Engineering Economic Analysis
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Lecture 25
Depreciation: Units of Production Method, Depletion

Welcome to the lecture on depletion. So when we talk about the natural resources the term depletion is used instead of depreciation because in this case there is piecewise removal of the asset which is in question. Suppose we try to talk about the natural resources, oil reservoirs or mines, in that case basically process of amortising cost of natural resources in accounting period is known as depletion.

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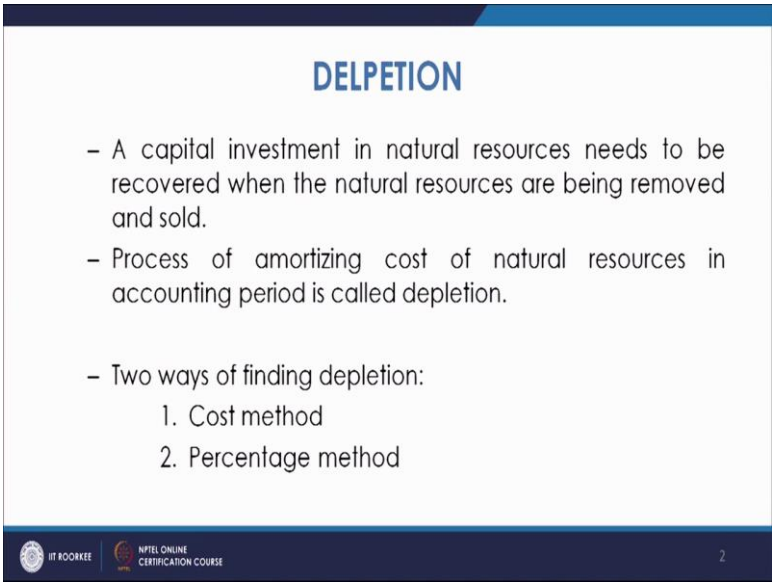

So basically as the time progresses, the amount of resources is being depleted and for that a depletion allowance is given for the recovery of the loss which is caused because the natural resources are lost during the mining process. So there are two ways of finding these depletion charges, one is the cost method and another is percentage method.

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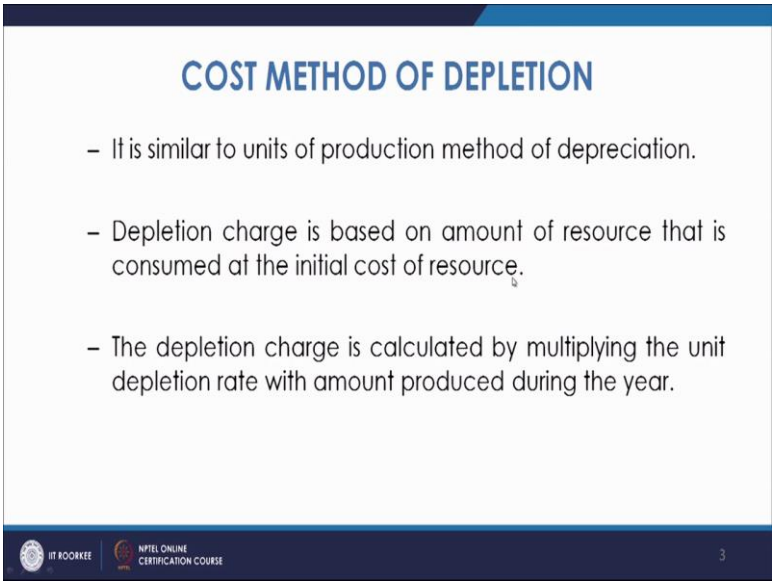

Now cost method of depletion, this cost method of depletion is similar to the units of production method what we have discussed earlier in depreciation. Now in this case, depletion charge will be based on amount of resource that is consumed at the initial cost of resource.

So basically when you know that this much amount of resource is to be extracted from the source and you have extracted certain amount from that source, so based on that is depreciation amount will be calculated. Depreciation charge is calculated by multiplying the unit depletion rate with amount produced during that year.

