

Lecture-26

Aircraft Reciprocating Engine Inspection (part-III)

So, this is your starter here and here your is your starter Drive here as part of the fifty hours inspection we need to clean and lubricate it, we will show you how to lubricate that is a spray we will spray it here it is a silicon based spray, and we will lubricate with that spray here so, this is your starter drive gear and see that it is being sprayed. So, it has been sufficiently sprayed and this is to be done at every fifty hours of operation. So, this was your fifty hours of operation in which we have checked the cowlings, and the cowl flaps, we have checked the alternate induction air system, we have checked the induction system, induction air filter, engine hoses metal lines and fittings, engine baffles and shields, exhaust system we have replaced the engine oil oil filter, we have checked the oil cooler and we have cleaned and lubricated the drive starter assembly starter drive assembly. So, this was your fifty hours of inspection it was more or less visual kind of inspection but it required an engine oil change oil filter change which is very essential for the health of the engine and we have also inspected and the complete engine for any leakage for any cracks etc.,

One of the major schedules on an aircraft is, 100 hours inspection the manufacturers also call it an annual inspection, it may be carried out annually or it may be carried out at hundred hours, whichever is earlier in our case we are doing it at every hundred hours of operation. So, it is considered to be a major schedule a major inspection scheduled, any inspection starting from hundred hours, and above is considered to be a major schedule major inspection. So, this major inspection to start with it is again the induction air box, walls, doors and controls so, we will check the induction system we have in the case of fifty hours of inspection we have checked it in the case of di also similarly we are going to check it in the hundred hours of operation also. So, there are there is a long list of inspections in the hundred hours it is a major schedule and we, will check each system wise, and you can see how do we do it.

So, in the induction air box walls doors, and controls we have to remove the air filter we have seen it in the case of fifty hours of schedule also the air filter, we will remove the air filter like this, this is your air filter we have removed it, and we need to inspect the hinges, we need to inspect the doors, seals and attaching parts for wear and security, you have seen that the alternate induction air system is here, you need to check the hinges there are hinges here for the this door you need to check the hinges in the hundred hours inspection, we need to check proper sealing, and security, and wear of the attaching parts. So, the complete induction system it needs to be checked the walls, the doors, and the seals all everything on the induction system need to be checked.

Next is your fuel line inspection we have mentioned this earlier also that the manufacturer has called for 100 hours inspection of stainless steel fuel lines they have come out with a service bulletins called Lycoming service bulletins three hundred and forty two which requires inspection of the stainless steel lines and this about clamps, so this is a very important inspection required to be carried out at every

hundred hours of operation. So, let us see how do we inspect it so these are your stainless steel fuel lines, these are your support clamps, and these lines are going to the nozzles, you can see that this is going to the nozzle this is your injector nozzle here, and as part of the inspection as part of hundred hours inspection we need to check the support clamps the clamps should be in proper shape they should be tight they should be firmly holding the line, the lines should be free of any cracks, free of any dents, and these lines should be inspected very thoroughly. So, all these lines all these lines in all the support camps they should be inspected thoroughly for leakage for any cracks for the clamps for tightness, and everything. Further their routing should be as per the service bulletins specified by the manufacturer the this is your service bulletins here for this inspection by the company Lycoming, it is a mandatory service bulletins required to be carried out at every hundred hours of inspection. So, this service bulletins they have given a route of the lines you can see the diagram here the diagram of the fuel lines is also given so the routing should be as per the diagram given in the service bulletins.

