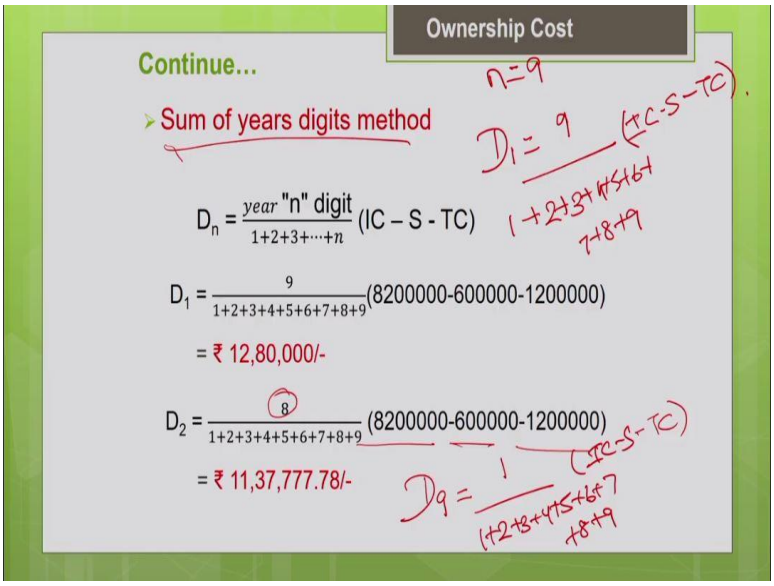

So, next is a sum of the years digit method. So, here, how do you calculate the depreciation for the first year when you calculate the number of years left in the recovery period is say n = 9. So, number of years left in the recovery period is 9 divided by the sum of the years in the useful life 1+ 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 multiplied by initial cost minus the salvage value minus tire cost. So, this will give you the depreciation for the first year.

$$D_n = \frac{year\ "n"\ digit}{1+2+3+\cdots+n}$$

$$D_1 = \frac{9}{1+2+3+4+5+6+7+8+9}(8200000-600000-1200000)$$
$$= ₹\,12{,}80{,}000/-$$

Similarly, depreciation for the second year number of years left in the recovery period is nothing but number of years left in the recovery period from the beginning of the second year to the end of the useful life of the machine is 8 year. So divided by the sum of the years in the useful life multiply by a initial cost minus tire cost minus salvage value. Similarly, we calculate the depreciation for every year.

$$D_2 = \frac{8}{1+2+3+4+5+6+7+8+9}(8200000-600000-1200000)$$
$$= ₹\,11{,}37{,}777.78/-$$

Say for the example depreciation for the 9th year it should be number of years left in recovery period will be 1 divided by 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 multiplied by initial cost minus salvage value. So, this is all the estimated depreciation using sum of the years digit method.

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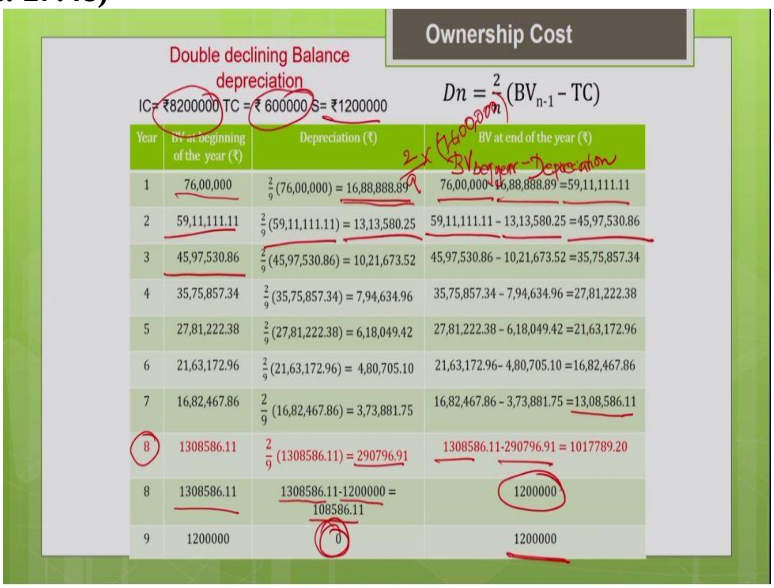

