ACCT205 Lecture 4 – Property, Plant, and Equipment

## Introduction

First, the assets property, plant, and equipment represent significant investments by the organization and generate significant expenses on the income statement. Property, plant, and equipment are long-lived and are generally not used for resale by the business. Typical examples include land, building, land improvements, and machinery and equipment.

The textbook lists costs that are generally included when setting up a fixed asset on a balance sheet. Generally, all costs related to the acquisition and preparation of the asset for its intended use are included.

Costs that are incurred between the time an asset is purchased and the time it is actually put into use may also be included. Such assets are always recorded at their historical cost.

The following table lists the typical items that are included when setting up a piece of property, plant, or equipment:

|  |  |  |  |
| --- | --- | --- | --- |
| **Land** | **Building** | **Land Improvements** | **Machines and Equipment** |
| Price | Architect Fees | Trees and Shrubs | Sales Taxes |
| Sales Taxes | Engineers' Fees | Fences | Freight/Installation |
| Unpaid Property Taxes | Insurance Costs | Outdoor Lighting | Repairs (Used) |
| Title and Survey Fees | Interest | Paved Parking Areas | Reconditioning |
| Broker's Commissions | Sales Taxes |   | Insurance in Transit |
| Grading and Leveling | Repairs (Existing) |   | Assembly |
| Remove Old Building | Reconditioning |   | Modifying for Use |
| Permits | Remodeling |   | Testing for Use |
|   | Permits |   | Permits |

## Capital Expenditures vs. Revenue Expenditures

Example: A company purchased a machine in 2005 for $10,000. The machine was intended to last about six years. In 2009, the company invested $4,000 in the machine to rebuild major components so that it would last longer than the six years that were originally anticipated. The $4,000 would have been placed in the asset account (that is, capitalized) and depreciated over the remaining life of the asset. It would not have been expensed in 2000 on the income statement.

Capital expenditures are expected to benefit future periods by increasing either the quantity or quality of service from the asset. They are recorded as assets. In the example above, the journal entry would be:

 Debit Credit
Equipment/Machinery (Asset) $4,000
 Cash $4,000

Capital expenditures are sometimes referred to as additions or betterments. They add to the original asset or make it better.

Revenue expenditures are normal, recurring expenditures designed to maintain the asset through the current period. They are recorded as expense as they are incurred. In the example above, if the $4,000 invested in 2009 was for normal maintenance and repair on the machine to get it back into peak operating condition and was not going to increase its useful life, then the journal entry would be:

 Debit Credit

Repairs & Maintenance (Expense) $4,000
 Cash $4,000

## **Depreciation**

In this lecture, we focus on depreciation of assets that have been purchased as property, plant, and equipment. Depreciation is a journal entry adjustment needed to properly expense the cost of a particular asset to the periods in which the asset will benefit the company. Sounds like the matching principle, right? Exactly. It makes for more accurate and reliable financial statements.

Accumulated depreciation is a contra asset account that lowers the book value of the asset on the balance sheet. Contra means that the account sits on the debit side of the balance sheet, but with a credit balance.

Depreciation expense is an expense account that flows to the income statement. Whenever we are recording depreciation on an asset, we debit depreciation expense and credit accumulated depreciation:

· The original cost of the asset

· The expected useful life of the asset

· The expected salvage value of the asset

### What do we need to calculate depreciation on an asset?

The salvage value, or residual value, must be estimated at the time the asset is put into service. The useful lives of assets are generally set up as policies or procedures by a company. For example, all vehicles might have a five-year life, all computer equipment might have a three-year life, all furniture and fixtures might have a ten-year life, and so on.

### **Methods of Depreciation**

The three methods of depreciation we will study are straight-line, units of production, and double declining-balance.

Companies are required to disclose the method of depreciation they use in their first "Notes to the Financial Statements." The straight-line method continues to be the most popular depreciation method. However, it is acceptable for a company to use more than one depreciation method.

