

निर्माण प्रबंधन (Construction Management) के सिद्धांत
[Nirman prabandhan (Construction Management) ke Siddhant]

Prof. Sudhir Misra

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Lecture – 14

Nirmaan upakaranon ka moolyahraas - II

Department of Civil Engineering
Indian Institute of Technology Kanpur

भारत सरकार की MOOCs पहल के अंतर्गत पाठ्यक्रम
निर्माण प्रबंधन के सिद्धांत
Principles of Construction Management

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भारत सरकार की MOOCs पहल के अंतर्गत पाठ्यक्रम ; निर्माण प्रबंधन के सिद्धांत 1

Namaskaar aur aapaka ek baar phir svaagat hai Bhaarat sarakaar kee moocs pahal ke antargat paathyakram Nirmaan Prabandhan ke Siddhaant (Principles of Construction Management).

(Reference Time 00:24)

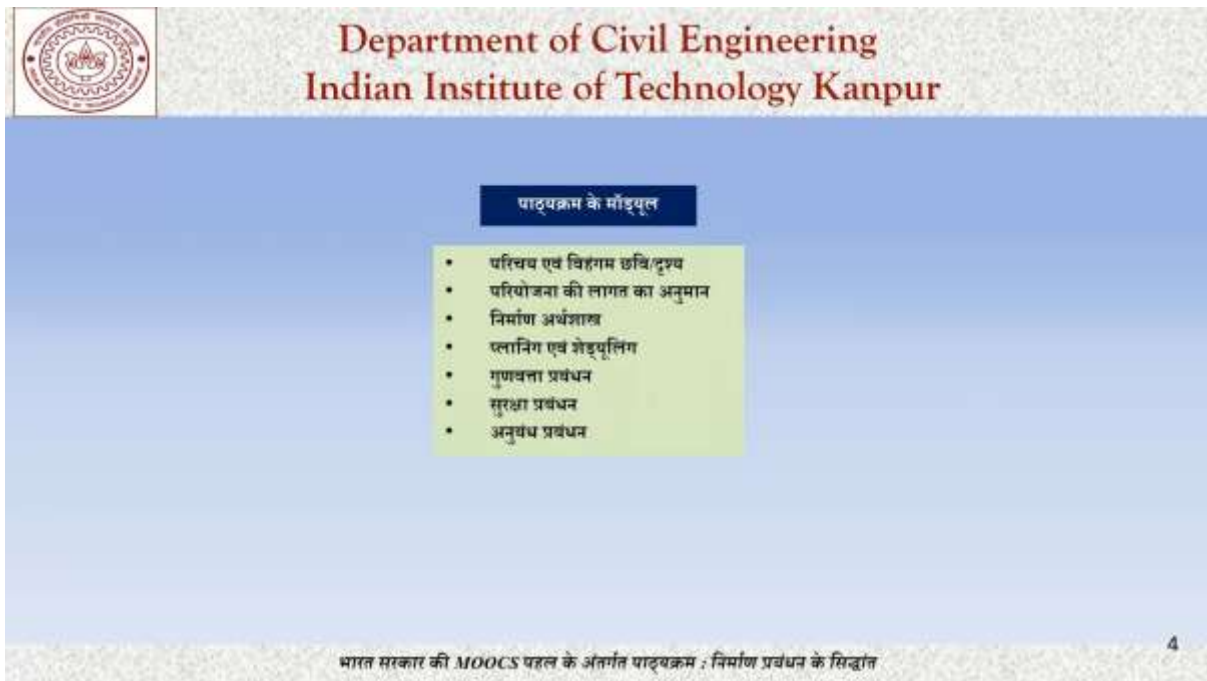
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लेक्चर - 14
निर्माण उपकरणों का मूल्यहास - II
DEPRECIATION OF CONSTRUCTION EQUIPMENT - II

भारत सरकार की MOOCs पहल के अंतर्गत पाठ्यक्रम ; निर्माण प्रबंधन के सिद्धांत 3

Aaj ham lecture 14 par hain, aur pichhalee baar kee charcha nirmaan upakaranon ka moolyahraas arthaat Depreciation of construction equipment. Jo chaar vidhiyaan hamane pichhalee baar kee thee unako ek udaaharan ke maadhyam se samajhane kee koshish karenge.

(Reference Time 00:40)



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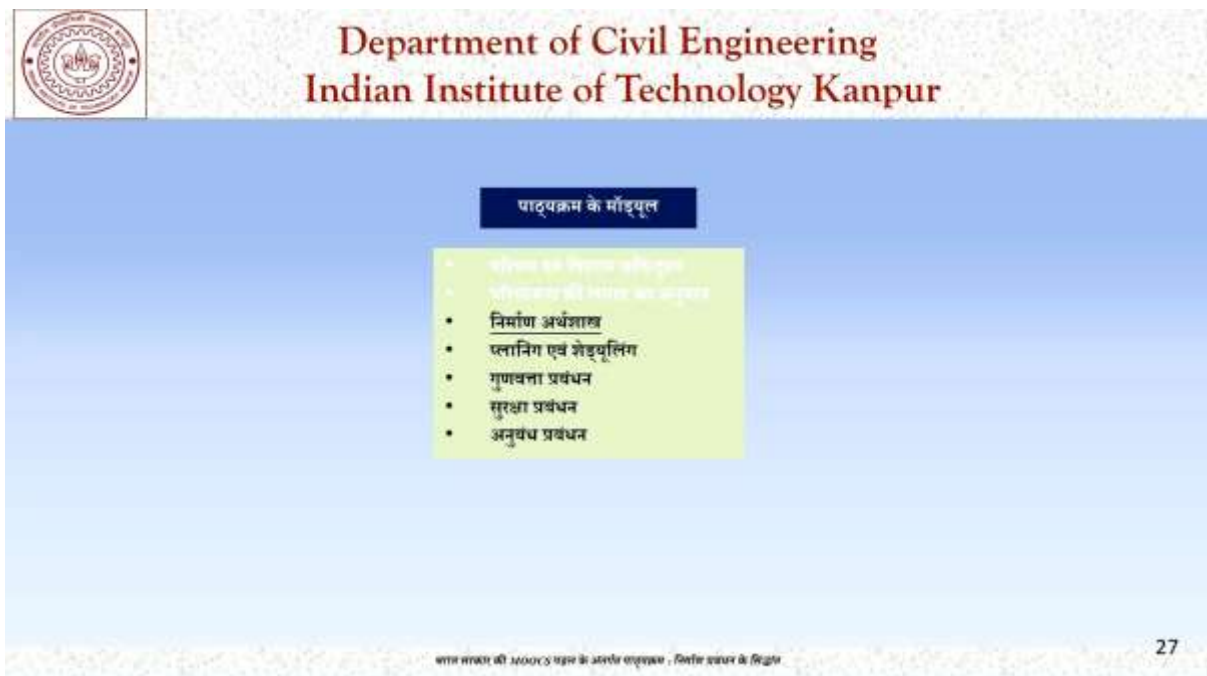
पाठ्यक्रम के मॉड्यूल