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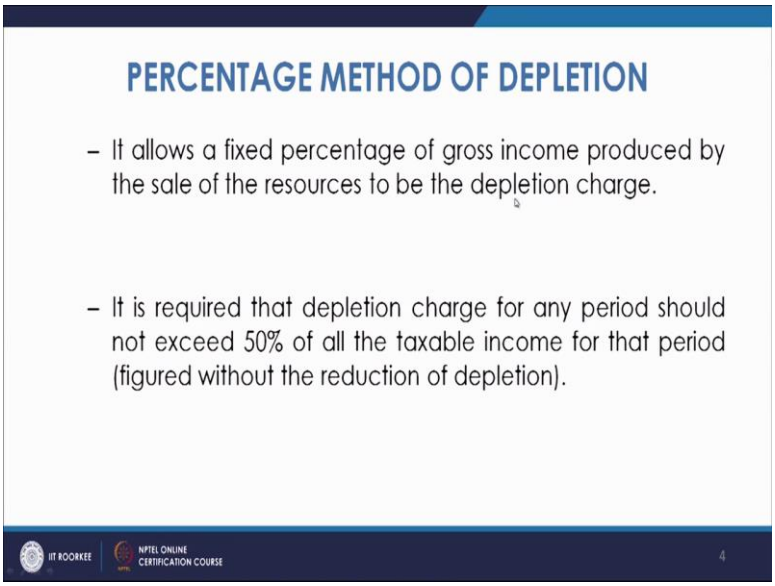

So what we do with, you find the unit depletion charge and then that you multiply when the amount which is produced and you calculate the depletion charges. Then there is another method which is known as percentage method, what happens that in this case **ee** a fixed percentage of gross income produced by the sale of resources is known as the depletion charge.

In this case what happens, whatever be the income, depending upon the type of mineral resources a percentage is fixed and that is said to be the depletion charge.

Now in that there is a cap, it is required that you charge for any period should not exceed 50% of all the taxable income for that period. So basically what may happen that it may go to more than that, so basically this is the cap which is given. The depletion charge which is basically demanded by the investor, it has not to exceed 50% of the taxable income.

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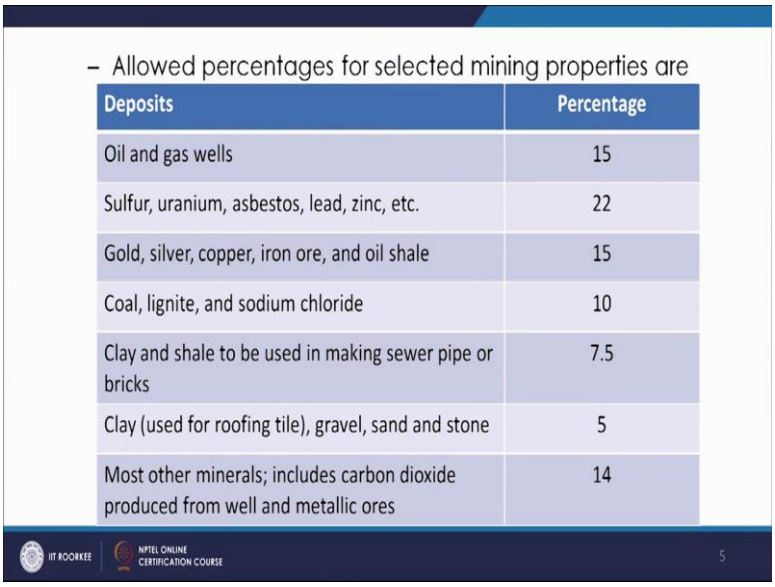

So basically taxable income will be calculated based on the gross income and also any type of expenditure which the investor does regarding operation in that particular area like mining or reservoir. So in that based on the surveys are based on the US survey there has been certain percentages defined and these are all oil and gas wells. It is said to be 15%, sulphur, uranium, asbestos, lead, zinc, they are treated as 22%.

Gold, silver, copper, iron ore and oil shale is 15%. Coal, lignite and sodium chloride 10%. Clay, shale, all this 7.5%. Clay, gravel, sand and stone 5% and other minerals, they are under the 14%. So what we do is, once you have the gross income, this much percent is calculated

as the depletion allowance. Now it is also ensured that this amount should not exceed 50% of the taxable income.

So once you have the taxable income, it should not, you get the 50% of that and whichever of the two is less, that amount is taken as the depletion allowance. So we can see with an example how to fall such problems. Let us have a problem where it is tell that you have an oil reservoir which has estimated 10,00,000 L of oil.