### Straight-Line Depreciation

The following table illustrates the steps involved in calculating the yearly depreciation expense on our delivery van using the straight-line method.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Item** | **Cost – Estimated Salvage Value Equals Base** | **Base** | **Useful Life** | **Base / Useful Life Equals Yearly Depreciation Expense** |
| **Delivery van** | $20,000-$2,000 | $18,000 | 5 Years | $18,000 / 5 Years Equals $3,600 |

We would record depreciation expense of $3,600 each for the five-year useful life.

### Units of Production Depreciation

Let's look at our truck example above. Pretend that the company involved would rather depreciate the truck based on mileage than on time. The company estimates that the truck will have a useful life of 150,000 miles.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Cost -** | **Salvage Value** | **= Base** | **Total Mileage in Useful Life** | **Depreciation Rate per Mile** |
| $20,000 - | $2,000 | = $18,000 | 150,000 miles | $18,000 divided by $150,000 = **$.12 per mile** |
|   |   |   |   |   |
|   | **Miles Driven** | **Rate** | **Yearly Depreciation** |   |
| Year 1 Depreciation | 24,000 | $.12 | 24,000 X $.12 **=$2,880** |   |
| Year 2 Depreciation | 19,500 | $.12 | 19,500 X $.12 **= $2,340** |   |
|   |   |   |   |   |

### Double Declining-Balance Depreciation

Using an accelerated method of depreciation has tax benefits, because a company can report a lower net income and pay fewer taxes during the early years. Another argument for this method is that repairs will be higher on assets after the first few years, so the company likes to get the depreciation on the asset expensed in the early years to smooth out costs.

To use the double declining-balance method, we take the asset cost and then times that cost by two times the yearly straight-line rate. We **do not** consider the salvage value in our calculations, but we must remember not to depreciate the asset beyond the salvage value. Using the delivery truck example, consider the following table:

|  |  |  |
| --- | --- | --- |
| **Cost** | **Straight Line Rate** | **Double Declining Rate** |
| $20,000 - | 1 divided by the 5 year useful life = 20% per year | 2 times the straight line rate, or 20% x 2 = 40% |
|   |   |   |
|   | **Beginning Balance** | **Yearly Depreciation** |
| Year 1 Depreciation | **$20,000** | $20,000 x 40%= **$8,000** |
| Year 2 Depreciation | $20,000-$8,000= **$12,000** | $12,000 x 40%= **$4,800** |
| Year 3 Depreciation | $12,000-$4,800= **$7,200** | $7,200 x 40%= **$2,880** |
| Year 4 Depreciation | $7,200-$2,880= **$4,320** | $4,320 x 40%= **$1,728** |

Just remember that in year 5, we can't depreciate more than $592. Otherwise, our total accumulated depreciation will be more than $18,000. Note that depreciation for the first four years already equals $17,408.

If we didn't depreciate the van, it would remain on the balance sheet valued at $20,000. This would not be proper accounting, because the van would lose its value over the five-year service period. Also, no expense would be attached to the use of the van over the five years if we did not debit an expense account (depreciation expense). That is the reasoning behind depreciation expense.

It does not matter if the van lasts longer than five years. An asset should be depreciated over the "useful" life of the asset. If the van lasts longer than five years, it will simply sit on the balance sheet at its salvage value of $2,000 after the fifth year. This is an accelerated depreciation method, and accelerated methods are based on the fact that an asset's usage is greater in its early years and less in its later years. Therefore, more depreciation is taken in the first years under this method compared to the straight-line method.

Depreciation expense can fluctuate each year based on total usage; however, the company would not depreciate beyond 150,000 miles. After 150,000 miles, the truck will be depreciated down to its expected salvage or residual value of $2,000. You might be wondering, "When is it appropriate to use this method?" A company uses this method when a fixed asset's service is related to use rather than time. The formula to calculate depreciation using units of production is to take the cost minus the salvage value and then divide that by the total estimated number of hours or miles expected during the useful life of the asset. This will give you an hourly or mileage depreciation rate that is then multiplied by the total hours or miles used each year.