So, we need to ensure that these lines are in proper shape after this fuel line inspection we need to check the crankcase we have checked it earlier also in our fifty hours schedule we need to check the crankcase here, and you see this is your crankcase and as part of the schedule we need to check the crankcase whether there are any cracks well we need to check for evidence of oil leakage you can see the bolts here the hole down bolts you need to check the tightness of each bolt as part of the hundred hours inspection. So, you can see the number of bolts here, and each bolts tightness is to be checked at every hundred hours of inspection all the bolts, and nuts they should not be loose, then you need to check the crankcase breather lines for obstructions security and general condition this is your breather line here we need to check that this breather line is firmly placed it is not loose, and it as the general condition is fine there is no obstruction in the breather line at the bottom this line is open, you need to see that you see that this is your line coming out breather line we need to check whether there is no obstruction in this be the line this should be completely clear. So, as part of the hundred as inspection you need to check the crank case you need to check the tightness of the bolts, and nuts Andrey talked them as necessary and check the crankcase breather lines, and obstructions for security, and general condition.

After this you need to check the cylinders, rocker box covers, and pushrod housings, as I have told you earlier also this engine particle this engine is a Lycoming IO five forty engine with six cylinders, these are the six cylinders here this is cylinder number one, cylinder number three, this is cylinder number five, similarly, you have cylinder number two on the opposite side cylinder number four opposite to this, and cylinder number six opposite to this and this is a horizontally opposed engine, as part of the hundred hours inspection we are going to check the cylinders, we will check that there is any leakage from the cylinders here these are your rocker box covers, who we need to check whether there is any leakage from

the rocker box covers, any leakage from the cylinders on the upper side you have seen the cylinders we will check the fins also of the cylinders we have checked it in the fifty hours also, we have checked it in the fifty hours also here you see that you check the cylinders all the fins for any damage you check the cylinders based nuts for tightness, we will check the tightness of each nut in the hundred hours inspection for any looseness in case it is loose then we need to talk it properly we need to check whether there is any leakage from these hold on places also, then we also need to check these push rod housings you can see these pushrods you have the push rods inside this and you need to check the push rod housings any leakage to on these points you there are seals here and in case if these seals have gone bad in that condition you will have leakage from these points also, so you need to check during the hundred hours inspection whether there is any leakage from these points or not whether the seals are properly in place.

So, all the housings should be free of cracks they should not be loose and tightly placed so this was the inspection in hundred hours. Next inspection is the cylinder compression a very important check of hundred hours inspection to ascertain the health of the engine the internal health of the engine and we will show you how to carry out the compression check first we have to put, we have to warm the engine and then we have to carry out tests on each cylinder, and to see that what leakage we are observing, basically we have to observe the leakage static leakage rate of the cylinder of as compared to a leakage across a standard orifice and to check that compression test we will carry use a differential compression tester, and we will just now show you in the procedure how we are carrying out the compression test.

So, next inspection is the engine driven fuel pump here you see this is the engine driven fuel pump a very important component of the engine, this engine driven fuel pump we need to check for evidence of leakage security of attachment and general condition, we need to observe that if there is any leakage around the pump if there is any leakage from the attachment point whether this pump is securely attached and overall general condition of the pump, the hoses which are coming out of this pump, whether they are tightly in place we will have to check everything for this pump leakage, general condition, security of attachment security of attachment of these hoses, you can see the hoses, the lines, the metal line which is coming out we need to ensure you can see the creep mark is also there we need to check whether the creep marks are also in place. So, a thorough inspection of the engine driven fuel pump is required at every hundred hours of operation.

After the engine driven fuel pump, the next in line is the fuel injection system, we need to carry out a thorough inspection of the fuel injection system so, here this is your fuel injector we have read about the injector in our earlier lectures also in the fuel system this is your fuel injector, or you can also say it has a few layer control unit there are various controls this is your total control here, then you have the mixture adjustment at this point you have the idle speed adjustment at this point, you can see you have the idle

speed adjustment idle speed adjustment there is a spring-loaded screw here, which is just adjacent to the throttle lever this is your throttle control, and this is your idle speed adjustment screw. Then this is your mixture adjustment lever and you can see a flywheel here, and with the help of the fly wheel you can adjust the mixture whether lean or rich whatever is required, then this is your throttle here this control you can see this control this is your mixture control, so throttle control mixture, control both these controls are there on the injector or the fuel layer control unit as part of the hundred hours inspection we need to inspect this injector whether it is strongly in place whether it is properly secured we should observe that there are no cracks in the system, and there are no leaks in the injector unit.