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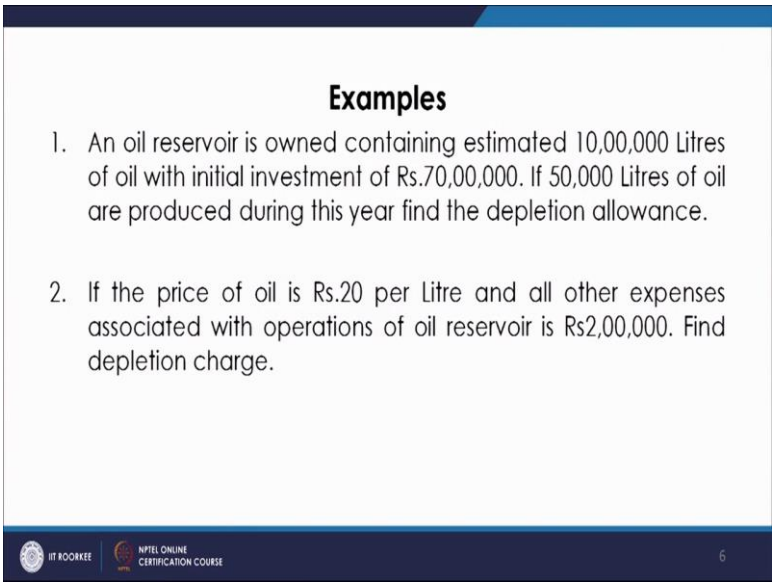

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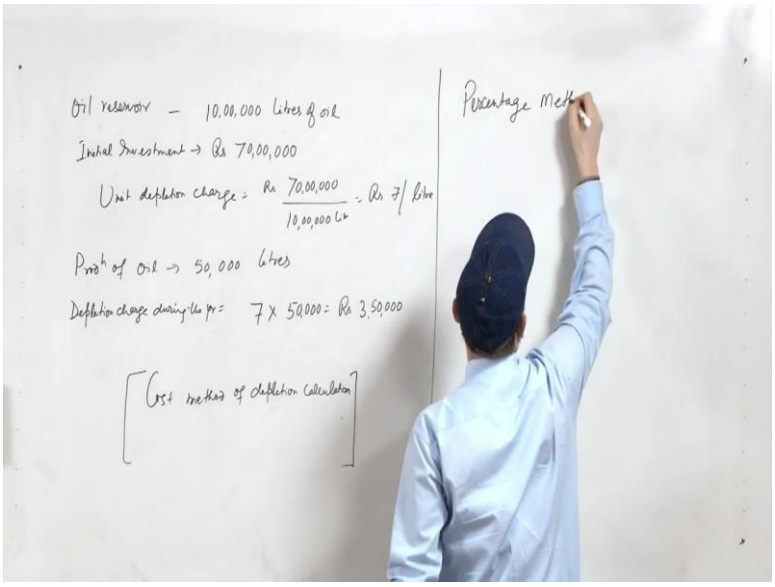

So it has 10,00,000 L of oil. Now initial investment is done as Rs. 70,00,000, so initial investment is Rs. 70,00,000. Now in this case the unit depletion charge if you look at, so the

depletion charge will be basically Rs. 7 per litre. So unit depletion charge will be 70,00,000 by 10,00,000 L of oil so Rs. 7 per litre of oil. This is the depletion charge.

So basically as per the unit of production method, the amount you produce or you extract from the reservoir, the depletion charge will be calculated. Now it is told that you have extracted 50,000 L of oil, so production of oil is 50,000 L. So for 50,000 L, depletion charge will be during the year, it will be unit depletion rate multiplied by the oil which has been produced so it will be 7 multiplied by 50,000 so it is Rs. 3,50,000.

So this is basically based on similar method as we discussed as the units of production method and this method is known as cost method when we talk about the depletion of resources, natural resources and that is why it is known as cost method of depletion calculation. Now there is another method which is known as percentage method.

