Buy, Rent, Lease, and Replacement Analysis of Construction Equipment

Civil Engineering
Construction & Graphics

Lecture # 20

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Lecture # 19 _ Fundamentals of Engineering Economics - Machine Rate (Problems) - (Summary)

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Lecture # 20 _ Buy, Rent, Lease, and Replacement Analysis of Construction Equipment

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Buy, Rent, Lease, and Replacement Analysis of Construction Equipment

- ✓ There are **different methods of acquiring the construction equipment** required for a project. These are namely **buying, renting and leasing.**
- ✓ There are **advantages and disadvantages associated** with each of these methods.
- ✓ Before acquiring the equipment, it is essential to **explore all the options** by considering various parameters namely **company's cash flow, working capital, equipment utilization, and its maintenance, obsolescence and replacement of equipment, operating conditions etc.**

A **liquid asset** is cash on hand or an asset that can be readily converted to cash.
Down payment, is an initial up-front partial payment for the purchase of expensive items such as a car or a house.

Buy, Rent, Lease, and Replacement Analysis of Construction Equipment

Buying

- ✓ Buying results in **direct ownership** of the equipment.
- ✓ Acquisition of equipment by buying is done either through cash purchase by **using company funds or through financing purchase.**
- ✓ The outright cash purchasing is **done when sufficient funds are available**.
- ✓ However, cash purchase can have an adverse effect on company's cash flow as **it reduces the liquid asset** thus, **affecting company's working capital.**
- ✓ When sufficient funds are not available for outright cash purchase, the equipment can be acquired by finance purchasing wherein the purchasing is done through **loan arrangements from lenders i.e. banks or other financial institutions** that includes the payment of loan through **installments** along with an **initial down payment.**

Buy, Rent, Lease, and Replacement Analysis of Construction Equipment

Buying

- ✓ One of the main **advantages of owning** the equipment by outright cash purchase is that it may result in **lowest cost per operating hour as compared to renting or leasing.**
- ✓ Other advantages associated with buying include, **complete control of the owner over use of the equipment and its maintenance and replacement** of equipment when it is no more economical.
- ✓ In addition, there is also **income tax benefit associated with depreciation of the equipment.**
- ✓ Acquiring the equipment through buying is an economically **attractive option,** when there is **more work load leading to higher utilization rate** of the equipment over its useful life.

Buy, Rent, Lease, and Replacement Analysis of Construction Equipment Buying

- ✓ Otherwise, it will lead to the **risk of not getting the required return** on the capital investment if there is **not enough utilization** of the equipment. This is one of the disadvantages associated with buying. If the equipment is purchased through finance purchasing, the equipment owner has to pay the required loan installment to the lender even when the equipment is not operational.
- ✓ Acquisition through buying may sometimes force the owner to **use the obsolete equipment due to financial constraints.**

Buy, Rent, Lease, and Replacement Analysis of Construction Equipment

Renting

- ✓ Renting is a **method of acquiring the equipment for a shorter duration.**
- ✓ It is an **alternative to direct ownership** (i.e. through buying) of the equipment for a shorter period.
- ✓ Acquisition of equipment through renting is suitable when the contractor or the construction company **requires the equipment for a project task of shorter duration.**
- ✓ In addition through renting, the **company can select the equipment that is exactly suited for the project task,** and it is **possible to acquire the equipment based on latest technology** which is more productive than older models.

Buy, Rent, Lease, and Replacement Analysis of Construction Equipment Renting

- ✓ In these circumstances, renting of the equipment is more beneficial than direct ownership even though the **rental charges are higher than the direct ownership charges.**
- ✓ Since the equipment is not owned by the user, there is **no tax benefit associated with depreciation of the equipment.**
- ✓ However, **tax benefit is gained** as the **rental cost is considered as an expense** that reduces the income of the company using the equipment.
- ✓ The capital that is tied up when the equipment is acquired through buying can be used in other investment if the equipment is rented.