* This is the most popular method used in the business world, and it is quite easy to use. We simply take the cost of the asset, subtract the residual value from the cost, and then divide that number by the useful life.

Most companies have many different assets that require depreciation. Examples include the building, service vans, office furniture, and computer equipment. While all of these assets are depreciating by different amounts over different time periods, we are still required to calculate the yearly depreciation on each item and then expense one-twelfth of that amount each month as an estimate.

Note**: Land is never depreciated.**

Although computer programs assist with this project, it is still important to understand the concept of depreciation and be familiar with the more popular methods that are used.

Disposal of Fixed Assets

Fixed assets that are no longer useful to a company are eventually sold--or simply discarded. These assets must be taken off the books. If an asset is fully depreciated, the entry is simply to debit the accumulated depreciation account and credit the asset account.

For example, a typewriter that was sitting in a cabinet was recently thrown out. After review of the fixed asset listing, the typewriter was purchased for $215 and fully depreciated to a $0 book value. In other words, the office equipment asset account had a debit of $215, and the accumulated depreciation account had a credit
balance of $215.

After discarding the typewriter, we need to do the following entry:

|  |  |  |  |
| --- | --- | --- | --- |
| **Date** | **Account** | **Debit** | **Credit** |
| Dec. 31, 2009 | Accum-Depr-Office Equipment | $215.00 |   |
|   | Office Equipment |   | $215.00 |
|   | To dispose of typewriter |   |   |

What if the typewriter had a salvage value of $25? This would mean that the accumulated depreciation account was only at a credit balance of $190.

Therefore, after discarding the typewriter, we would need to do the following entry:

|  |  |  |  |
| --- | --- | --- | --- |
| **Date** | **Account** | **Debit** | **Credit** |
| Dec. 31, 2009 | Accum-Depr-Office Equipment | $190.00 |   |
|   | Loss on disposal of Office Equipment | 25.00 |   |
|   | Office Equipment |   | $215.00 |
|   | To dispose of typewriter |   |   |

Notice that there is a debit to a 'loss' account. The loss represents the salvage value that will never be realized because the company simply threw the typewriter in the garbage.

This is still not bad, but now assume that we sold the typewriter to a junk dealer for $40.

We will keep the scenario the same as the last example. The typewriter is fully depreciated to a book value of $25.

|  |  |  |  |
| --- | --- | --- | --- |
| **Date** | **Account** | **Debit** | **Credit** |
| Dec. 31, 2009 | Accum-Depr-Office Equipment | $190.00 |   |
|   | Cash | $40.00 |   |
|   | Gain on Sale of Typewriter |   | $15.00 |
|   | Office Equipment |   | $215.00 |
|   | To dispose of typewriter |   |   |

## Exchanges of Fixed Assets

To keep things easy for you to follow, let's use the exact same numbers we just used in the sale of the delivery van above.

This time, we will assume that we traded the van in for a new one on July 1st of the third year.

### Gain on Exchange

Here are the numbers for us to use:

Price of new delivery van $22,000

Trade-in Allowance $12,000

Cash paid July 1 $10,000

Book value $11,000

Cash paid for new van: $10,000

Cost of new van: $21,000

The entry to record the exchange and payment of cash would be:

|  |  |  |  |
| --- | --- | --- | --- |
| **Date** | **Account** | **Debit** | **Credit** |
| July 1 | Accumulated-Depreciation -Vehicles | $9,000.00 |   |
|   | Vehicles - New Van | $21,000.00 |   |
|   | Cash |   | $10,000.00 |
|   | Vehicles - Old Van |   | $20,000.00 |
|   | To record exchange of delivery van for new one |   |   |

This example represents a gain on the exchange, because the dealer gave us $12,000 for our van even though it had a book value of $11,000.