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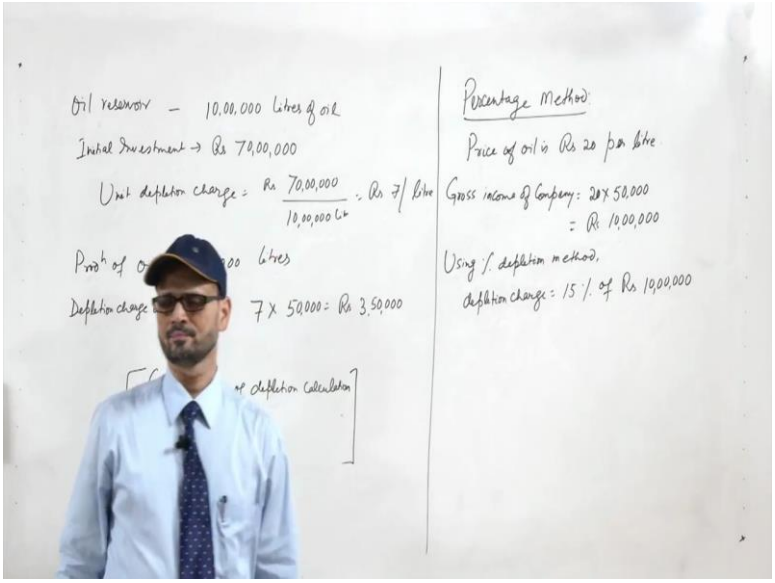

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– Allowed percentages for selected mining properties are

Deposits	Percentage
Oil and gas wells	15
Sulfur, uranium, asbestos, lead, zinc, etc.	22
Gold, silver, copper, iron ore, and oil shale	15
Coal, lignite, and sodium chloride	10
Clay and shale to be used in making sewer pipe or bricks	7.5
Clay (used for roofing tile), gravel, sand and stone	5
Most other minerals; includes carbon dioxide produced from well and metallic ores	14

Now this is the oil reservoir, so what we see is that the price of oil is given as 20 per litre. So the company has basically produced and sold 50,000 L of oil at Rs. 20 per litre and it is the income of the company. So basically that is a gross income of the company, so gross income of the company will be 20 times 50,000 that is Rs. 10,00,000. Now this is the gross income of the company.

Now here we have to use the percentage method, so we see that for oil, the percentage depletion charge is 15%, so using the percentage depletion method, depletion charge will be 15% of the gross income Rs. 10,00,000, so it will be Rs. 1,50,000. This is the depletion charge calculated using the percentage method. Now the condition which is there with this depletion method by percentage is that not exceed 50% of the taxable income.

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PERCENTAGE METHOD OF DEPLETION

– It allows a fixed percentage of gross income produced by the sale of the resources to be the depletion charge.

– It is required that depletion charge for any period should not exceed 50% of all the taxable income for that period (figured without the reduction of depletion).

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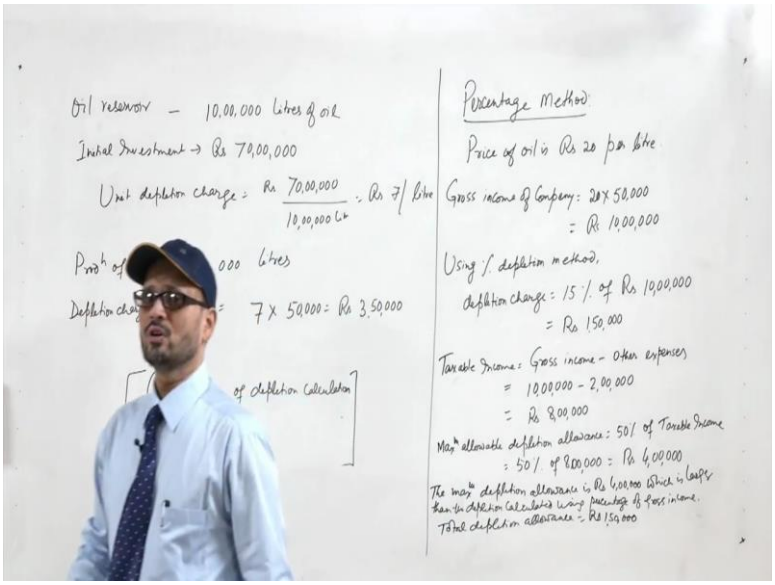

Now taxable income is nothing but the gross income minus some other expenditure the company has made. So the taxable income will be gross income minus the other expenses which has been incurred by the company related to the operation of oil reservoir, so this will be other expenses. So gross income was said to be Rs. 10,00,000 minus the other expenses are Rs. 2,00,000, so it is Rs. 800,000.