Year	BV at beginning of the year (₹)	Depreciation (₹)	BV at end of the year (₹)
1	76,00,000	$\frac{2}{9}$(76,00,000) = 16,88,888.89	76,00,000-16,88,888.89 =59,11,111.11
2	59,11,111.11	$\frac{2}{9}$(59,11,111.11) = 13,13,580.25	59,11,111.11 - 13,13,580.25 =45,97,530.86
3	45,97,530.86	$\frac{2}{9}$(45,97,530.86) = 10,21,673.52	45,97,530.86 - 10,21,673.52 =35,75,857.34
4	35,75,857.34	$\frac{2}{9}$(35,75,857.34) = 7,94,634.96	35,75,857.34 - 7,94,634.96 =27,81,222.38
5	27,81,222.38	$\frac{2}{9}$(27,81,222.38) = 6,18,049.42	27,81,222.38 - 6,18,049.42 =21,63,172.96
6	21,63,172.96	$\frac{2}{9}$(21,63,172.96) = 4,80,705.10	21,63,172.96- 4,80,705.10 =16,82,467.86
7	16,82,467.86	$\frac{2}{9}$(16,82,467.86) = 3,73,881.75	16,82,467.86 - 3,73,881.75 =13,08,586.11
8	1308586.11	$\frac{2}{9}$(1308586.11) = 290796.91	1308586.11-290796.91 = 1017789.20
8	1308586.11	1308586.11-1200000 = 108586.11	1200000
9	1200000	0	1200000

Now, let us move on to the double declining balance method. In double declining balance method it is totally different from the earlier method as I told you here, we are not using salvage value in the estimation of the depreciation of the machine. So, you are going to depreciate the instantaneous book value. So, for the first year, what is the book value at the beginning of the year? It is 76 lakh how did you get this up to 76 lakh your initial cost is 82 lakhs minus your tire cost 6 lakh.

$$D_n = \frac{2}{n}(BV_{n-1} - TC)$$

So, that will give you the book value at the beginning of your 76 lakh now what is the depreciation for the year 1 it is nothing but 2 / n multiplied by book value. So, already we have deducted the tire cost. So we need not deduct the tire cost. So 2 / n multiply by the book value, so n is 9. So, 2 by your n is 9 multiplied by the book value is nothing but 76 lakhs. So, that gives you the depreciation once the depreciation is estimated.

Now, what is the book value at the end of the year it is nothing but your book value at the beginning of year minus your depreciation that gives you the book value at the end of the year so book value at the beginning of year is 76 lakh and depreciation is 16,88,888 when you subtract both you will

get the book value at the end of the year. So, this is all estimate. Now, book value at the end of year will become the book value at the beginning of the next year.

So, book value at the beginning of next year is 59,11,111.11 does the same way to calculate the depreciation 2 / n, n is 9 multiplied by the book value will give that depreciation. So, once you know the depreciation, again calculate the book value at the end of the year. It is nothing but book value at the beginning of year minus your depreciation that gives you book value at the end of the year. Now the book value at the end of this year becomes a book value at the beginning of the next year third year. The same way you calculate the depreciation for all the years?

And one important thing here you have to note here as I told you there are more chances that your book value estimator can go below the salvage value. So, say for example for the 8 year you have estimator the depreciation now when I estimate the book value at the end of the year you can see it is 10,17,789. So, your salvage value is 12 lakh so, it has gone below the salvage value, so, this is not accepted now, you back calculate so, that is calculated for the 8 years again so how do you back calculate.

So, book value at the end of the 7^{th} is the beginning of your 8^{th} year now, you fix up the book value at the end of 8 year you cannot go below salvage value. So, fix the book value is 12 lakh now, you back calculate the depreciation. So, the book value of the beginning of the year minus 12 lakh gives you the depreciation. So, you have to back calculate. Now for the 9th year depreciation will be 0 because I cannot depreciate further I have already reached the salvage value. So, that is why depreciation is 0.

So, finally, you can see at the end of the 9th year salvage value is 12 lakh as estimated earlier. So, this is how we estimate the depreciation using double declining balance method.

