5) Archor | Advanced design, correct power selection | Engine celestion Advanced design correct nouse celestion 20 Sem | THRUST COMPONENTS | Engine colorting Advanced during correct neuron colorting
 |
| Engine Installation Correct Intake and exhaust design. Include fuel meter 5) Bowerd | Engine instaliaidon Correct intake and exhautit design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller inozde/duct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Figure 1

 | Engine selection Advanced design, correct power selection 4) Hull 5) Actor | Engline selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | angine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection
 | Autorized design, conset ported senset diales to diale to diale attention and a sense of the sen | English intelligities and interventional advect for a start of the sta
 | Paulos installation Connect intoles and subscut design technics for another Connection Connectica C | Engine installation Correct intake and exhaust design. Include fuel meter 6/80w | Engine installation Correct intake and exhaust design. Include fuel meter 7 Porward 80 Deck 80 Deck | Engine installation Correct intake and exhaust design. Include fuel meter 6180w
 | Social installation Exception in the section of the | Engine serection Advanced design, correct power selection all and selection all and selection all all selections are selected as a selection all all selections are selected as a selection all all selections are selected as a selection all all all selections are selected as a selection and selection are selected as a selection are selected as a selection and selection are selected as a selected as a selection are selected as a s | Engine selection Advanced design, correct power selection | Engine celestion Advanced design correct nouse celestion 3 Proceller | THRUST COMPONENTS | Engine colorting Advanced during correct neuron colorting
 |
| Engine installation Correct intake and exhaust design. Include fuel meter | Engine instaliation Correct infake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzleduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas

 | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection
 | Auflite a design, context porter serection | S) Anchor
 | Record and the set of | Engine installation Correct intake and exhaust design, include fuel meter 6) Bow
 | Engine installation Correct intake and exhaust design. Include fuel meter 7-01 61 Bow
71 Forward B) Deck | Engine installation Correct intake and exhaust design. Include fuel meter 6180w | 5) ARCHOR | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection
 | 2) Stem | THRUST COMPONENTS | 2) Sem |
| Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzle/duct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas

 | Engine selection Advanced design, correct power selection 3) Proceder
9) Hull
9) Arctor | Engine selection Advanced design, correct power selection 3) Propeler 4) Hull | Engine selection Advanced design, correct power selection 3) Propeler | Engine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection 3) Propeler 4) Hull
 | angene versation Autorities design, correct porter selection | 4) nui
5) Anchor
 |
 | Engine installation Correct intake and exhaust design, Include fuel meter 6 Bow | Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter P 61 Bow | 5) Anchor | Engine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection | 2) Stern | THRUST COMPONENTS | 2) 56m |
| Engine installation Correct intake and exhaust design. Include fuel meter 0100000000000000000000000000000000000 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzledduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Correct shape especially bow & stern areas

 | Engine selection Advanced design, correct power selection 3 Propeler
0 Hul | Engine selection Advanced design, correct power selection 3) Propeter | Engine selection Advanced design, correct power selection 3) Propeler | Engine selection Advanced design, correct power selection 3 Propeler
 | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection 3) Propeter 4) Hall
 | angine selection Aurantee design, conect power selection | 4) neu
 |
 | Engine installation Correct intake and exhaust design. Include fuel meter 6) Bow | Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter 63 Bow | 5) Anchor | Engine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection 3) Propeler | 2) Stern | THRUST COMPONENTS | 2) Stern |
| Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzle/duct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas

 | Engine selection Advanced design, correct power selection 3) Proceder
9) Hull
9) Arctor | Engine selection Advanced design, correct power selection 3) Propeler 4) Hull | Engine selection Advanced design, correct power selection 3) Propeler | Engine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection 3) Propeler 4) Hull
 | angene versation Autorities design, correct porter selection | 4) nul
5) Anchor
 |
 | Engine installation Correct intake and exhaust design, Include fuel meter 6 Bow | Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter P 61 Bow | 5) Anchor | Engine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection | 2) Stern | THRUST COMPONENTS | 2) 56m |
| Engine installation Correct intake and exhaust design. Include fuel meter 0.00000000000000000000000000000000000 | Engine installation Correct infake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzledduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation
Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas
Correct shape especially bow & stern areas

 | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection 33 Propeter | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection
 | Autorited design, context ported beleaven | S) Anchor
 |
 | Engine installation Correct intake and exhaust design. Include fuel meter 6) Bow | Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter 61 Bow | 5) Arizhor | Engine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection | 2) Stem | THRUST COMPONENTS | 2) Stern |
| Engine installation Correct intake and exhaust design. Include fuel meter 0100000000000000000000000000000000000 | Engine installation Correct intake and exhaust design. Include fuel meter
Gearbox & propeller Gearbox for largest possible propeller, RPM <1000
Propeller nozzledduct Included where vessel size & speed is appropriate
RESISTANCE COMPONENTS
Hull dimensions Increased length. Hull to suit speed, capacity, displacement &
operation Trim & weight Correct balance to match hull design
Hull shape Correct shape especially bow & stern areas

 | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection 33 Propeter | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection
 | angine selection Aurantee design, conect power selection | 4) neu
 |
 | Engine installation Correct intake and exhaust design. Include fuel meter 6) Bow | Engine installation Correct intake and exhaust design. Include fuel meter | Engine installation Correct intake and exhaust design. Include fuel meter 63 Bow | 5) Anchor | Engine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection | 2) Stem | THRUST COMPONENTS | 2) Stern |
| Engine Installation Correct Intake and exhaust design. Include fuel meter 5) Bow | engine instalaation Correct intake and exhaust design. Include fuel meter Gearbox & propeller Gearbox & propeller Gearbox for largest possible propeller, RPM <1000 Propeller nozzledduct Included where vessel size & speed is appropriate RESISTANCE COMPONENTS Hull dimensions Increased length. Hull to suit speed, capacity, displacement & operation Trim & weight Correct balance to match hull design Hull shape Correct shape especially bow & stern areas for the special speed is appropriate and future vessels.

 | angine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | engine selection Advanced design, correct power selection
 | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection
 | Auferice version Auferice version vers | English intelligities and the second se
 | Paulos installation Connect intoles and subscut design technic factors and a factor and a factors and a factors and a factor and a | Engine installation Correct intake and exhaust design. Include fuel meter 6/80w | Engine installation Correct intake and exhaust design. Include fuel meter 7 Porward 80 Deck 80 Deck | Engine installation Correct intake and exhaust design. Include fuel meter 61 Bow
 | Successful a line of the second subsect of a line to all and the second subsect of the line to all and the second subsect of the line to all and the second subsect of the line to all and the second subsect of the line to all and the second subsect of the line to all and the second subsect of the line to all and the second subsect of the line to all and the second subsect of the line to all and the second subsect of the line to all and the second subsect of the line to all and the second subsect of the line to all and the second subsect of the line to all and the second subsect of the line to all and the second subsect of the line to all and the second subsect of the line to all and the second subsect of the line to all and the second subsect of the second subsector subsect of the s | angine selection Advanced design, correct power selection | Engine selection Advanced design, correct power selection | 2) Stem
3) Provider | THRUST COMPONENTS
 | 2) Stem
2) Downlar |

There are other measures also that can also be done to improve the fuel efficiency in the existing vessels like the hull related I think you know what is hull the structure the main the bottom structure that is there in the ship.

Let me show you the with the figure if you see this figure of a ship, in general any ship or any vessel in this aquatic vessels if you see the number 4 if you see the number 4 in the bottom that is called the hull.

And this number 1 this is the funnel and there is this 2 this stern in the backside of it which is like stern and then it has his propeller just below the stern we have this propeller, we have this anchors to stuck to the seafloor, we have this bow in if you see number 6 in the front there is like one extension that is called bow and this is the forward in the upper deck extension that is called forward and the deck and the accommodation the bridges.

So, this is the how these vessels are actually vessels looks like in any ship. So, this hull this is the bottom this hull what happens sometimes this what are the measures that we can do we can do this we can retrofit installation of the Bulbous Bow.

And what is Bulbous Bow this you see the bow number 6 which is in the extension of this bottom this hull part of this call this is the Bow what this bow is doing in general when the suppose there is a ship there is like typical rerik (()) (27:00) structure it will go cutting the water waves.

So, what will happen because of the generation of the wave it will go up and down then it will lose it because of this wave because there will be an additional wave that it will generate from its the front part of its hull and because of that what will happen there is a chances of high drag into your vessel and this drag value will be very high and also because of that the motion of the ship will be very unstable.

That is why people started introducing these bows and especially if you have this Bulbous say this Bulbous Bow that we call when we retrofitted in this kind of structures, what will happen this Bulbous Bow they because of their specific design, it will kind nullify this generation of the wave or it will create the wave which will just, just like the opposite to the sinusoidal curve.

Suppose your bow is generating like say 0 degree to 90 then again 180 like this and because of the Bulbous Bow it will go from the other way around it will from 0 to negative side then 90 to 180 because of this the opposite sinusoidal curve that it is generating, it will nullified the wave pattern around.

So, in general it will reduce the drag and reduce the it will increase the stability of the ship because of the reduction in the drag and the increase in the stability of the ship it will consume less amount of fuel you understand why we why the ships they provide this Bulbous Bow that is there in front of the ships. So, this is the reason.

Hull appendages the hull should be as smooth as aligned as possible it should not have the edges because if there is edges what will happen it will cause the resistance the water will stuck and it will restrict the how to say it is the velocity of your fishing vessel. So, it will restrict because of this restriction that it is if the resistance that it is getting from this extra appendages from your hull. So, you should avoid it, it should be as smooth as possible the bottom structure.

Proportionate and vessel speed you have to reduce you have to do. So, all this changes in the hull related items it can save the fuel 5 percent to as high as 15 percent is Bulbous Bow was (()) (29:22). In case of hull appendages 2 percent to 5 percent if you properly maintain the speed, it can go 5 to even 20 to 30 percent of the fuel saving is possible.