- परिचय एवं विहंगम छवि/दृश्य
- परियोजना की लागत का अनुमान
- निर्माण अर्थशास्त्र
- एलानिंग एवं शेड्यूलिंग
- गुणवत्ता प्रबंधन
- सुरक्षा प्रबंधन
- अनुबंध प्रबंधन

भारत सरकार की MOOCS पहल के अंतर्गत पाठ्यक्रम : निर्माण प्रबंधन के सिद्धांत 4

Paathyakram ke jo module hain vo pun: yahaan par dikhae gae hain.

(Reference Time 00:44)



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पाठ्यक्रम के मॉड्यूल

- परिचय एवं विहंगम छवि/दृश्य
- परियोजना की लागत का अनुमान
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- अनुबंध प्रबंधन

भारत सरकार की MOOCS पहल के अंतर्गत पाठ्यक्रम : निर्माण प्रबंधन के सिद्धांत 27

Aur ham log charcha kar rahe hain nirmaan arthashaastr kee.

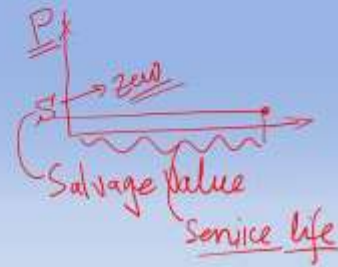
(Reference Time 00:48)



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मूल्यहास के मॉडल

- Straight-line method (linear depreciation)
- Sum of years method
- Sinking fund method
- Declining balance method



Pichhalee baar hamane Straight Line method, sum of years method, sinking fund method aur Declining Balance method in chaar vidhiyon par charcha kee thee. Jisase ki kisee bhee asset kee depreciation ya moolyahraas ko gyaat kaise kiya jaata hai is baat par charcha huee thee. Kisee bhee asset kee praarambhik laagat P hotee hai aur samay ke saath yah ghatakar ek value S ho jaatee hai, is S ko ham kahate hain salvage value. Jo samay lagata hai vo hai is asset kee service life. Dhyaan rahe ki yah service life aur yah depreciation ka poora discussion aarthik modal hai, vitteey modal hai. Operation sanchaalan se isaka bahut jyaada lena dena nahin hai. Koee bhee asset jisaka ki service life 3 saal ho, 4 saal ho, 5 saal ho usake baad bhee sanchaalan mein prayog mein rah sakata hai lekin usakee book value jisakee ki charcha ham pichhalee baar vistaar se kar chuke hain, usakee book value salvage value pe aa jaatee hai jo ki zero bhee ho sakatee hai arthaat usakee koee value nahee hai usako bina kisee muaavaze ke write off kiya ja sakata hai usako books mein se hataaya ja sakata hai. To aaiye ham log charcha aage badhaate hain aur ek udaaharan ke maadhyam se in methods ko samajhane kee koshish karate hain.

(Reference Time 02:30)



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उदाहरण

एक एसेट की प्रारम्भिक और साल्वेज वैल्यू क्रमशः 100 लाख रुपये (1 करोड़) और 40 लाख रुपये है। एसेट की उपयोगी सर्विस लाइफ तीन साल है। विभिन्न विधियों से मूल्यहास ज्ञात कर, समय के साथ एसेट की बुक वैल्यू में परिवर्तन का अध्ययन करें। जहाँ भी आवश्यक हो, 10% ब्याज दर मान लें

Udaaharan ham lete hain ek asset ka jisakee ki praarambhik aur salvage value kramash: 100 lakh arthaat 1 karod aur 40 lakh rupaye hai. Asset kee upayogee service life teen saal hai aur prashn yah hai ki vibhinn vidhiyon se moolyahraas gyaat kar, samay ke saath asset kee book value mein parivartan ka adhyayan karen. Jahaan par aavashyak ho byaaj kee dar 10 percent maanee jaaye. In aakadon ke saath ham log depreciation calculation shuroo karate hain.