Apart from the general condition, we need to check the movement of the controls, we have seen it in case of the fifty hours inspection also, how the controls move you have seen it earlier as part of the fifty hours inspection similar inspection we are going to do it in the hundred hours inspection also we will move the controls we will observe that the controls are free to move, there is no binding in the movement they are free all these nuts they are firmly in place, and all these nuts these are the castle nuts and they have a cotter pin here. So, we need to ensure that these cotter pins they are firmly in place, so after seeing the controls their movement these controls during their movement we also need to ensure that they need to touch their extreme stops, here you can see that there are stops here this is one extreme, and this is another extreme, so in one position this very touch and in another position this is stop will touch at this position, for for you to understand it easily we will move it again and you can see it in this schedule also. So, now we will move the throttle control, and you can see it how this is moving so at the moment you can see that this control is moving total control and it has come to now see this is one extreme it has touched this stop and another stop this is touching, so you can, we need to ensure that the extreme stops, are being touched by during the movement of the controls.

After seeing all the movement of the controls this was throttle control again. Similarly now you will see how the mixture control is moving you see the mixture control is moving, and it is touching the two extremes see the is this will touch this point this is stop here, so you can see and another stop is being touched here so, you can see the two extremes being touch they are touching the two extremes and at the same time the controls are moving freely. After seeing the general condition the free movement of the controls we will clean these controls properly and we will lubricate them, by the lubricant as specified by the manufacturer in their maintenance manuals. So, this is also a very essential part of your maintenance hundred hours maintenance, after your fuel injector fuel injection system, we need to check the idle admission adjustment now idle speed adjustment, and idle mixture adjustment I have already told you that this is your idle speed adjustment, this is your spring-loaded screw here, and this is your mixture adjustment, which is a flywheel here. In case, during the ground run if we observe that it is needed to

adjust the idle speed, or the idle mixture first we need to check the idle speed, idle speed as a specified the manufacturer is six hundred and fifty plus minus fifty rpm that is something it is in the range of rpm. In case, if it is required to be adjusted we will adjust it from this point, so this is your idle speed adjustment this is a spring-loaded screw, and it is just adjacent to the throttle lever you can see that we have to adjust the idle rpm, and we are increasing the idle rpm you see that we are now increasing the idle rpm, we have turned the screw so we have done it we have rotated it counter clock wise and the idle rpm is adjusted and we will check it we will verify it in the engine ground run.

Now, the mixture adjustment the mixture adjustment is required to be done, so you see that this is the lever here, and this is the flywheel you can see here through which we will adjust the mixture if you turn the mixture this flywheel, on the downside you can see there is a R letter written with a downward arrow, and if you turn this, this flywheel on the down side, on you see we are turning it and you see we have turned it on the richer side that means we have made the mixture on the richer side. So and if we turn it back that means we have moved the mixture towards the linear side, so it depends on the number of notches on the flywheel how many notches we have to move and depending on our requirement we will adjust the mixture from this adjustment from this thriving. One thing to be kept in mind is after carrying out this mixture adjustment we also need to adjust the idle speed, we need to check we need to verify whether there is a change in the idle speed in case if the idle speed has changed then we need to readjust it, after every adjustment after every mixture adjustment, idle speed adjustment we need to clear the engine we need to move the throttle to two thousand rpm and then revert back to idle and again adjust if required. So, this is how we do the idle speed adjustment, and the idle mixture adjustment.

So our next inspection is for the Magneto's which requires examination of the external condition and for correct installation you can see the black unit, there are two Magneto's one on the left side, and one on the right side, we need to check the general condition security of attachment of the magnet oh and you can see some wires coming out we have covered in our ignition chapter about these wires the, P leads the connections coming out you can see this. These connections, we need to check the security of attachment of these connections whether they are firmly in place they should not be loose and the, the magneto mounting should not be loose and the magnet or should be in place. So, this is the general condition examination of the magneto, and the leads which are coming out the electrical leads which are coming out of the Magneto's both left magneto, and the right Magneto. Apart from this general inspection apart of the hundreds inspection we are supposed to check the timing of the magneto, the external timing of the magneto so, that this is required to ascertain that the spark, the ignition spark is happening at the right time at the right instant when it is required inside the combustion chamber. So, we will do the magnitude

timing, and this is a very essential check part of the hundred hours inspection, and we will do a magneto timing we will examine whether our Magneto's are timed properly.