Buy, Rent, Lease, and Replacement Analysis of Construction Equipment
Renting

- ✓ Among the three methods of acquiring the equipment, typically the **hourly rental cost is higher as compared to that of lease or direct ownership.**
- ✓ **Rental period** may **a day, a week or a month and may go up to one year.**
- ✓ The **rental rates** are generally **established on daily basis, weekly basis or monthly basis.**
- ✓ The **daily rate on hourly basis is higher than the weekly rate** on hourly basis and the weekly rate (on hourly basis) is higher than the monthly rate (on hourly basis).
- ✓ The repair and maintenance cost of the equipment to be **paid either by the user or owner** of the equipment (i.e. renting company) is **stated in the rental contract.**

Buy, Rent, Lease, and Replacement Analysis of Construction Equipment
Renting

- ✓ In case of **major repair work**, generally the **cost is paid by the renting company,** whereas the cost of **minor repair and maintenance** that is incurred at the project site is usually **paid by the user** of the equipment.
- ✓ The **cost fuel and lubricants** is mostly **paid by the user** of the equipment.
- ✓ By renting, it is possible to **reduce the downtime experienced due to breakdown of the equipment** followed by repair as the **equipment is replaced by the rental service.**
- ✓ Further in order to **check the suitability of specific equipment in actual job site conditions,** the equipment can be rented and its **performance can be tested before taking a decision** to purchase the equipment that involves a major capital investment.

Buy, Rent, Lease, and Replacement Analysis of Construction Equipment

Renting

- ✓ In addition, the user of the equipment can **get rid of the cost of transporting the equipment from one project site to another by renting it.**
- ✓ However, the user mostly pays the **transportation charges for bringing the equipment from renting company's yard to the work site** and also pays the cost of assembly, loading etc.

Buy, Rent, Lease, and Replacement Analysis of Construction Equipment Leasing

- ✓ Leasing is another **method of acquiring the equipment,** for a **longer period of time** as compared to renting.
- ✓ It is a long term **alternative to direct ownership** of the equipment.
- ✓ The **leasing company (i.e. owner of the equipment)** is known as lessor whereas, the **user of the equipment** is known as lessee.
- ✓ Lease is a **contract between the lessor and the lessee** wherein, the lessee uses the equipment owned by lessor by paying the rentals over the lease period.
- ✓ Mostly the **lease period** is more than **six months and may run up to years.**

Buy, Rent, Lease, and Replacement Analysis of Construction Equipment Leasing

- ✓ It is important for the lessee to know about the **details of past and ongoing leases in which lessor is involved** and also to **check the terms and conditions of the lease agreement** before entering into lease contract with lessor.
- ✓ Most of the equipment leases are **noncancellable.**
- ✓ During lease period the **lessor retains the ownership of the equipment** and also **gets the tax benefits from depreciation of the equipment.**
- ✓ Thus, there is **no tax benefit to lessee from depreciation** of the equipment.
- ✓ However, similar to renting, **lessee gains tax benefits** as the **lease payments are considered as an expense.**

Buy, Rent, Lease, and Replacement Analysis of Construction Equipment Leasing

- ✓ Due to leasing, the capital of lessee is **not tied up in purchasing the equipment** and lessee can use it for other investment.
- ✓ Even if the equipment is purchased through loan arrangement, the owner has to pay an initial down payment. However, **leasing can provide 100% financing, including the cost delivery and installation of the equipment.**
- ✓ Lease payments can be **made monthly, yearly or at other time intervals as agreed upon between the two parties.**
- ✓ The lease payments need **not necessarily be uniform over the lease period** and there is **flexibility of coordinating the schedule of payment** (to be made by the lessee) to that of **revenue generated from use of the equipment by the lessee.**

Buy, Rent, Lease, and Replacement Analysis of Construction Equipment Leasing

- ✓ Generally, the **cash inflow due to use of the equipment at the beginning may be low** and thus, the lessee prefers to **pay less amount at the beginning of lease period.** This type of payment arrangement may be **accepted by the lessor from tax considerations** as the lessor receives less payment at the beginning.
- ✓ Two types of commonly offered leases through which construction equipments acquired are **finance lease** and **operating lease.**
- ✓ The **finance lease** is generally **offered by a financial institution** (usually a bank or a finance company) and the **equipment is leased to the lessee.**
- ✓ The **lease period** may **extend up to the operating life of the equipment.**