Now the condition is that the depletion charge for any period should not exceed 50% of all the taxable income. So since your taxable income is a 8,00,000, maximum allowable depletion allowance it will be 50% of taxable income. So it will 50% of 8,00,000 that is 4,00,000. Now company can afford to have maximum depletion allowance of Rs. 400,000 whereas based on percentage basis the depletion amount has come out to be Rs. 150,000.

So the minimum of the two will be taken as the depletion charge. So we can write that the maximum depletion allowance is Rs. 4,00,000 which is larger than the depletion calculated using percentage of gross income. So the depletion, so this is basically, so total depletion will be Rs. 1,50,000. This is how you calculate the depletion allowance in case of natural resources.

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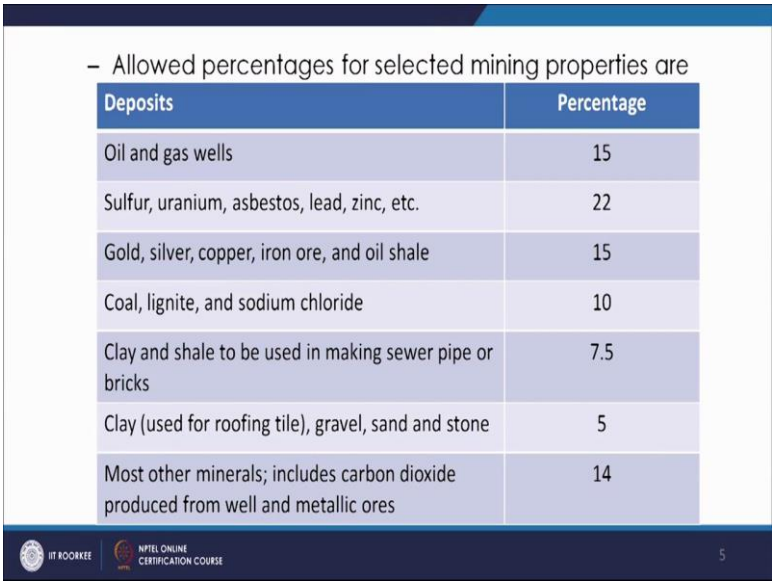

Now what we see is that you have different type of these deposits. Whenever we are told in the question about any kind of this type of materials like if you are mining sulphur, uranium or lead or zinc, in that case the percentage which we calculated as 15% in case of oil and gas, this will be basically 22%. Similarly once you go for coal, lignite or sodium chloride, this will be used then depletion percentage will be based on the 10% of gross income.

Further in the gross income side you have to see what are the other investments which are required for the mining purposes. These amounts will be subtracted from the gross income and 50% of that is to be calculated. So if the 50% of that gross income exceeds then the smaller value will be taken. If the 50% of the total taxable income is the lower value, in that case that lower value will be used, so this condition is also to kept in mind.

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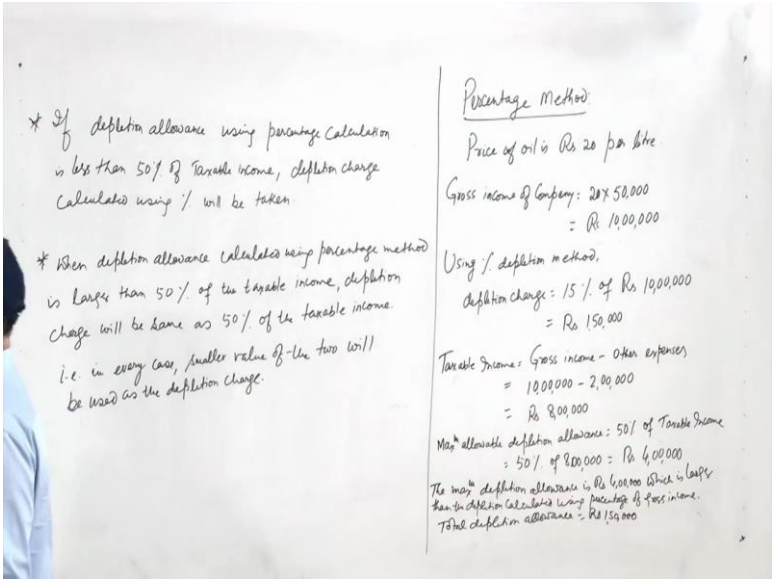

So what we see, if depletion allowance using percentage calculation is less than 50% of taxable income, depletion charge calculated using percentage will be taken. Now if on the other hand it may so happen that sometimes the amount which you get as 50% of the taxable income, it may be lesser.