This is a magneto we have taken out one magneto from a source to show it to you, and this is your connection where you have a Plead connection, this is your grounding connection which you have just now seen on the aircraft on the magneto which is fitted on the aircraft. As part of the hundred hours inspection we have to check the general condition of the magneto, we need to check whether your ignition harness this is your distributor block, so this is your distributor block here, you can see outlets which are coming out where your ignition harness will get connected and apart from the general condition we need to check the timing of the magneto this particular Magneto I am showing you just in case we have to put we have to install a new magneto on the engine in that case before fixing the magneto on the aircraft we have to time this magneto internally also, so the timing of the magneto internally means that this magneto is ready for installation on the engine, and this is your timing pin which is provided by the manufacturer and here you can see there is a hole which is which has got L written on it, and this is you can see the notches here on the pin, and this pin will go inside this and it should go inside till this first groove position, you can see here that this is going inside and this has gone inside. So on the front side this is your impulse coupling in case if the pin doesn't reach till that point we have to adjust it, we need to adjust by putting the pin inside pressing it lightly and we have to adjust it through this through the front portion we have to move it gradually here till the pin goes inside.

When one precaution to be observed is that we are not supposed to move this impulse coupling the front portion with the timing pin inside in case if we do it, we will damage the magneto. So, this is in case we have we are supposed to fit a new magneto on the engine before putting the magneto, we have to time this magneto we have to do an internal timing of the magnitude. So, this was the procedure how we do the internal timing of the magneto now we will do the timing of the magneto, which is already installed on the engine, we are doing going to do an external timing. So now let us see how do we do an external timing of a magneto which is already fitted on the engine. So, in order to carry out the magneto timing we need a magneto synchronizer this is your magneto synchronizer we also call it our magneto timing light. You can see various leads coming out of this there are two red leads this is one for the right magneto, another one is for the left magneto, and this black lead is the grounding. Now I will first show you on how we put it on a magneto on the aircraft.

First sample is, for the magnet which is outside you see this is the left magneto lead and we are putting it on the P lead connection on the magneto this is your P lead connection and we will put it on the Plead, you see we have fixed it on the Plead connection, and since when this magneto is installed on the aircraft, this is your grounding you will have a grounding connection, and this magneto this is your black lead this is at

the grounding connection here. So you see the two connections the left magneto lead is connected to the P lead, the black lead is connected to the ground, and now we will put this timing light on you see that the timing light is on, and one lead this right magnet only light is coming on. Now let me tell you what is the purpose of these lights these lights basically when these lights come on that means it indicates that the breaker points inside the magneto they are in an open condition. We have to ascertain, that we have to time the Magneto's in such a way that these breaker points this light should come on at that very instant when your breaker points are just opening. So, in that condition we have to time the magnetos.

And you can see here at the moment my left magneto is connected to this lead, and if I move this if you can see here the left magneto lead is light is not coming and the right light is coming on, this is an indication that your left is connected and your breaker points are closed. Now if I, move this you can see that this light is coming that means it is an indication that the breaker points have just come in, you see how the light is coming on it is going back so we have to keep it at that position where the light just comes on, and you can see how the light comes on that's that is an indication that is a point that is the instant at which the breaker point is just open. So we have to ensure that you have to time it in such a way that the breaker points just open, and similar thing we are going to do it when the magneto is installed on the aircraft this was just a demo to show you how the magnitude will be timed because of clearance issues you might not be able to see how the leads are connected in on the aircraft.