Buy, Rent, Lease, and Replacement Analysis of Construction Equipment Leasing

- ✓ The **rental paid by the lessee** over the lease period **covers the cost of the equipment** less the estimated residual value at the end of lease period, **along with the profit margin of the lessor.**
- ✓ The **lessee has the option to purchase the equipment with a discounted price or a predetermined price at the end of the lease period.**
- ✓ Usually the lease **contract can not be cancelled till the lessor has recovered the investment cost** at the end of the lease period.
- ✓ The **finance lease** is stated on **lessee's balance sheet.**

Buy, Rent, Lease, and Replacement Analysis of Construction Equipment Leasing

- ✓ The **operating lease** is offered by the manufacturer or dealer of the equipment.
- ✓ In operating lease, **payment charges are lower as compared to finance lease.**
- ✓ In this type of lease, lessor (manufacturer or dealer of the equipment) provides the skilled service personnel required for carrying out the repair and maintenance operations and this type of arrangement is more suitable for sophisticated equipments requiring specialized repair and maintenance. Thus in this type of lease, **lessee does not hire service personnel required for carrying out servicing and maintenance operations.**
- ✓ Usually lessee returns the equipment to lessor at the end of lease period. Unlike finance lease, **operating lease is not stated on lessee's balance sheet** and is often referred to as **off-balance-sheet financing.**

Buy, Rent, Lease, and Replacement Analysis of Construction Equipment
Replacement Analysis

- ✓ Replacement analysis is carried out when there is a **need to replace or augment the currently owned equipment (or any asset).**
- ✓ There are various reasons that result in replacement of a given equipment.
- ✓ One of the reasons is the **reduction in the productivity of currently owned equipment.**
- ✓ This occurs due to **physical deterioration of its different parts** and there is **decrease in operating efficiency with age.**
- ✓ In addition to reduced productivity, there is also **increase in operating and maintenance cost** for the construction equipment due to physical deterioration. This necessitates the replacement of the existing one with the **new alternative.**

Buy, Rent, Lease, and Replacement Analysis of Construction Equipment
Replacement Analysis

- ✓ Similarly, if the production demands a **change in the desired output from the equipment,** then there is **requirement of augmenting the existing equipment** for meeting the required demand or replacing the equipment with the new one.
- ✓ Another reason for replacement of the **existing equipment is obsolescence.**
- ✓ Due to rapid change in the technology, the **new model with latest technology is more productive** than the currently owned equipment, although the currently owned equipment is still operational and functions acceptably.
- ✓ Thus, **continuing with the existing equipment may increase the production cost.**
- ✓ The impact of rapid change in technology on **productivity is more for the equipment with more automated facility than the equipment with lesser automation.**

Buy, Rent, Lease, and Replacement Analysis of Construction Equipment

Replacement Analysis

- ✓ In replacement analysis, the **existing (i.e. currently owned) asset** is referred as defender whereas, the **new alternatives** are referred as challengers.
- ✓ In this analysis, the **'outsider perspective' is taken to establish the first cost of the defender.**
- ✓ This **initial cost of the defender** in replacement analysis is nothing but the **estimated market value from perspective of a neutral party.**
- ✓ In other words, this cost is the **investment amount which is assigned to the currently owned asset (i.e. defender)** in the replacement analysis.
- ✓ The current market value represents the **opportunity cost** of keeping the defender i.e. if the defender is selected to continue in the service. In other words, **if the defender is selected, the opportunity to obtain its current market value is forgone**.

Buy, Rent, Lease, and Replacement Analysis of Construction Equipment
Replacement Analysis

- ✓ Sometimes, the additional cost required to **upgrade the defender** to make it competitive for comparison with the new alternatives is **added to its market value to establish the total investment for the defender.**
- ✓ Along with the market value, **there will be revised estimates for annual operating and maintenance cost, salvage value, and remaining service life of the defender,** which are expected to be different from the original values those were estimated at the time of acquiring the asset.
- ✓ The **past estimates** of initial cost, annual operating and maintenance cost, salvage value, and useful life of defender, are **not relevant in the replacement analysis**, and are thus neglected.