(Reference Time 03:01)



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उदाहरण

Year (t)	Linear		
	BV_t	d_t	BV_t
1	100	20	80
2	80	20	60
3	60	20	40

All values in lakhs

BV_t indicates opening book value
 d_t indicates the depreciation in year t
 BV_t indicates closing book value

ज्ञात है कि एसेट की :
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 साल्वेज वैल्यू : 40 लाख रुपये है।
 उपयोगी सर्विस लाइफ तीन साल है।
 जहाँ भी आवश्यक हो, 10% ब्याज दर मान लें


$$P - S \rightarrow 100 - 40 = 60$$

$$\frac{60}{3} = 20$$

To ye to hai linear depreciation ka uttar. Gyaat hai ki praarambhik value hamaaree 100 lakh hai, salvage value 40 lakh hai, upayogee service life teen varsh hai aur yahaan par hamen isakee aavashyakata nahee padegee. To ham kya karenge? P minus S arthaat total

depreciation jo ki teen varsh mein hona hai, vo kitana hai? 100 minus 40 arthaat 60. Ye 60 lakh ka depreciation teen varsh mein hona hai. Linear depreciation hamaara modal hai. To har varsh 60 divided by 3 arthaat 20 lakh ka depreciation liya ja sakata hai. Vahee cheejen yahaan kee gayee hain ki har varsh 1, 2 aur 3 mein 20 minus 20 ka depreciation lekar ke jo opening book value is varsh mein thee, to closing book value lene ke liye yah depreciation isase ghata diya gaya hai. 100 minus 20 arthaat 80 aur jo yahaan kee closing value hai vah hee agale varsh kee opening value ho jaatee hai. To ye 80 minus 20 is equal to 60 aur 60 minus 20 is equal to 40. To is prakaar se jo hamaaree praarambhik value thee 100 aur salvage value thee 40 aur vo 3 saal pe pahunch gayee. To is prakaar hamane dekha ki linear depreciation kis prakaar se calculate hota hai aur kis prakaar se samay ke saath book value mein parivartan hota hai.

(Reference Time 04:34)



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उदाहरण

Year (t)	Sum of digits		
	BV _o	d _t	BV _c
1	100	30	70
2	70	20	50
3	50	10	40

All values in lakhs

BV_o indicates opening book value
d_t indicates the depreciation in year t
BV_c indicates closing book value

ज्ञात है कि एसेट की :
प्रारंभिक वैल्यू : 100 लाख रुपये (1 करोड़) है।
सालखेज वैल्यू : 40 लाख रुपये है।
उपयोगी सर्विस लाइफ तीन साल है।
जहां भी आवश्यक हो, 10% ब्याज दर मान लें

1+2+3 = 6

1 30 } 30
2 20 } 20
3 10 } 10

60

भारत सरकार की MOOCs पहल के अंतर्गत पाठ्यक्रम : निर्माण प्रबंधन के सिद्धांत

9

Yahee udaaharan ab karate hain sum of digits se sum; of digits matalab teen saal kee life hai arthaat 1 plus 2 plus 3 ye hua 6, to ham pahale saal mein 3 divided by 6 arthaat 1 divided by 2 yah total depreciation hai/total moolyahraas hai kul usaka aadha pahale saal mein jaayega, doosare varsh mein 2 divided by 6 aur teesare varsh mein 1 divided by 6. Yah charcha ham log pichhalee baar kar chuke hain aur isako agar ham is udaaharan mein utaar dete hain tab ham dekhenge ki 3 divided by 6, 2 divided by 6 aur 1 divided by 6 hamako calculate kis par karana hai? Total moolyahraas par arthaat T minus S jo ki hamaara diya hua hai 60. To pahale varsh mein depreciation hua isaka 3 divided by 6 arthaat 30 lakh, phir 20 lakh aur 10 lakh. Yahee aankade yahaan par likhe hue hain ki pahale varsh mein d_t 30 hai, agale varsh mein 20 aur teesare varsh mein 10. Ab pichhalee udaaharan ke tareeke se hee opening book value se yah moolyahraas ka aankada se ghata karake closing book value nikaalee ja rahee hai arthaat 100 minus 30 is equal to 70 ye 70 yahaan aayega 70 minus 20 is equal to 50, 50 yahaan aa gaya, 50 minus 10 is equal to 40. To us prakaar vahaan bhee teen varshon mein hamaara asset 100 lakh ka jo tha vo maatr 40 lakh ka rah gaya. Jo linear depreciation mein yahaan par 20, 20 aur 20 tha ye yaheen par 30, 20 aur 10 ho gaya.

(Reference Time 06:13)



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उदाहरण

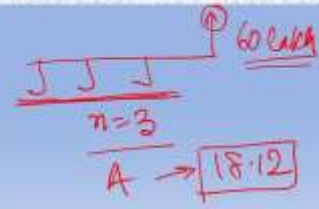
Year (t)	Sinking fund		
	BV _t	d _t	BV _t
1	100	18.12	81.88
2	81.88	19.93	61.95
3	61.95	21.92	40

All values in lakhs

BV_t indicates opening book value
d_t indicates the depreciation in year t
BV_t indicates closing book value

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साल्वेज वैल्यू : 40 लाख रुपये है।
उपयोगी सर्विस लाइफ तीन साल है।
जहां भी आवश्यक हो, 10% ब्याज दर मान लें

$$d_t = (P - S) \times \frac{i}{(1+i)^n - 1} \times (1+i)^{t-1}$$



Handwritten calculation: $19.93 - 18.12 = 1.81$
 $1.81 + 18.12 = 19.93$
 $18.12 + 3.62 = 21.74$