On the aircraft the two leads will be simultaneously connected to the two Magneto's the left lead will go to the left magneto P lead connection, the right lead will go to the right magneto P lead connection, and the black lead will be grounded on the engine structure. So, let us now do it and we will go step by step to time the engine. So now coming back to the aircraft we will time the two Magneto's you see on the aircraft, we have kept the magneto timing light the synchronizer here, and we have connected the leads to the respective Magneto's as we have just now displayed how the leads were connected to the P lead, connection as well as the grounding. So the two leads are connected to the respective Magneto's before doing all this we need to take certain precautions, we need to keep the ignition switch in the off condition, we need to ensure that the ignition is in the off condition and only we are going to put these connections. Now with these connections after this we need to ensure that cylinder number one this is your cylinder number one this cylinder number one should be in the compression stroke should be at the TDC that is the top dead center position. You recall that in our previous lectures we have seen that the admission takes place just before the top dead center, it is not taking place at the top dead center the ignition event is happening just before the TDC for complete combustion, and proper efficiency. So we will take the cylinder number one to the compression stroke first to the TDC, and then we will rotate this propeller in

opposite to the direction of rotation so that the spark is advanced as specified by the manufacturer, in this case the manufacturer has specified that it should be twenty degrees before top dead center.

So, let us see how we are going to first bring cylinder number one to the TDC position, and then the twenty degrees before top dead center position. So now we are going to put this cylinder number one in the compression stroke, you in case of our earlier also procedure we have seen how we have placed the thumb on the spark plug hole, and we will try to feel the pressure of the cylinder pressure on the thumb when the pressure is exerted on the outside of the spark plug on the thumb, at this is your compression stroke. So, you see the pressure has been felt on the thumb at this position, and this is your compression stroke the cylinder is number one is at the compression stroke, so this is perfectly accurate at the compression stroke now that means the piston is at the top dead center we are trying to see it, and we are trying to do some more finer adjustments so that the piston is exactly at the top dead center position. These are very fine adjustments which come with experience so, you see now our piston is at the top dead center position cylinder number one is at the TDC position now with the cylinder at the TDC position now we will turn this propeller opposite to the direction of rotation so that the spark is timed to happen at twenty degrees before top dead center.

Now, before doing that I will show you some marks here on the starter ring gear there are a few marks which are shown here on the starter ring gear you see this is your starter ring gear here, and there are certain marks which are given by the manufacturer here you see there are certain marks which tell us that this is twenty degrees this is twenty five degrees and depending on the engine the manufacturer specifies at what degrees we need the advance spark. So, in this case it is twenty degrees before top dead center and this mark you can see if there is a line here this is twenty degrees this is your starter ring gear, and on the starter housing you can see here this is a hole here if you see that there is a hole on the starter housing. So, this hole and this mark should be aligned so in this case you see that the hole, and the mark align that means now your propeller is at the twenty degrees before top dead center position. So, we will move the propeller accordingly so that it is at the twenty degrees before top dead center position if you see that this mark and this hole is perfectly aligned, and that means now your cylinders are at twenty degrees before top dead center position. So, with this twenty degrees before top dead center now we are going to turn our ignition switch in the on condition, and now we will put the timing light on, and see if the light is coming on or off now with the light on you can see that both the lights have gone out that means your breaker points have just closed. See now with the twenty degrees set we have turned the magneto lights on the ignition the timing light on after putting the timing light on we have seen that the lights have come, they are glowing both the lights are glowing, that indicates that the breaker points are just opening.

Now, to verify this I will turn the propeller slightly to see whether the lights are going out, or not if the lights are going out that means that indicates that at that instant your breaker points are closing. So, let us see how this is happening whether it is happening or not so let me see I am turning the propeller slightly and you see these lights have just gone out, so that means that is an indication that your pickup points have just closed. So now I'll put it again back I'll verify it again and see now the lights have come have glow, glown and this indicates that your breaker points are just opening. So, this ensures that my both the Magneto's are perfectly timed as specified by the manufacturer. So now after doing this inspection I, will remove I'll switch off this light and I'll remove the connections and put the ignition switch off, this ensures that my ignition system is working in a satisfactory way.