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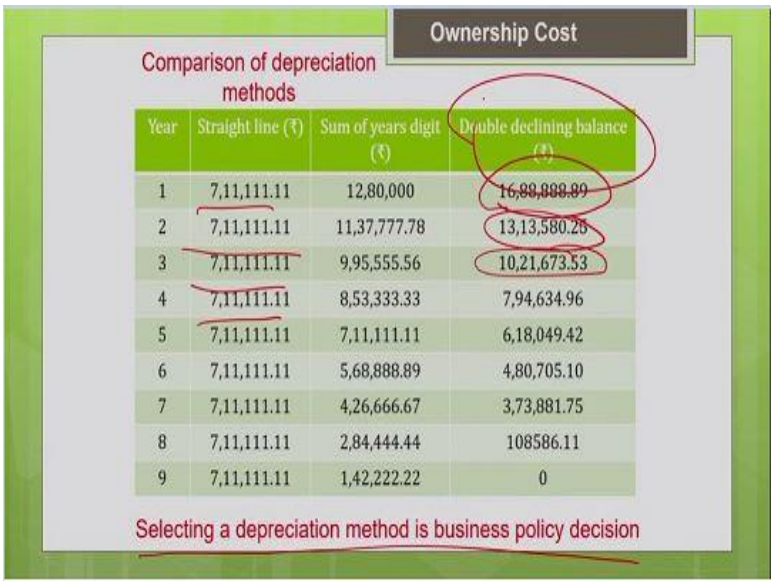

Now, let us compare the depreciation estimated using 3 different methods you can say straight line method depreciation is always same every year. So, when you compare sum of the years as well as the double declining method, you can see that the double declining method is giving accelerated depreciation that means more depreciation in the early age of the machine when compared to the other methods.

So, more depreciation in the early age of the machine. So, when compared to the other methods, this is what people prefer as a total to get the tax benefits. But however, selecting the depreciation is totally a business policy decision there is no constraint or any project estimator any company that they have to follow only this particular depreciation method for accounting purpose. So, they are free to choose any method according to their business policy, but generally people prefer only more accelerated method. So, this double declining method is more commonly used.

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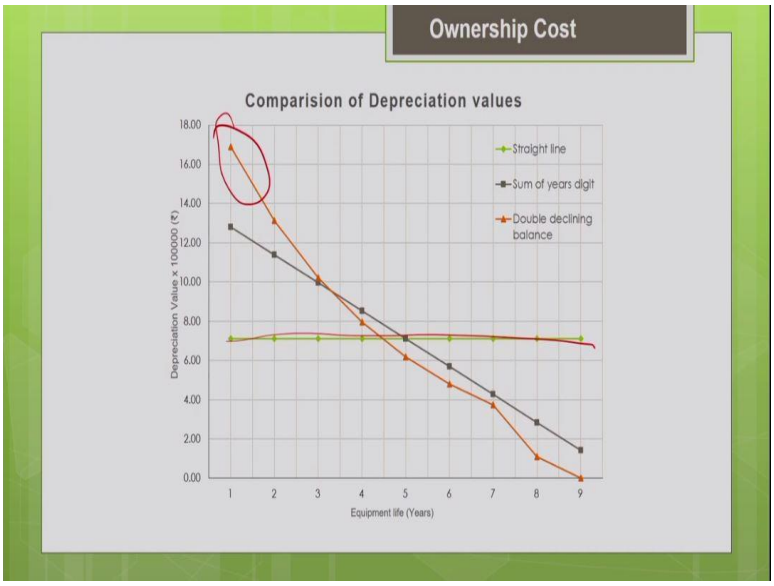

This is just a graphical representation of the depreciation values estimated by 3 different methods you can see straight line method is always constant double declining method this one is giving you the accelerated depreciation more depreciation in the early age of the life of the machine.