Aage chalen aur dekhien sinking fund method. Isamen pichhalee baar bhee samajhaaya gaya tha ki ham kya chaahate hain ki teen varshon mein ham ek aisee raashi jama kar den jisakee ki value yahaan par teen varsh ke ant mein 60 lakh ho jaaye. To usake liye hamaare paas table hain ya khe ki taalikaayen hain jinase ki ham factor nikaal sakate hain. Un factors se agar ham nikaalate hain ki 10 percent kee byaaj dar hai, n is equal to 3 hai, to A hamaara kya hoga? To aap dekhenge ki A hamaara aayega 18.12. Ab vahee 18.12 yahaan par diya hua hai, yaheen par ye 18.12 kyon nahee hai? Ye isaliye nahee hai kyonki ye 18.12 par byaaj lagata hai jo ki agale saal aur usake agale saal account mein lena hoga. To yahaan par 19.93 jo likha hai usako ham do bhaagon mein dekh sakate hain: ek bhaag hai 18.12 aur doosara bhaag hai 1.81. 18.12 yahee constant hai aur 1.81 is factor ka 10 percent ka byaaj hai. To ab ham dekhate hain doosare varsh mein depreciation ya moolyahraas hamaara ho gaya 18.12 plus 1.81 arthaat 19.93. To jahaan se ham shuroo hue the 100 lakh vahaan se hamane 18.12 hata diya, 81.88 aa gaya. 81.88 ham yahaan lekar aaya usamen se 19.93 hata diya to 61.95 aa gaya aur 61.95 mein se 21.92 hataaya to ham lagabhag 40 ke aasapaas pahunch jaenge. To is 21.92 ko bhee ham 18.12 plus byaaj component arthaat 3.62 ke roop mein dekh sakate hain aur hamaaree total value ant mein 40 ke lagabhag aaegee. Aap agar khud calculation karenge to aap dekhenge kuchh rounding of errors isamen aa rahee hain jisase ki yah value exactly 40 nahin aaegee lekin vah rounding of error hai usako ham abhee charcha nahin karate hain. Ham aage badhate hain aur baat karate hain declining balance method kee.

(Reference Time 08:50)



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उदाहरण

Year (t)	Declining balance method		
	BV _t	d _t	BV _t
1	100	40	60
2	60	24	40
3			

All values in lakhs

BV_t indicates opening book value
d_t indicates the depreciation in year t
BV_t indicates closing book value

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साल्वेज वैल्यू : 40 लाख रुपये है।
उपयोगी सर्विस लाइफ तीन साल है।
जहाँ भी आवश्यक हो, 10% ब्याज दर मान लें

$$d_t = \frac{2}{N} B_{t-1}$$

Double declining balance

Handwritten notes:
 $\frac{2}{3} = 0.67 \approx 67\%$
 $\frac{2}{5} = 0.4$
 $40\% \text{ of } 60 \rightarrow 24$
 $67 \text{ lakh} > 60 \text{ lakh} \rightarrow \text{Not possible}$
 (P-S) circled in red

Usase pahale ham double declining balance kee baat karate hain jo ki hamane pichhale lecture mein dekha tha. Vahaan par hamane factor liya tha 2. Ab is factor ko agar ham yahaan prayog karana chaahenge to 2 divided byn hamaara kitana hua, 2 divided byn hua 2 divided by 3 arthaat .67 ya 67 percent. Ab double declining method ka jo siddhaant hai vo yah kah raha hai ki yah jo book value thee usaka 67 percent moolyahraas pahale saal mein hoga. Ab ham agar 100 ka 67 percent lete hain to kitana hoga? 67 lakh lekin yah 67 lakh jo total depreciation hai vah hai kul 60 lakh. To ab yah 60 lakh se adhik to nahin ho sakata hai, ye 67 lakh jo ki 60 lakh se adhik hai yah to maany nahin hai arthaat maximum depreciation jo yahaan par ham le sakate hain vah kahaan se gavarn ho raha hai vah yahaan se gavarn ho raha hai ki hamaaree praarambhik value kya thee aur salvage value kya hai. Isase adhik depreciation permissible nahin hai usako ham nahin maan sakate hain, to ham kya karenge? Ham kahenge ki double declining method se 67 lakh aa jaroor raha hai lekin yah 60 lakh par seemit rahega aur 1 saal ke ant mein hee hamaaree book value 40 lakh ho jaeege. Is prakaar se yahaan par hamako double declining method ka ek cap ya ek maximum limit dekhane ko mil rahee hai. To total depreciation 60 lakh se adhik nahin ho sakata hai aur jo double decline hai usake hisaab se 67 lakh permissible nahin hai. Ham aapake lie ek homework chhod sakate hain ham yah kahen ki n 3 saal na hokar ke 5 saal hota tab kya hota, tab double declining method mein kya hota hai? Tab double declining method hota ki 2 divided by 5 arthaat .4, 40 percent depreciation permissible hai aur 40 percent agar depreciation permissible hota tab ham kah sakate the ki haan pahale varsh mein 40 lakh ka depreciation hoga aur book value aa jaeege 60 lakh, 60 lakh ham yahaan lekar aaenge aur phir 40 percent lagaenge. To ab 40 percent kitana hoga? 40 percent of 60 yah hua jaakar ke 24 lakh to phir vahee baat aa jaeege ki agar ham 24 lakh le lete hain to yah total depreciation 64 lakh ho gaya yah bhee permissible nahin hoga. To doosare varsh mein 24 na lekar ke ham 20 lenge aur yahaan par 40 lakh le lenge arthaat is calculation mein agar ham 5 saal lekar chalate hain to double decline mein 2 varsh ke ant mein hamaara asset salvage value par aa jaega aur usakee depreciation pahale aur doosare saal mein kramashah 40 lakh aur 20 lakh lee jaeege.

(Reference Time 12:20)



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उदाहरण

Year (t)	Declining balance method		
	BV _t	d _t	BV _t
1	100	33	67
2	67	22	45
3	45	15	40

All values in lakhs

BV_t indicates opening book value
d_t indicates the depreciation in year t
BV_t indicates closing book value

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$$d_t = \frac{2}{N} * B_{t-1}$$

$\frac{2}{3}$ 33%

Take the factor to be '1' instead of '2'

Ham aage chalte hain aur double decline ke alaava agar ham double decline na karen aur ham yahaan par 1 le len tab kya hoga? To us case mein hamaara jo factor hai depreciation nikaalane ke liye vo ho gaya 1 divided by 3 arthaat ham 33 percent karate hain. Ab 33 percent kar dene se phir calculation aasaan ho gae kyonki ham 33 percent agar lete hain to pahale saal mein 33 percent ho gaya, to 33 lakh 67 lakh yahaan aa gaya 67 lakh ka phir 33 percent kar denge to isaka ek tihaee arthaat 22 lakh ke aasapaas. To 22 lakh agar ham karate hain to abhee bhee hamaara total depreciation 55 lakh hee aa raha hai. To 22 lakh kam kar dene se hamaara book value yahaan par lagabhag 45 lakh huee. To ham 45 lakh jab lekar aate hain aur phir us par 1 divided by 3 karane kee koshish nahin kar sakte kyonki yahaan par agar ham 15 lakh karenge to hamaara total depreciation 60 lakh se oopar chala jaega. To yahaan par jo aankada ham lenge vah maatr itana le sakte hain jo ki total depreciation ko 60 lakh tak pahunchaega aur hamaaree book value ko 40 lakh par seemit rakhega. To ye charcha huee declining balance method kee.