Engine replacement with the new definitely it will the moment it will start you have to change it according to your shelf life, according to the manufacturer's guide, the gearbox propeller nozzles trim and weight the fuel meter it all these things really does matter how you are maintaining your fishing vessels or how you are maintaining, just to increase the capacity of increase the fuel efficiency and because of that, by means of this you can save the climate change because by

events of this you can save the greenhouse gas emission and obviously it is good for you for your business as well.

There are other activities as well like the thrust component like the engine selection, you have to go for a very proper powered I mean like correct power adaptation is, selection power selection is very much important with very much advanced design that is available in the market.

The engine installation properly proper intake and exhaust lines is important including the fuel meter gearbox the it should be largest possible propeller and with the RPM of less than 1000 and propeller nozzle or duct included where vessel size and speed is appropriate.

What are the resistance component like the hull dimension increased length and what will happen it will give the hull to switch proper speed capacity and replacement and operation, trim you have to currently balance to match the hull design you have to correct the shape especially for bow in the bow and the stern areas to maintain the hull shape for in proper way.

You have to include where the vessel size and the speed is appropriate this Bulbous Bow should be included the hull appendages should be reduced as I discussed because to smooth shape will give you the proper water flow proper velocity it will not provide any restriction or any resistance.

You have to improve its hydraulics upgrading the pumps and control how to increase the recreation upgrading the compressors and pumps and the good insulation of your recreation unit heating and cooling and electricity lighting utilize the waste heat and the good insulation and good control and properly time to time switch off you have to if you have a parasitic load such as pumps and motors, you have to reduce by designing and engineering properly.

So, all these factors always implement installations if you do, you can definitely improve the overall fuel consumptions the you can improve the overall greenhouse emissions by all the other means by the carbon footprint that I discussed.

(Refer Slide Time: 32:18)



So, what are the currently available and what are the emerging technologies available for reducing the greenhouse gas emission so currently available technologies we have this diesel we normally it is we use it for inefficient vessels over 7 meter in length and it generates for generators for the electric power and recreations and the hydraulics it has a greater engine efficiency but it emmits huge amount of nitrogen NO_x , SO_x and particulate matters.

Whereas petrol or gasoline it is used for the small fishing tank mainly in outboard motors it has a lower engine efficiency but carbon dioxide emission is higher than diesel, but it has a very low NO_x and low particulate matter and only a stress amount of SO_x is emitted.

Liquid natural gas it is a sometimes people use it in the shipping vessels especially where the NO_x emissions are taxed. So, carbon dioxide emission is almost 25 percent less than diesel 85 percent less in case of inverse emissions, no SO_x emissions and particulate matter. But methane production is there and is produced when you use the liquid nitrogen natural gas kerosene it is the notorious one it has it is not efficient as efficient as gasoline but very high carbon dioxide emission and dirty exhaust.

Biodiesel IC engines converted to bond this biodiesel and blended with the gasoline and diesel sometimes it can reduce the pollutants like particulate matter, carbon monoxide hydrocarbons

but can increase the NO_x compared to diesel there it is possible just remind this is not biodiesel it is completely pure.

Hybrid electric or the diesel electric they are similar to diesel engine diesel engine based internal combustion diesel based diesel fuel based internal combustion engines whereas ethanol propanol are also being used now it is. What are the alternatives, better alternatives go for battery electric. Small vessels of they can you can use the battery electric and if it is only the emission is 0 if the batteries are charged from renewable electricity still I would not say it is 0 it is near to 0 because of its carbon footprint.

Fuel cell based it is a very advanced technology if you remember in the sixth module we have discussed about sixth I think or seventh or eighth model I do not know in twelth that we have discussed like what are the different biochemical systems how they can be used to generate electricity out of the waste materials. And this electricity can be transferred to your ship.

Solar energy, wind propulsion, wind and other renewable energies like the tidal energies that also can be used in your shipping vessels, which can be which will be considered as a very, which will definitely reduce the overall greenhouse emission gas emissions you will see this is a example of a solar powered steamers, how it looks like it definitely it is a completely solar powered steamers.

(Refer Slide Time: 35:32)



So, in conclusion, there are different climate change related risk are there in aquaculture and food security in the water supply and the overall economic development and what are the mitigation techniques that we can follow, we discussed in details it will be followed by coming lecture materials as well.

(Refer Slide Time: 35:59)



And I hope you in the coming lecture, you will get to know more about the what are the different other adaptive strategies that we need to follow other than the mitigation techniques that we are discussing right now.

We discussed about that these things to be go along like the mitigation technique as well as adaptation strategies has to go along in order to prepare your eco farming communities population in the ecosystem to build the resilience and effectively cope with the greenhouse the climate changes.

(Refer Slide Time: 36:26)



These are the references that you can follow to gain more knowledge about it. I hope this lecture, from this lecture material you are very much enlightened with the very important factors the physics behind all these things and you got to know that how we can effectively eliminate how we can take the different mitigation technologies are already available, which can be replaced or the retrofitted on a existing ones so, to reduce the greenhouse emission to so to, somehow reduce the climate change anomalies and all these factors.

I hope you are very much benefited with this lecture we will continue in the coming two lectures as well about this different climate change effects in the aquaculture and what are these mitigation and adaptive strategies. Thank you so much. See you in the next lecture video.