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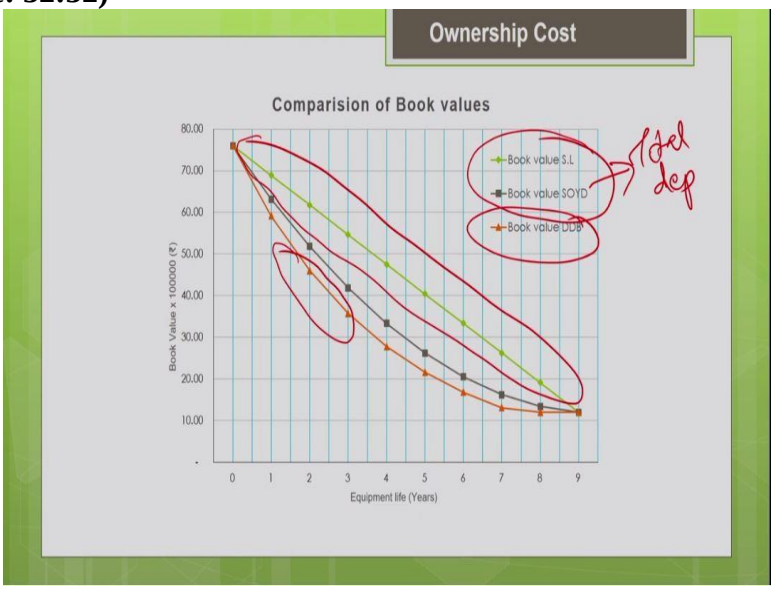

In the same way you can also compare the book value. So, you can see that the straight line method there is a linear reduction. So, the reduction the book value is linear, but for the other 2 methods it is nonlinear and you can see for the double declining method it is more accelerated. So, this is more accelerated depreciation the book value deduction is more. So, one thing to be noted is the rate of reduction is different for different methods.

So, when you compare your straight line method and the sum of the year digit method, you can keep in mind that the total depreciation will be same the total depreciation there is a difference between your initial cost minus salvage value is going to be the same, but the rate of reduction will be different depreciation factor is different, but in double accounting method, the way you estimate the depreciation and there are more chances that the total depreciation may not be the same. So, and your book value can go below the estimated salvage value. So, then we have to back calculate and make it equal to the salvage value.

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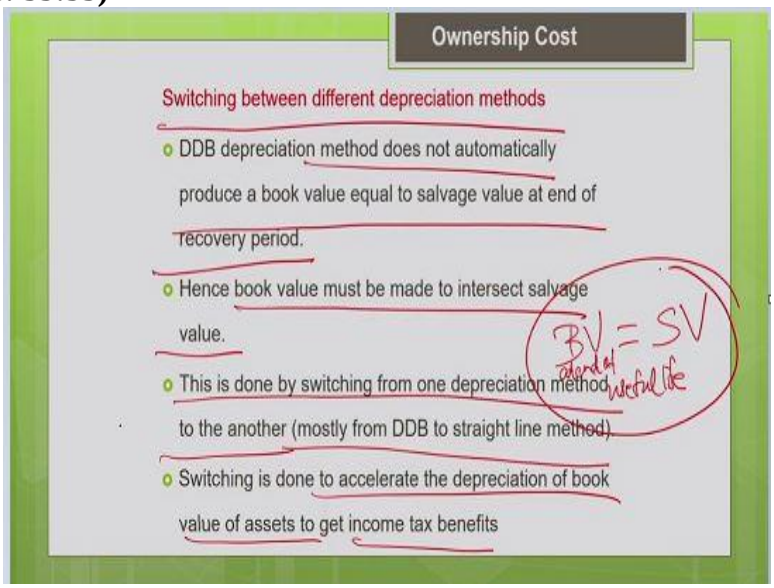

So, another important factor which we are going to discuss today is about switching between different depreciation methods, this is very important as I told you, DDB stands for double declining balance the depreciation method, so, DDB method does not automatically produce a book value equal to the salvage value at the end of the recovery period many cases you can see that the estimated book value can go below the salvage value.

So, now we have to make the book value to intersect with the salvage value that is fair I told you I mean the earlier example we back calculate depreciation. So, there is one way we can also use this methodology where this switch between different depreciation methods, this switch between the speeds from one depreciation method to another depreciation method. So, that your estimated book value you should match with your salvage value.

So, you can switch from one depreciation method to the, another mostly from the DDB method to the straight line method. The reason why we switch as I told you we have to actually take depreciation of the book value people prefer acceleration of the depreciation of the book value of the assets to get the income tax benefits. That is why as we discussing double declining balance method in the early age you can see that the depreciation will be more when compared to straight line method. But as age have taken increases.

Have some point of time you have straight line method of depreciation may become more than the double declining balance method in that the case you can switch over from the double declining balance method to straight line method so that I can get the benefits of higher depreciation to get tax benefits just for the accounting purpose. So, this switching method constitutes accelerated depreciation.