(Reference Time 13:40)



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उदाहरण

Year (t)	Linear			Sum of digits			Sinking fund		
	BV_o	d_t	BV_c	BV_o	d_t	BV_c	BV_o	d_t	BV_c
1	100	20 ✓	80	100	30 ✓	70	100	18.12	81.88
2	80	20 ✓	60	70	20 ✓	50	81.88	19.95 ✓	61.95
3	60	20 ✓	40	50	10 ✓	40	61.95	18.43 ✓	40

All values in lakhs

BV_o indicates opening book value
 d_t indicates the depreciation in year t
 BV_c indicates closing book value

Double decline
Method linear

To yah taalika aa gae jisamen ki hamane udaaharan ka linear, sum of digits and sinking fund in teen vidhiyon se jo depreciation calculation kiya vah dikhaaya gaya hai. Linear mein har saal 20 lakh sum of digits mein 30, 20 aur 10. Sinking fund mein isako do bhaagon mein todate hue 18.12 plus interest component aur phir 18.12 plus interest component ke roop mein samajhakar agar ham karate hain to lagabhag 18.12 ka ek aankada constant hamaare saamane aa jaata hai. Teenon cases mein ham dekhenge ki total depreciation 60 lakh ho raha hai aur yahee baat jo hamane declining balance kiya tha to vahaan par bhee emphasize kee gae thee us par bhee jor diya gaya tha. Aksar aap kitaabon mein dekhenge kisee bhee tareeke se ham depreciation calculation karate hain to ek had tak aane ke baad ham yah bhee kar sakate hain ki usake baad ham method badal den, ham usake aage koe doosara method laga den. Ham shuroo mein udaaharan ke taur par, ham shuroo mein double decline se shuroo karen aur 2 varsh double decline use karane ke baad jo bhee bachee huee raashi hai usako linear depreciation karate hain. To is tareeke kee combination bhee depreciation methods mein aksar use kie jaate hain. Aage badhate hain aur dekhate hain ki depreciation kee yah pooree discussion hamen kahaan sahaayak hotee hai.

(Reference Time 15:20)



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किसी साइट पर प्रयोग वाले उपकरणों के लिए कुल मूल्यह्रास

मान लें कि किसी परियोजना में एक वर्ष के लिए निम्नलिखित उपकरणों का उपयोग होता है।

Equipment	Initial value	Salvage value	Service life (years)	Age *
1	100	0	4	3
2	500	50	9	10
3	300	60	6	5

* : of equipment or the how long ago it was procured

टिप्पणी : दिए गए आंकड़े ₹1000 (INR) में माने.

प्रश्न

उस साइट पर देय कुल मूल्यह्रास क्या है ?

To pahala udaaharan ham lete hain kisee site par prayog kie jaane vaale upakaranon ke lie kul moolyahraas is baat kee ganana. Jab hamane ek project ke estimation kee baat kee thee pahale module mein/pichhale modal mein, vahaan par baat huee thee ki equipment component bhee poore mooly ka ya pooree laagat ka ek mahatvapoom hissa hota hai. Equipment mein aane vaalee vah laagat kahaan se aaegee? Vah yahaan darshaaye gae udaaharan se lee ja sakatee hai ki aakhirakaar ek project mein tamaam equipment tamaam upakaran use kiye ja rahe hain unamen sabhee kuchh nae nahee hain, kuchh puraane bhee hain unamen se kitanee value us project se utpann kee jaanee chaahie. Aaiye udaaharan dekhate hain ki maan le ki kisee pariyojana mein ek varsh ke lie nimnalikhit upakaranon ka prayog hota hai. Vahaan par teen equipment use ho rahe hain ek, do aur teen. Inakee initial value ya initial laagat yahaan par hajaaron mein dee huee hai 1 lakh, 5 lakh aur 3 lakh. Unakee salvage value dee huee hai aur service life dee huee hai aur is site par ya is pariyojana mein aane se pahale unakee umr kya thee ya 4 saal kee service life thee to yah 3 saal baad yahaan par aae arthaat chauthe varsh mein yahaan par aae hain. Yah upakaran 9 varsh ka service kaal poora karane ke baad abhee bhee serviceable hai aur yahaan par usaka hoga dasavaan varsh; teesare equipment ke lie yahaan par usakee chhah saal kee useful service life hai usamen se paanch pooree ho chukee hai aur isake kes mein bhee pahale upakaran kee tarah last year of service life aur service life ka antim varsh vah is pariyojana mein aega. Ab in aankadon ko dekhate hue nikaalana yah hai ki is pariyojana mein upakaranon kee cost kitanee lee jaanee chaahie arthaat prashn hua is site par dey kul moolyahraas kya hai?

(Reference Time 17:33)



Department of Civil Engineering Indian Institute of Technology Kanpur

ध्यान दें कि

- उपकरण-1 और 3 अपने सर्विस लाइफ के अंतिम वर्ष में हैं।
- उपकरण-2 की सर्विस लाइफ पूरी हो चुकी है।
- अतः, उपकरण-2 का प्रयोग एक बोनस के रूप में देखा जा सकता है। इसलिए, इन संचालित वर्षों में कुल मूल्यहास कितना होगा?