After the Magnetic check we need to check the ignition harness I have one ignition harness spare harness to show you, you can see these are this connects to the distributor block you can see the springs here, which goes inside the distributor block of the magneto, and these are your terminals the ignition harness needs to be inspected that this is firmly in place in the distributor block, the harness is properly routed all the terminals these get connected to the spark plugs, and they are tightly in connected to the spark plug and all these terminals are proper there is no deterioration, there is no deterioration in the harness, there is no breakage so all this thing is to be checked on the aircraft. So, you see here I'll show you on the aircraft this is your harness which is coming out of the magneto and this proper routing this is seen in the scrambled at various points it is coming to the spark plug each lead is going to the spark plug, you see here and as part of the inspection we need to see that it is properly routed all the clamps are tight and this there is no deterioration, there is no breakage on this harness all along for both the magneto's. So, this harness inspection is also very important in case if there is any breakage, any deterioration then we will encounter snags during operation.

So, here you see just for your reference I have connected this is your harness here, and it gets connected to the distributor block like this and this is this gets connected, and these go to the respective spark plugs. So, this is how it functions, and after this if you see that this is the spark plug and this terminal will get inside this spark plug and this gets screwed in like this. So, this is how this is your complete system your distributor block your Magneto this harness connected to the distributor block, and then the terminal connected to the spark plug. So, this is how your system works on the aircraft. So after the ignition harness and insulators inspection we will carry out the inspection of the spark plugs, and you can see how we are removing the spark plugs there are two spark plugs in each cylinder so since it is a six-cylinder engine you will have twelve spark plugs, one in the top, and one in the bottom of each cylinder. So let us see how we will remove the spark plug the spark plugs are properly talked as per the manufacturer's recommendation, and the stock specified by the manufacturer is around four hundred and twenty inch

pounds, you see we have to remove the ignition harness first, and while removing it we need to be very careful we are not supposed to twist the harness at this point otherwise there will be breakage at this point. You see this harness is being removed we are removing it, and we have to be very careful. So after removing it, see this harness has been removed this terminal has been removed, and now we have to open the spark plug you can see the spark plug we are connecting it deep socket over the spark plug and we have to break the torque, we have broken the torque and you see now we have to unscrew the spark plug, we have to be very careful while handling the sparkplugs because any wrong maintenance on the sparkplugs can lead to severe problems during operation.

So, here you see we are removing the spark plug and we also need to service all the spark plugs you can see here so this is the spark plug which has been removed from the aircraft you see we need to see whether the spark plug is dirty, there may be lead fouling over this, there maybe carbon fouling, and there may be oil fouling over this. So for all the things we need to clean it a general cleaning needs to be done we use fuel the aircraft fuel to clean it, and in case if there is lead fouling we need a vibrator to clean it after cleaning we have to adjust the gap you see this is a massive electrode, you can see the center electrode, we need to ensure that the electrode is proper it has not worn out then we need to adjust the gap between the center electrode, and the side, side electrodes, and we will adjust the gap as specified by the manufacturer and after adjusting the gap we will clean it, we will inspect it after doing a sandblast, and in the tester we will see whether the spark coming out of the spark plug is of correct order or not.

So, let us see how do we do it how do we clean it, how do we sandblast it, and how do we inspect the spark coming out of the spark plug. Whenever we remove the spark plug we are supposed to renew these gaskets we are supposed to replace them with the new ones so this is discarded now, and you see the credit portion here while we install the spark plug we put engine oil, or we put anti-seize grease on this. So, we have to first be grease this portion, we have to clean the threads we have to clean the threads of this side also so we need to check, we need to clean the threads, first we are we will be cleaning the threads like this and after cleaning the complete threads like this, after cleaning the all the threads here we need to clean the front portion we need to clean the electrode portion also. In case if there is any oil fouling, or any carbon fouling we need to clean it also and from the front side also, after decreasing the thread threaded portion. So once this portion is cleaned thoroughly then we need to see whether there is any contaminant inside, in case if there is any contaminant we will have to remove it with the help of fine needles, and after that is done after the threaded portion cleaned, the front portion cleaned, this terminal and cleaned and the edges cleaned there are no sharp edges we will check the sparkplug in the bomb tester. This is your spark plug bomb tester first of all we are going to give an air blast this is the place where we will give an air blast this tester is connected to an air supply to a compressor, and we will give an air blast