So that you can get tax benefits and another important reason just now what we discuss is your estimated book value should match your estimated salvage value, book value at the end of useful life should intersect with your salvage value. So, this is another reason why we go for switching over between different depreciation methods.

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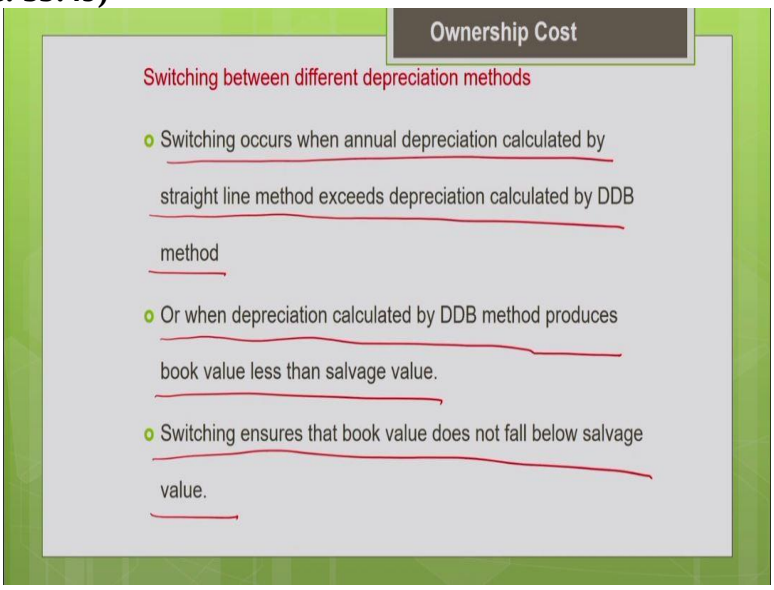

So, switching occurs when the as we discussed just now switching occurs when the annual depreciation calculated by the straight line method exceeds the depreciation calculated with a DDB method it occurs as the initial stage of DDB may be higher than the straight line method as the age

of the equipment increases. So, DDB method depreciation may go below the straight line method in that case we have to switch over another case where we switch over is when the depreciation calculated by the DDB method produces book value less than the salvage value.

This we do not want to occur we want the book value at the end of useful life to match with the salvage value. So, in that case also we have to switch over from one method to another method switching will ensure that the book value does not fall below the estimated salvage value.

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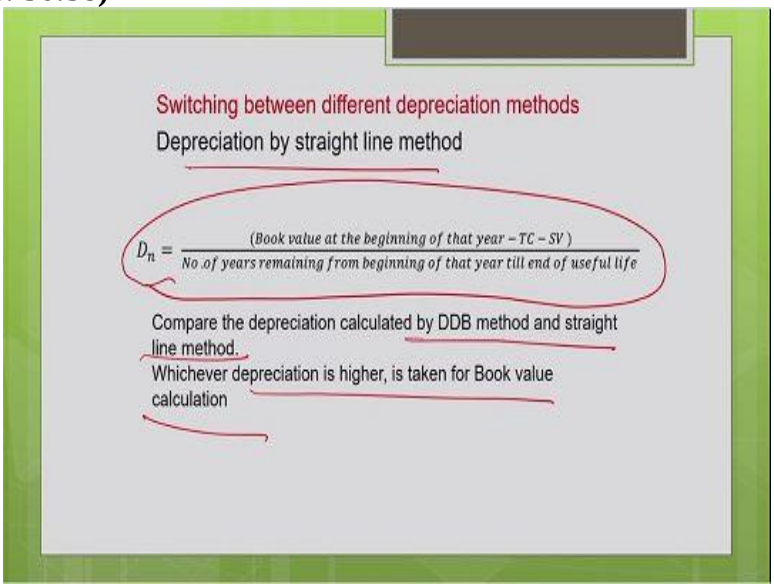

So, when we do this the switching process. So, we have to remember that when we estimated straight line method, the formula will not be the same as a regular straight line depreciation however, it is different when we switch over we can see now. So, for straight line method when you switch over with the depreciation according to this formula, it is nothing but your book value at the beginning of that year, minus tire cost minus salvage value as usual divided by a number of years remaining from the beginning of that year till the end of the useful life.

$$D_n = \frac{(Book\ value\ at\ the\ beginning\ of\ that\ year\ -\ TC\ -\ SV)}{No.\ of\ years\ remaining\ from\ beginning\ of\ that\ year\ till\ end\ of\ useful\ life}$$

So, this is how we calculate the depreciation using straight line method, when we follow the switching process. So, in our regular straight line method depreciation we pay initial cost. So, here we are taking book value at the beginning of every year for every year we are calculating the

depreciation and that is going to be different here and we have to estimate the book value at the beginning of every year for the depreciation calculation.