Now because sometimes you produce a large amount of material and this comes out to be quite large, so in those cases when depletion allowance calculated using percentage method is larger than 50% of the taxable income, so in that case, depletion charge will be same as 50% of the taxable income that is in every case smaller value of the two will be used as the depletion charge.

So this is how the depletion of these natural assets are taken into account and are used for getting the tax benefits by investors who have invested in such industries. We can have a look at that case in which there will be active consideration of the fact that how the 50% of the taxable income can affect the value of the depletion allowance.

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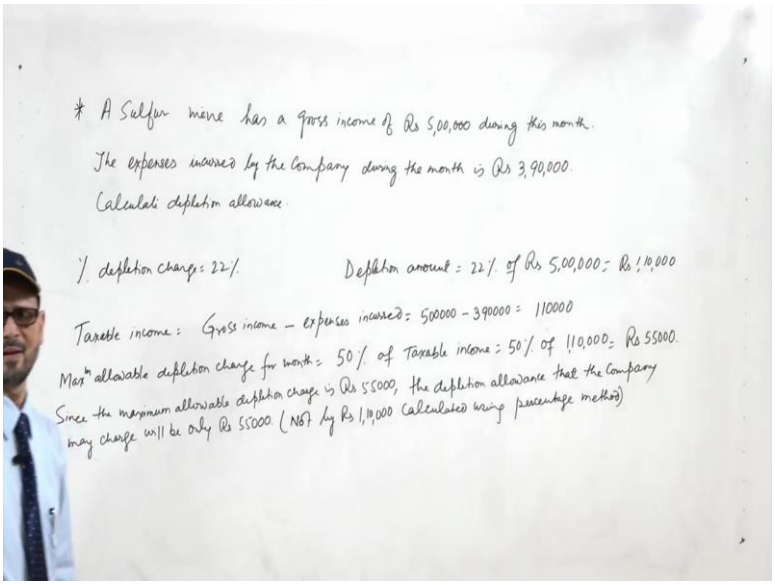

Now let us take example that a sulphur mine has a gross income of Rs. 5,00,000 during this month. So a sulphur mine is there which has sold a sulphur and it has generated an income of Rs. 500,000. Now the expenses incurred by company during the month is Rs. 3,90,000. So you have to calculate depletion allowance for this case. So basically we have to use the percentage method of depletion in this case.

Now let us see for the sulphur, you have the category under this the percentage depletion is 22%. So basically the percentage depletion charge is 22%, so depletion amount will be 22% of Rs. 500,000 and that comes out to be Rs. 1,10,000. Now if you look at the expenses incurred by the company, it is 3,92,000. So the taxable income is calculated, this will be gross income minus the expenses which have been incurred.

So this will be 5,00,000 minus 3,90,000 that is 1,10,000. Now the rule says that the maximum allowable depletion charge has to be 50% of the taxable income. So maximum allowable depletion charge for the month, it should be 50% of taxable income that is 50% of 1,10,000 which comes out to be Rs. 55,000. Now what we see is that using the percentage method you calculate the depreciation charge as Rs. 1,10,000.

Whereas once you take into account the taxable income, the maximum allowable depletion charge which the company can afford to get is Rs. 55,000. Now since the maximum allowable depletion charge is Rs. 55,000, the depletion allowance that the company may charge will be only Rs. 55,000 not by Rs. 1,10,000 calculated using percentage method.

So as we were discussing that we will face many situations when the amount of depletion calculated will be quite large. Basically what happens that company has put in a large amount of expenses as investment to mine the sulphur. Now it would like to have a large depletion amount then it will be restricted because of the taxable income because anyway it has to pay the taxes.

So it will be 50% of the taxable income which we have calculated and minimum this much, I mean this much is will be basically the depletion charge which will be calculated using this method.

So we will deal with such problems also in future when we solve the problems based on the depreciation as well as depletion and we can calculate the value of these charges depending upon what type of minerals on materials are being mined, they are under which category and also during the process what are the different kinds of investments, what are the different kinds of expenses which are used for mining these resources. Thank you.