Equipment	Initial value	Salvage value	Service life (years)	Age *
1	100	0	4	3
2	500	50	9	10
3	300	60	6	5

* : of equipment or the how long ago it was procured

Linear method

$$= \frac{(100-0)}{4} + \frac{(300-60)}{6} = 65$$

Maint 1yr

Sum of year method

$$= \left\{ \left(\frac{1}{1+2+3+4} \right) \cdot (100-0) \right\} + \left\{ \left(\frac{1}{1+2+3+4+5+6} \right) \cdot (300-60) \right\}$$

$$= 21.42$$

भारत सरकार की MOOCs पहल के अंतर्गत पाठ्यक्रम : निर्माण प्रबंधन के सिद्धांत

16

Yahaan par linear aur sum of year in do tareekon se nikaalane kee koshish kee gae hai. Yah taalika jo pahale dee gae thee vo hee hai ki yah vahee teenon equipment hai, inakee initial value, salvage value, service life aur age at the time coming to site arthaat is pariyojana mein aane se pahale kitana varsh ho chuka tha ye yahaan par diya hua hai aur dhyaan den ki upakaran ek aur teen apanee service life ke antim varsh mein hain aur upakaran do kee service life pooree ho chukee hai. Atah upakaran do ka prayog ek bonus ke roop mein dekha ja sakata hai aur moolyahraas maatr upakaran ek aur upakaran teen par hee laagoo hoga. Upakaran ek aur upakaran do mein ho rahe moolyahraas ka bojh us pariyojana ko lena hoga. Vo kitana hua? Jab linear method kee baat ho rahee hai to chaaron saal kitana moolyahraas hoga? 100 minus 0, ye 100 hai ye 0 hai, to 100 minus 0 divided by 4 plus 300 minus 60 divided by 6, ye jo chhe saal kee service life hai isako agar ham jodate hai to hamaara 65 hazaar ka aankada aata hai. Sum of years mein ham jaate hai to ye chaar saal kee life hai, ye chhe saal kee life hai to is prakaar se ham yahaan ka factor likhate hain aur ham dekhenge hamaara moolyahraas ya depreciation 21.42 hee rah jaata hai. To 65 hazaar kee jagah maatr 21 hazaar 420 rupe rahata hai. To is prakaar se in methods ka upayog karake ham ek site par aane vaale equipment expenditure isako nikaal sakate hain. Dhyaan rahe ki yah expenditure maintenance yaanikee rakharakhaav se alag hai chaahe equipment ek ho; do ho; teen ho usamen ek saal mein jo bhee rakharakhaav ka kharch aaega vah to is pariyojana ke mathe jaega hee divided by vah to is pariyojana ko vahan karana hee hoga. Usake alaava yah jo depreciation ka kharch aata hai vah kaipital expenditure ke roop mein yah capital expenditure ke recovery ke roop mein dekha jaata hai. Yah ek application hai jahaan par kee depreciation calculation hamako help karatee hai hamaaree sahaayata karatee hain ek site par hone vaale depreciation ko calculate karane mein.

(Reference Time 20:13)



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ध्यान दें कि

- उपकरण-1 और 3 अपने सर्विस लाइफ के अंतिम वर्ष में हैं।
- उपकरण-2 की सर्विस लाइफ पूरी हो चुकी है।
- अतः, उपकरण-2 का प्रयोग एक खोना के रूप में देखा जा सकता है। इसलिए, इन संचालित वर्षों में कुल मूल्यहास कितना होगा?

Equipment	Initial value	Salvage value	Service life (years)	Age *
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Linear method

$$= \frac{(100-0)}{4} + \frac{(300-60)}{6} = 65$$

Maint 1yr

Sum of year method

$$= \left\{ \left(\frac{1}{1+2+3+4} \right) \cdot (100-0) \right\} + \left\{ \left(\frac{1}{1+2+3+4+5+6} \right) \cdot (300-60) \right\}$$

$$= 21.42$$

Isake alaava ham depreciation ke calculation se unaka upayog karake yah jaanakaaree praapt kar sakte hain ki kisee kampanee ke paas upakaranon ka kitana asset base hai, aakhir tamaam nirmaan kampaniyaan hai usamen kuchh kampaniyon ke paas adhik equipment honge aur usake paas kaam honge, to kis kampanee ke paas kitane equipment hai is baat kee jaanakaaree hamen depreciation ke calculation se mil saktee hai. Use kampanee mein kitana depreciation, expenditure dikhaaya ja raha hai unake account books mein. Yah moolyaankan book value arthaat kisee bhee nishchit taareekh par ham dekh sakte hain ya sampatti kee praarambhik value. To book value par bhee kar sakte hain aur ham initial value par bhee kar sakte hain. Ham dekh sakte hain ki kis kampanee ke paas kitane asset base hai, equipment asset base hai. Kya kisee kampanee ke paas apne equipment hai ya nahin yah baat ham isase pata laga sakte hain. Yah baat ham bolee prakriya arthaat procurement procedure mein lekar aa sakte hain, ham kah sakte hain ki is project ke lie unhen kampaniyon ke paatrata hogee jinakee aaset base 100 karod se jyaada hai. Jinake paas 100 karod rupe se adhik ke nirmaan hain. Upakaran hai to is baat ko bolee prakriya kee paatrata ka maapadan bhee banaaya ja sakata hai. To yah ek aur application hai jahaan par ki ham depreciation calculation kee madad le sakte hain. Ab ek baat aatee hai ki ham depreciation expenditure shuroo mein adhik kyon rakhana chaahate hain, aakhirakaar kampanee shuroo mein depreciation kyon adhik karana chaahenge? Hamane dekha ki Linear sum of year, double decline tamaam tareeke hain aur usamen se kaun sa tareeka ya kaun see vidhi shreshakar hogee? Isamen ham yah jaanana aavashyak hai ki ham adhik kyon rakhana chaahate hain kaam kyon nahin rakhana chaahate hain? Yah baat dhyaan mein rakhane chaahie kee total depreciation fixed 100 karod hai to 100 karod hai; 10 lakh hai to 10 lakh hai baat sirph yah hai ki usaka distribution kya hai? Ham 100 ka distribution shuroo mein 50 phir agalee baar 25-25 karate hain ya shuroo mein 40 par 30, 30 karate hain ya shuroo mein 66 phir 32 phir 8 kar dete hain, to is tareeke se jo bhee karen ham kis distribution ko follow karana chaahate hain yah baat aksar nirbhar karatee hai kar pranaalee par arthaat tax policy par.