In the earlier method, when we discussed the straight line method n we have to take the total n number of years and the useful life of the machine. But here similar to your sum of years digit method formula, here we are taking number of years left in the recovery period number of years left in the recovery period from the beginning of the year for which you are going to calculate the depreciation till the end of the useful life.

So, this is how we are calculating the n here. So number of years left in the recovery period from the beginning of the year for which you are going to calculate the depreciation till the end of the useful life. So this will give you the annual depreciation when we do this switching process and here you can note that even when you go for straight line method depreciation every year is going to be different in this approach, when we will work out the demonstration we will understand better.

So now you compare the depreciation calculated by the DDB method every time you have to compare the depreciation calculated by the DDB method and straight line method whichever gives you higher depreciation. The depreciation will be used for book value estimation. So this guideline you have to keep in mind? In every time calculate the depreciation by both the methods, whichever depreciation is higher, you set a depreciation for the estimation of the book value that you are going to switch over from this method to the next method.

Now let us work out an illustration how to do the switching process from the DDB method to the straight line method.

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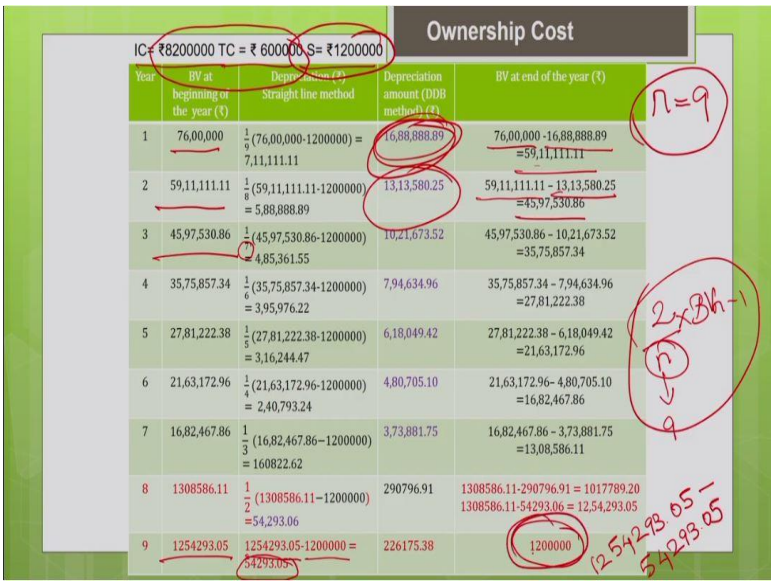

Year	BV at beginning of the year (₹)	Depreciation (₹) Straight line method	Depreciation amount (DDB method) (₹)	BV at end of the year (₹)
1	76,00,000	$\frac{1}{9}$(76,00,000-1200000) = 7,11,111.11	16,88,888.89	76,00,000 -16,88,888.89 =59,11,111.11
2	59,11,111.11	$\frac{1}{8}$(59,11,111.11-1200000) = 5,88,888.89	13,13,580.25	59,11,111.11 – 13,13,580.25 =45,97,530.86
3	45,97,530.86	$\frac{1}{7}$(45,97,530.86-1200000) = 4,85,361.55	10,21,673.52	45,97,530.86 – 10,21,673.52 =35,75,857.34
4	35,75,857.34	$\frac{1}{6}$(35,75,857.34-1200000) = 3,95,976.22	7,94,634.96	35,75,857.34 – 7,94,634.96 =27,81,222.38
5	27,81,222.38	$\frac{1}{5}$(27,81,222.38-1200000) = 3,16,244.47	6,18,049.42	27,81,222.38 – 6,18,049.42 =21,63,172.96
6	21,63,172.96	$\frac{1}{4}$(21,63,172.96-1200000) = 2,40,793.24	4,80,705.10	21,63,172.96– 4,80,705.10 =16,82,467.86
7	16,82,467.86	$\frac{1}{3}$(16,82,467.86−1200000) = 160822.62	3,73,881.75	16,82,467.86 – 3,73,881.75 =13,08,586.11
8	1308586.11	$\frac{1}{2}$(1308586.11−1200000) =54,293.06	290796.91	1308586.11-290796.91 = 1017789.20 1308586.11-54293.06 = 12,54,293.05
9	1254293.05	1254293.05-1200000 = 54293.05	226175.38	1200000