to clean now this will go inside this. So, now with the spark plug inside this we will first give an airblast see this is an air blast being given to clean the spark plug, and while giving this air blast we continuously need to rotate the plug inside this once the air blast is given we will give an abrasive blast there is sand particles inside, and with the abrasive blast this will clean the plug properly. So after the abrasive blast again we need to give an air blast to clean it thoroughly, so once the air blast and a cleaning blast is given we have we remove the plug and now you see that the plug is very nicely cleaned, and once the plug is cleaned, then we will put it in, in this hole to check the quality of spark which is coming which is coming out of the sparkplug.

So, now the spark plug is screwed inside the tester to check the quality of spark, so we have to tighten it completely and but this and first we have to create the pressure which the spark plug is supposed to inside the combustion chamber so that pressure we are creating artificially in this machine, so we will give an air pressure see I am giving an air pressure and I'll give the pressure something in the green range, we have to ensure that the pressure is in the green range to create we are creating an artificial pressure whatever pressure the spark plug is supposed to face in the combustion chamber. So, with this pressure and the ignition lead connected we will press the switch and watch for the quality of spark coming out. So, just see you can see the spark coming out this quality of spark this bright blue color spark indicates that your spark plug is perfectly fine it is giving a strong spark. In case if the spark is of yellow color in that case that indicates that your sparkplug is a weak spark plug. After inspecting this a spark plug we will similarly inspect all the sparkplugs we have all the spark plugs here we have got six spark plugs in this tray, and six more spark plugs so we will check sparkplug one by one, and once all the spark plugs are tested gapped set then we will put an anti-seize lubricant here either anti-seize grease, or an engine oil as is specified by the manufacturer after putting that lubricant here we will put a new gasket this is this old gasket is to be discarded and put a new copper gasket for this is for sealing purpose it will go inside like this and then we will put the spark plug in the surrender and give it a proper torque the torque specified by the manufacturer is around thirty five bitpounds or four twenty inch pounds in this case engine, and once the spark plugs are fitted we will put the ignition harness terminal connections and tighten them carefully.

The engine oil which is used in the engine is to be applied on the threads so this and while applying them applying the oil, we need to take a precaution that first two threads or three threads we should make clear of the lubricant. So, we have applied the engine oil this is specified by the manufacturer and we have taken the precaution, to keep the first two three threads dry, after putting this oil, we will put the new gasket and install this plug on the cylinder and give it a torque of thirty five fit pounds. So, after this inspection of the ignition system is complete, the inspection of the magneto the spark plugs the ignition harness is complete.

Next as part of hundred hour inspection, the inspection of electrical starter, all the electrical switches, all the electrical connections, and we need to ensure that all the electrical connections are in place, they are firmly connected, there are there is no breakage, there is they are not loose, and we need to ensure that each and every connection is intact, the sleeves of the electrical wires they are in place and they are properly routed, coming to the starter, we have seen that in the starter, we have done a lubrication of the starter drive as part of the fifty hour inspection. Now, in the hundred hours inspection also, we need to verify whether the starter drive is properly lubricated or not, we have to lubricate it again in the hundred hours inspection and the electrical connections on the starter should be verified, that the electrical connection is intact, they are not loose, there is no breakage in the connection, as just to demonstrate we have one starter, you can see here we have one starter, and this is your starter drive which was lubricated, you can see it has a gear here, and drive this is lubricated by means of a silicon based spray, and this is your motor here in the starter, and this is your electrical connection where your electrical leads will get connected. So, this essential component of the engine, this also needs to be inspected lubricated and checked for proper mounting.