(Reference Time 22:58)



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कुल मूल्यहास के व्यय पर कर में छूट का प्रावधान

- वार्षिक आय के आधार पर कंपनियों पर टैक्स लगाया जाता है।
- कंपनी के कुछ खर्चों, जैसे किसी संपत्ति पर मूल्यहास, पर अक्सर कर प्रणाली में टैक्स-बल आय तब करते समय कुछ राहत का प्रावधान होता है।
- इसलिए
 - विभिन्न विकल्पों के बीच लिए गए निर्णय अक्सर कर प्रणाली के प्रावधानों से प्रभावित होते हैं
 - किसी भी वर्ष में मूल्यहास को अधिक से अधिक रखना चाहिए
 - इससे कंपनी को उपकरण खरीदने का प्रोत्साहन भी मिलता है

100%
50%
75%

Kul depreciation ke vah par karo mein chhath ka praavadhaan aksar hota hai. Vaarshik aay ke aadhaar par kampaniyon mein tax lagaaya jaata hai. Kampanee ke kuchh kharchon jaise kisee kampanee ke sampatti par moolyahraas par aksar kar pranaalee mein taxable aae tay karate samay kuchh raahat ka praavadhaan hota hai. Iseelie vibhinn vikalpon ke beech lie gae nirnay aksar kar pranaalee ke praavadhaanon se prabhaavit hote hain aur kisee bhee varsh ke moolyahraas ko adhik se adhik rakhana chaahie. Yah adhik rakhane ka arth yah bhee hai ki time value of money jis par hamane pahale bhee charcha kee thee agar yah tay ho jae ki hamen 100 lakh kar dena hai, hamaare paas agar vikalp hai ki ham 50 lakh aaj den aur 50 lakh agale varsh den. Doosara vikalp hai ki ham 25 lakh abhee de den aur 75 agalee baar de den, to kaun sa shreshakar hoga? Svaabhaavik hai ki ye shreshakar hoga kyonki is case mein ham jo bacha hua dhan hai vah apane paas ek aur varsh ke lie rakh sakate hain aur usako apane vyavasaay mein laga sakate hain usaka upayog kar sakate hain. To yah baat time value of money ke saath judee huee hai iseelie kampaniyaan aksar yah prayaas karatee hain ki depreciation ham adhik se adhik dikhaen taaki hamen karo mein chhoot mil sake. Saath hee saath praavadhaan yah bhee ho sakate hain ki kampanee ko upakaran khareedane ka protsaahan bhee mile. Kar pranaalee mein aksar yah praavadhaan bhee hota hai ki agar aap nae equipment khareedane hain/nae upakaran khareedane hain to usakee khareed mooly ka kuchh hissa aapakee taxable income se kam kar diya jaata hai yah baaten hamen udaaharan se samajhane kee koshish karate hain.

(Reference Time 25:00)



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उदाहरण

एक वित्तीय वर्ष में, एक कंपनी की कुल (ग्रॉस) इनकम INR 5,00,000 है।

कर नियमों में प्रावधान है कि:

1. मूल्यहास व्यय कुल (ग्रॉस) आय से पूर्णतः कटौती के पात्र हैं, और
2. टैक्सेबल आय पर 25% की दर से कर लगेगा

निम्नलिखित स्थितियों में कंपनी द्वारा देय कर को ज्ञात करें :

- a) जब कंपनी के लिए कोई मूल्यहास व्यय न हो
- b) जब पहले से मौजूद संपत्तियों के मूल्यहास (व्यय) के लिए INR 80,000 हो

19

Ek vitteey varsh mein kampanee kee kul grosss aae 5 lakh hai, kar niyamon mein praavadhaan hai ki moolyahraas vyay kul gross aay se poornata kataatee ke paatr hain aur taxable aae par 25 percent kee dar se kar laga hai? Ab prashn yah hai ki nimn sthitiyon mein hamen dey kar ko gyaat karana hai. Kaun see sthitiyaan hai? Jab kampanee ke lie koee bhee depreciation ka vyay nahin hai aur doosara case hain jabaki maujooda ya pahale se maujood sampattiyon ka total kul depreciation vyay 80 hazaar rupe hai.

(Reference Time 25:39)



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Gross Income (A)	Case - A			Case - B		
	Depreciation expense (B)	Net income (C) = (A) - (B)	Tax payable @ 25% of C	Depreciation expense (B)	Net income (C) = (A) - (B)	Tax payable @ 25% of C
5,00,000	0	5,00,000	1,25,000	80,000	4,20,000	1,05,000

- यह स्पष्ट है कि यदि संपत्ति पर मूल्यहास के रूप में धन का आवंटन होता है, तो टैक्स में 20,000 रुपये की नेट सेविंग्स होती है
- कंपनियां अक्सर अपनी टैक्सेबल इनकम को कम करने के लिए कर प्रणाली के इन प्रावधानों का प्रयोग करती हैं