I have used the same input data for the previous problem, it is just a continuation that I am going to show you the methodology of switching from one method to another depreciation method. So, the initial cost is say 82 lakh tire cost of 6 lakh and salvage values are 12 lakh and the useful life of the machine as it is earlier as it is going to be n = 9. So, the book value at the beginning of the year is 76 lakh we know how we estimated here 82 lakh minus 6 lakh initial costs minus tire costs gives us the book value at the beginning of the year.

Now we calculate the depreciation using the straight line method. Straight line method we just now discussed how to estimate like it is nothing but your book value at the beginning of the year 76 lakh minus your salvage value divided by the number of years left in the recovery period. So, at the beginning of year 1 from the beginning of year one if you calculate number of years left in the recovery period is 9 because n = 9, so, number of years left in the recovery period is 9.

So, now you estimate a depreciation 76 lakh minus 12 lakh divided by 9 that will give you the depreciation now, depreciation by DDB method you already know it has nothing but a 2 / n multiply by the book value this is how we estimate we have already estimated I am not going to repeat explain the calculations again but one thing you have to note here is here n refers to 9 it is a total number of years the useful life of the machine so n is fixed every year.

So, here we are not going to change the n every year. So, this is how we estimate the double declining balance depreciation value. Now, at the end of year is nothing but your book value at the

beginning of the year 76 lakh and whichever depreciation is higher compared straight line method and DDB obviously a DDB method depreciation is higher. So, you are going to use this for the book value estimation. So, your book value at the end of the year is 59,11,111.11.

So, book value at the end of this year becomes a book value at the beginning of the next year the same way calculate the straight line depreciation. Now the number of years left in the recovery period from the beginning of the second year to the end of the useful life is 8 that is why 8 number of years left in the recovery period 8 now, this is your book value at the beginning of this year minus your salvage value.

This gives you the depreciation now DDB method you can calculate now the book value at the end of the year is nothing but book value at the beginning year minus whichever depreciation is higher, obviously, depreciation DDB is higher. So, I have taken that so, this is your book value at the end of year similarly to continue like the book value end of this year becomes the beginning of the next year number of years left in the recovery period now is 7 already 2 years are completed from the beginning of third year till the end of the useful life it is 7.

The same way you calculated the depreciation for all the years, but one thing you have to note here is 8th year what is happening 8th year your straight line depreciation is 54,293 your double declining balance depreciation is 2,90,796. So, which depreciation is higher obviously have to go for this only DDB. So, when we take the DDB when you estimate my book value, so, book value at the beginning of the year minus DDB depreciation gives you the book value at the end of the year.

You can see that your book value the end of year falls below a salvage value your salvage value 12 lakhs so it falls below the salvage value. So, now I have to switch over from DDB method to straight line method because your depreciation estimated is higher. So, we have to use the straight line depreciation, so that I can bring the book value to the salvage value. So, for that purpose, I have to switch over. So now how I am going to switch over you can see here the same book value at the beginning of the year.

Now I take straight line depreciation for the estimation of book value this is my new book value. So, this book value will be used in the estimation of the next depreciation. So, book value at the end of 8th year becomes a book value at the beginning of 9th year. So, now I switched over from DDB method to straight line method you can switch over only once. So, here we are going to confine to the straight line method of depreciation.

So, you can see that we calculate the depreciation by straight line method the book value at the beginning of year minus the salvage value of the machine it gives you 54,293 that is a depreciation. So, how will you calculate the book value at the end of the year it is nothing but book value at the beginning of year 12,54,293.05 minus the depreciation by straight line method is 54,293.05 so, that gives you 12 lakh so this is the estimated salvage value?