So, after all these inspections, we need to do a general visual inspection, whatever inspection items are specified by the manufacturer apart from that as a general policy also, we need to check the adjacent structures whether there is any crack, whether they are clean or not, general cleaning of the engine, the engine is supposed to be cleaned properly during the hundred hours inspection, after all the inspection, after all the cleaning all the parts are supposed to be lubricated, the controls are lubricated, we have discussed it earlier also, how the controls are to be lubricated and with all this we are able to finish off the hundred hour inspection. Once the complete maintenance is carried out, we are supposed to carry out an engine ground run, during the ground run, we will check all the parameters whether the parameters are within the range specified by the manufacturer, once the parameters are all Okay. We will switch off and again open the cowlings and we will verify whether there are any leaks, whether all the work which we have carried out everything is in order or not, one very important thing while you carry out any maintenance, after every maintenance we need to check whether you have not left any foreign object on the engine or on the aircraft, which is a very very important part of the inspection, we need to ensure that there is no tool or anything left by mistake in the aircraft or in the engine, which should be ensured, and once everything has been insured, and once as an engineer as a maintenance personnel, if we are satisfied that my machine my aircraft is a worthy, we will release the aircraft for flight. So, now next inspection is a two hundred hours inspection. So, whenever we are carrying out a higher inspection, one important thing is that with every higher inspection we are supposed to carry out the lower inspections, suppose it has a two hundred hours inspection schedule, so along with two hundred hour inspection, we will also carry out hundred hour inspection, fifty hours inspection and a daily inspection. So, any major schedule

will have all these schedules, the lower schedules are also carried out along with the major schedule. So, in a two hundred hours inspection, we are supposed to check the engine mount support structure the rod mounts.

So, here on the aircraft, we will show you how this is checked, you can see here on the aircraft, these are your Lord mounts, and this is your mounting structure and you have the mounting bolts here, they are properly torqued. So, in the major schedule in the two hundred hours inspection, we are supposed to check all these mounts, these rubberized mounts whether they are properly placed, whether the bolt is properly torqued, these bolts if you see here, you can see here, this, this bolt and nut here you can see here and there is a creep mark. So, once the torque is given a mark is made, so that in case if there is any slippage, if suppose the nut is loosen somewhere sometime in operation, then it will not align with the mark and we will come to know during the maintenance that this is loose. So, we need to ensure that these creep marks are there and the bolt is firmly in place, this mount apart from the rubberized mounts, we also need to check the structure here, this structure there are four points, one on this side, one on the other side, two at the back and two in the front side.

So, all the four support structures, support points they need to be checked the metal portion need to be checked for cracks, the rubberized portion should be checked for whether cracks, whether they I have not deformed, at the same time we need to check the torque of the attaching bolts. So, the torque of the bolts it is specified by the manufacturer, we as per the manufacturer's recommendation, we need to check the torque of all the four connection points and after checking the torque, we need to put a fresh creep mark. So, in the two-hundred-hour inspection, this is one of the major inspections, apart from this, we will carry out the regular one hundred hour and fifty hours and the daily inspection. Similarly, in case of a one year inspection, the manufacturer has specified, has to carry out an annual inspection on the basis of a calendar period, it is a one year inspection again in that inspection, we are supposed to check the engine support structure, engine support structure is again the same rod mounts and the mounting structure, we will check the torque also of the connecting bolts, at the same time we need to check the tunnel structure sidewalls and the shockmount support brackets, you can see the supporting structure, this is the fire wall we also need to inspect this firewall, this is you can see here this is a firewall all along this, we need to inspect whether there is any crack, whether there is any deformity in the fire wall during the annual inspection, apart from these inspections again the regular hundred hours, fifty hours and daily inspection will be carried out along with these inspections. So, this completes our inspection part on the engine and the engine is made a worthy and the aircraft is ready to fly. Thank you.