20

In do case mein agar ham taxable income ya tax calculate karate to kya aata hai? To hamaaree gross income hai 5,00,000. Case A hai jisamen depreciation bilkul nahin hai,

vahaan par net income 5,00,000 hee maanee jaegee aur us par 25 percent tax dene se hamen 1,25,000 rupe tax dena hoga. Case B jahaan par kee ham 80,000 rupe ham apane depreciation expenditure mein dikhaate hai, net income ya taxable income 4,20,000 huee aur tax payable jo isaka 25 percent hoga, vo ho gaya 1,05,000 rupe. Dhyaan deejie ki isamen is 80,000 ko is 5,00,000 se ghataaya gaya hai. Praavadhaan yah bhee ho sakata hai ki depreciation expenditure ka 50 percent hee taxable income calculate karate samay liya jae. Use case mein agar 50 percent kee baat hotee, to yahaan par baat 40,000 ho jaata hai, yahaan par ham 4,60,000 par calculate karate. To spasht hai ki yadi sampatti par moolyahraas ke roop mein dhan ka aavantan hota hai to tax mein 20,000 kee net saving ho rahee hai. Yahaan par 1,25,000 tha yahaan par 1,05,000 hai. Kampanee aksar apane taxable income ko kam karane ke lie kar pranaalee ke in praavadhaanon ka prayog karatee hain. Yah dhyaan rakhiega ki yah discussion jo aaj ham charcha kar rahe hain vah kisee specific praavadhaanon par nahin hai, lekin ek illustrative example hai ki ham agar is prakaar ke praavadhaan honge to ham depreciation ko kaise istemaal kar sakate hain, kaise ham use kar sakate hain apane karo ko nirdhaarit karane ke lie.

(Reference Time 27:30)

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आइए हम निम्नलिखित उदाहरण पर विचार करते हैं, जो किसी कंपनी के लिए टैक्सबल इनकम को और कम कर देता है।

Case-c:

पिछले उदाहरण में दी गई जानकारी और प्रावधानों के अलावा यदि कर नियमों में एक खंड हो जिसमें कहा गया है कि

उपकरणों की खरीद पर

- i) उपकरणों की कीमत का 50%, या,
- ii) INR 50,000,

जो भी कम है, टैक्सबल आय ज्ञात करने के लिए कुल आय से घटाया जा सकता है।

भारत सरकार की MOOCs पहल के अंतर्गत पाठ्यक्रम : निर्माण प्रबंधन के सिद्धांत

21

Aage badhate hue ek aur udaaharan dekhate hain jo ki kisee kampanee ke lie taxable income ko aur bhee kaam kar sakata hai. Vah hai is prakaar ka ek provision ya praavadhaan, jahaan par kee upakaranon kee khareed ko protsaahan देने के lie ek aur praavadhaan kiya gaya. Usamen kaha gaya ki upakaranon kee keemat ka 50 percent ya INR50,000 jo bhee kaam ho taxable aay gyaat karate samay kul aay se ghataaya ja sakata hai.

(Reference Time 00:22)



Department of Civil Engineering Indian Institute of Technology Kanpur

Gross Income (A)	Case - B		
	Depreciation expense (B)	Net income (C) = (A) - (B)	Tax payable @ 25% of C
5,00,000	80,000	4,20,000	1,05,000

उपकरणों की खरीद पर

- i) उपकरणों की कीमत का 50%, या,
- ii) INR 50,000,

जो भी कम है, टैक्ससेबल आय ज्ञात करने के लिए कुल आय से घटाया जा सकता है

Gross Income (A)	Value of equipment procured (X)	Case - e			
		Depreciation expense (B)	Rebate for equipment purchase (C)	Net income (D) = (A) - (B) - (C)	Tax payable @ 25% of D
5,00,000	2,00,000	80,000	50,000	3,70,000	92,500

1,00,000

To agar ab yah praavadhaan bhee hamaare sang lag gaya, to hamaaree taalika kis prakaar badal jaegee? To case B bhee tha jisamen kee depreciation 80,000 tha jahaan par ki hamaara 1,05,000 tax ban raha tha. Ab ek provision aur aa gaya kee value of equipment procured, to hamane ek equipment 2,00,000 ka khareed liya. Vahaan par depreciation 80,000 raha, rebate jo hamako 50 percent kee mil sakatee hai with the limit of 50,000. To isakee 50 percent hua 1,00,000 kee. Ab 1,00,000 kee rebate to hamako nahin mil sakatee haan, 50,000 kee rebate hamako avashy mil sakatee hai. To 50,000 kee rebate milane par hamaaree taxable income ho gae 5,00,000 minus 80,000 minus 50,000 arthaat 3,70,000 aur is 3,70,000 par 25 percent hamaara tax ho gaya 92,500. To hamane kuchh had tak jo kar bachaaya usako hamane invest kiya equipment mein. Doosaree tareeke se dekhen ki hamaare is equipment kee khareed par kuchh riyayyat ya kuchh support hamako sarakaar dvaara milee. Is prakaar se hamaaree kar pranaalee depreciation, equipment purchase yah sab ek tareeke se jude hue maamale hain. To is prakaar se kar pranaalee depreciation, equipment purchase inamen ek ajeeb sa sambandh hai ek doosare se jude hue hain. Aaj kee charcha mein hamane ek udaaharan ke saath depreciation kee tamaam vidhiyon par vichaar kiya aur saath hee saath depreciation ke calculation ko ham kis prakaar se upayog mein la sakate hain is par vichaar kiya aur is charcha ke saath nirmaan arthashastra (construction economy) ka hamaara yah module ab samaapt hota hai aur ham agale module mein aapase Planning aur Scheduling par charcha shuroo karenge.

(Reference Time 30:11)



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उपयोगी प्रकाशित पुस्तके

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Aur hamesha kee tarah ham aapako ek list dikha rahe hain jahaan par kee kuchh upayogee prakaashit pustak hain jo ki aapako is module mein cover kiya ja rahe vishayon ko samajhane mein sahaayak hogee.



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:: धन्यवाद ::

Agale module ham phir aapase milenge, dhanyavaad. Jay hind.