So, the book value at the end of useful life is coinciding with the salvage value. That is a purpose of switching over we switched over in the 8th year from DDB method to straight line method. So that I can intersect my book value at the end of the useful life of the machine with the salvage value of the machine.

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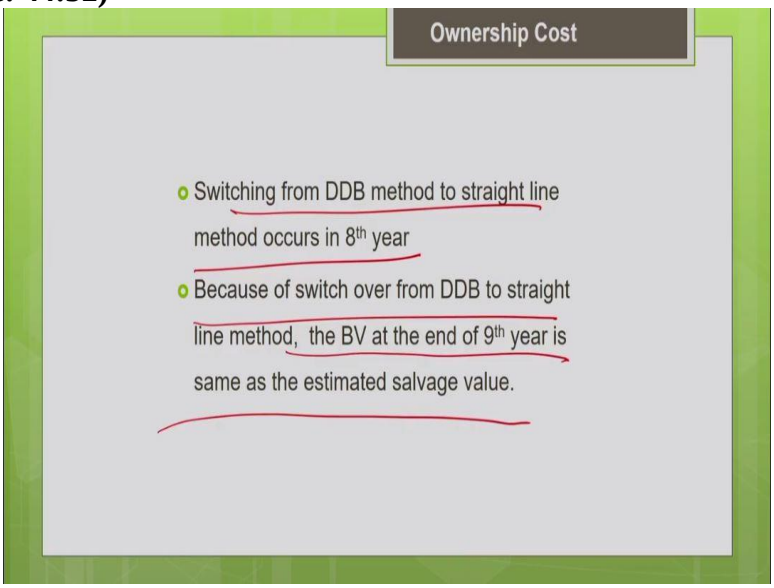

So switching from DDB method to straight line method, we have done it in the 8th year so because of the switchover I am able to see that book value at the end of 9th year is same as estimated salvage value. So, this is the benefit of switching over from one method to another method. So, as

I told you one requirement is to match the book value at the end of useful life to salvage value and another requirement is to accelerate the depreciation so, that I can get the tax benefits.

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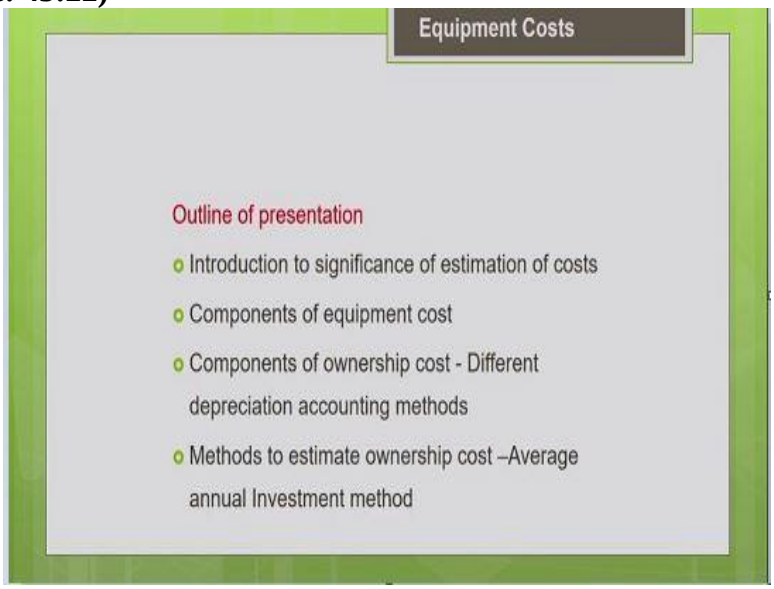

So, we have discussed so far about how to estimate the depreciation using different accounting methods and we have as compared to depreciation values that you are using 3 different methods that is straight line method, sum of the years digit method and our double declining balance method and we will compare the book values we found the difference between the different accounting methods.

And we also discuss how to switch over from one depreciation accounting method to another depreciation accounting method to get the benefits of higher depreciation or to match the estimated the book value at the end of the useful life of the machine the salvage value of the machine. So, what are the advantages of going for switching over from one depreciation to another depreciation which we have discussed so, far?

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