Buy, Rent, Lease, and Replacement Analysis of Construction Equipment
Replacement Analysis

- ✓ The **past estimates** also incorporate a **sunk cost which is considered irrelevant** in replacement analysis.
- ✓ Sunk cost occurs when the **book value (as determined using depreciation method) of an asset is greater than its current market value**, when the asset (i.e. defender) is considered for replacement.
- ✓ It represents the **amount of past capital investment which can not be recovered for the existing asset under consideration for replacement.**
- ✓ Sunk cost may occur **due to incorrect estimates of different cost components and factors related to productivity of the defender**, those were made at the time of original estimates in the past with uncertain future conditions. Since, sunk cost **represents a loss in capital investment of the asset,** the **income tax calculations** can be done accordingly by considering this **capital loss.**

Buy, Rent, Lease, and Replacement Analysis of Construction Equipment
Replacement Analysis

- ✓ In replacement analysis, the **incorrect past estimates and decisions** should not be considered and **only the cash flows (both present and future) applicable to replacement analysis should be included in the economic analysis.**
- ✓ For replacement analysis, it is important know about **different lives of an asset,** as this will assist in making the appropriate replacement decision.
- ✓ The different lives are **physical life, economic life, and useful life.**
- ✓ Physical life of an asset is defined as the **time period that is elapsed between initial purchase (i.e. original acquisition) and final disposal or abandonment of the asset.**

Buy, Rent, Lease, and Replacement Analysis of Construction Equipment

Replacement Analysis

- ✓ Economic life is defined as the **time period that minimizes the total cost (i.e. ownership cost plus operating cost) of an asset.** It is the time period that results in **minimum equivalent uniform annual worth of the total cost of the asset.**
- ✓ Useful life is defined as the **time period during which the asset is productively used to generate profit.**
- ✓ In replacement analysis, the **defender and challenger is compared over a study period.**
- ✓ Generally, the **remaining life of the defender** is **less than or equal to the estimated life of the challenger.**
- ✓ When the estimated lives of the defender and challenger are not equal, the **duration of the study period has to be appropriately selected for the replacement analysis.**

Buy, Rent, Lease, and Replacement Analysis of Construction Equipment
Replacement Analysis

- ✓ When the **estimated lives of defender and challenger are equal, annual worth method or present worth method may be used for comparison between defender and the challengers (new alternatives).**
- ✓ **When useful lives of defender and challenger are not same** i.e. remaining life of defender is not equal to useful life of the challenger (new alternative), mostly the **duration of the longer life span alternative is selected as the study period.**
- ✓ In other words, the useful life of the challenger (which is generally greater than remaining life of defender) is taken as the study period. In this case, it is assumed that the **equivalent uniform annual cost of the defender (i.e. the shorter life span alternative) will be same after its remaining life and till the end of the study period.**

Buy, Rent, Lease, and Replacement Analysis of Construction Equipment
Replacement Analysis

- ✓ In other words, the **shorter life span alternative will function at the same equivalent annual cost throughout the study period.**
- ✓ However, if realistic estimate of the equivalent annual cost of the shorter life span alternative (i.e. defender) after its remaining life is available, the same can be used appropriately in the economic analysis over the study period.

Buy, Rent, Lease, and Replacement Analysis of Construction Equipment
Replacement Analysis

- ✓ Sometimes, the **use of longer study period** may **not be beneficial because of the fact that the rapid obsolescence may force the replacement of longer life span alternative, due to availability of new models with latest technology which are more productive.**
- ✓ In addition, **inaccurate estimate of different cost components with uncertain future conditions for longer life span alternative** is also another factor which may adversely affect the selection of longer study period.
- ✓ These reasons may force the management of the company to **select a shorter study period for replacement analysis between defender and challenger.**

Buy, Rent, Lease, and Replacement Analysis of Construction Equipment
Replacement Analysis

- ✓ When a shorter study period is used, the **use of a realistic estimate of the salvage value or market value of the longer life span alternative (i.e. challenger) will result in an unbiased selection of the most economical alternative.**

Thank-you for Listening!

Certain people strive for uncertainty, while uncertain people like certainty.

(Shad)