### Loss on Exchange

Now let's assume the dealer only offered us $8,000 for our old van. Here are the numbers for us to use:

Price of new delivery van $22,000

Trade-in Allowance $8,000

Cash paid July 1

$14,000

Cost of van traded $20,000 (original cost of old van)

Accumulated Depr $9,000 ($3,600 + $3,600 + $1,800)

Book value of old van

$11,000

Trade-in Allowance $8,000

Loss on Exchange $3,000

The entry for a loss on the exchange would be:

|  |  |  |  |
| --- | --- | --- | --- |
| **Date** | **Account** | **Debit** | **Credit** |
| July 1 | Accumulated-Depreciation -Vehicles | $9,000.00 |   |
|   | Vehicles - New Van | $22,000.00 |   |
|   | Loss on Exchange of Old Delivery Van | $3,000.00 |   |
|   | Cash |   | $14,000.00 |
|   | Vehicles - Old Van |   | $20,000.00 |
|   | To record exchange of delivery van for new one |   |   |

## Natural Resources

Natural resources are treated in a similar way as fixed assets, except that the term for depreciation is changed to depletion. Depletion is generally used with the units-of-production depreciation method.

Example:

Your company paid $250,000 for mining rights to a mineral deposit estimated at 1,000,000 tons of ore. The depletion rate would be $250,000 / 1,000,000 = $.25 per ton. If 100,000 tons are mined during the year, how much depletion should be expensed for this mine?

The answer is $25,000 (100,000 tons x $.25 per ton).

Depletion Expense is debited for $25,000 and Accumulated Depletion is credited.

## Internal Control

We have talked in great detail about how to record fixed assets in the last two units, but what should we do to safeguard these assets? After all, these are expensive and important assets to any company.

Most companies keep fixed asset inventories, just like they would keep a merchandise inventory. A popular technique is to use a bar code, or fixed asset tag to number each asset, and then match that number to a corresponding entry in the fixed asset inventory detail listing.

Also, a fixed asset physical inventory should be taken yearly to ensure that the assets that are recorded on the balance sheet can be identified. In larger companies, this is a painful process; but it does identify poor internal control of fixed assets--or even theft.

## Intangible Assets

Intangible assets are certain nonphysical assets (used in operations) that confer on owners long-term rights, privileges, competitive advantages. Like other fixed assets, intangible assets are recorded at cost, and their cost is then allocated over its useful life (assumes a limited life) through amortization (like depreciation for fixed, tangible assets). For intangible assets with an indefinite life, the asset should be tested for impairment annually.

 In the computation of amortization, the following points are noteworthy:

* Useful or economic life may differ from legal life.
* Computed on a straight-line basis (cost divided by useful or economic life)
* Amortization period cannot exceed 40 years.
* Debit Amortization Expense and credit Accumulated Amortization.
* Leasehold improvements are amortized over the life of the lease or the life of the improvements whichever is shorter. Debit Rent Expense to amortize.

The text provides a list of the most common examples and explanations of types of intangible assets.

### Intangible Assets in Action: Leasing a New Car Exercise

Try this exercise for calculating lease payments on a new car. If you are comfortable working with these numbers, you can go to the car dealer with more confidence (assuming you plan to lease).

Suppose you are considering a new mid-sized car with a sticker price of $24,995.

Go to [www.leaseguide.com/calc.htm](http://www.leaseguide.com/calc.htm)

Hit the start button in the middle of the screen.

Type in the following as you are prompted (you will need to hit "next" each time):

1. MSRP - $24,995

2. Base Cap Cost $23,500. This would be the negotiated price of the car.

3. Additional Costs - Leave this $0.

4. Down Payment - $1,000

5. Net Cap Cost - Leave as is; Hit next.

6. Residual - Use 55%. This is the price for which you can buy the vehicle after the lease is over.

7. Interest Rate - Use 5%,

8. Leave Money Factor blank. It calculates automatically.

9. Term - 36 months

10. Sales Tax - Type 0

If you did everything correctly, it will show a monthly lease payment of $318.53. This would be without sales tax and assumes you paid $1,000 out of pocket.

If you get comfortable with this website, you can play with the numbers. You will find that adjusting them a little bit can significantly impact the size of a monthly car payment. For example, a lower interest rate of 4% and negotiating the price of the car down from $23,500 will save you money each month.