Case Study of Valuation of Plant & Machinery

We are going to see two different chapters on this.

- ***One is, the depreciated value is not the market value of the machines &***
- ***Two is, the depreciated value with the derating factors will also be not the market value of an Industry as a whole.***

A small preamble of valuation of Plant & Machinery:

General method of valuation:

1. Perusal of Assets Register.

2. Inspection of the machine & Recording its specifications

3. Ascertaining the date of purchase

4. Estimating the life span based on the performance of the machine in other units

5. Fixing off of the residual value at the end of the life period

6. Confirming it's only a residual value and not the scrap value

7. Ascertaining the replacement value either by market approach or by using Indices

8. Applying depreciation on a straight line method and calculating the depreciation component

9. Deducting the depreciation component from replacement value to arrive at the market value

This is generally known as theoretical market value of the machine. But, we miss lot of other components in this and they are Factor of Obsolescence, condition of the machine

I. VALUATION OF INDIVIDUAL MACHINERY

1. **Value is a function of purpose:**

   Valuation of plant and machinery also differs with purpose. Value arrived for one purpose need not be the value always and it could differ according to the purpose

2. **Value is a function of Time:**

   Obsolescence plays an important role while valuing the machines, the value arrived at on a particular day holds good on that day alone and cannot be decided for a particular period. For example, the value of HDPE/LDPE/PP processing units came down on imposition of Jute mandatory act to pack cements in 1980s. Also the restriction to use polythene bags made a hevy impact in the bag manufacturing units.

3. **Value is a function of usage:**

   Value depends on usage mainly.

   Value of an idle/spare machine of the same capacity and configuration cannot be compared with the value of a machine that has been on a continuous use.

   Similarly value of a machine on a batch process cannot be compared with the value of a machine on a continuous process.

   Likewise, value of standby generator in a less power cut area might have worn out to a little extent when compared to a generator in usage of power starving area.

4. **Value is a function of maintenance.**

   The value depends on maintenance to a very great extent.

   A machine, if maintained well by replacement of worn out parts and with periodical overhauling values better when compared to the machine in a poorly maintained condition. The housekeeping of the industry as a whole also plays an important role.

5. **Value is a function of process:**

   Machines in a chemical plat might have suffered corrosion and the life span will be very less when compared to the machine of other plants.

   A motor of a coupled pump has a better longevity than a motor of a mono block pump.

6. **Value is a factor of environment also:**

   Industry situated in a sea shore or in an air polluted area suffers on corrosion when compared to the industries of other belt.

For exercising the correct procedure and to ascertain the right value, the Valuer must be familiar with the on the following heads.

1. **Lifespan:**

   Due to constant use leading to continuous deterioration a stage may occur, beyond which it becomes uneconomical or unsafe to use or work with a machine. The period from the date of putting the asset to use till the date it reaches this stage, is known as "*Lifespan*" or the "*Life expectancy*" of the asset.

   Lifespan depends on various factors.

   - Loading of the machine
   - Working hours
   - Environment
   - Quality maintenance and care
   - Timely replacement of worn - out parts
   - Speed at which the machine is run
   - Protection of machine from heat and dust
   - Proper usage
   - Usage of genuine and apt parts
   - To retain proper safety devices required such as fuses or crumbling zones

   To determine the lifespan the Valuer should be thorough about the process, the functions of the unit and the job extracted from the plant.
   To ascertain these factors, he should have perused the following documents.

   ⇒ Log book of the machine.
   ⇒ Maintenance record from the date of installation.

⇒ Production record of the unit as a whole.
⇒ The profitability statement and the balance sheet to ensure the production rate.

Lifespan is not constant for all machines or even for a category of machines. It depends on several points discussed above and the Valuer should not have any thumb-rule for life span of any of the machinery.
The declared age of the machine by a Valuer in any valuation report or in any article could be considered as a suggestive age only and not as the age on all aspects.

2. Depreciation:

The Dictionary meaning of Depreciation is "*a decrease or loss in value because of wear, age, or other causes.*" It is also described as the "*fall in value*" or "*to become less worthy*."

The decline in the value of asset is generally termed as depreciation and it can be classified under three major headings.

They are:

- Physical Deterioration
- Obsolescence
- Present condition of the machine.

Depreciation is neither constant for all the machines nor for a particular machine. It is a relative term, related to several aspects as discussed in this paper.

In a nutshell depreciation can be termed as "The Loss that cannot be restored by maintenance and that could result in, due to all factors, causing ultimate retirement of that machine".

It is not to be generalized and considered as 10% per annum as done while accounting in the book of accounts. It also depends on the residual value of the machine, which in turn depends on the material of construction.

Depreciation due to physical deterioration may occur due to any one of the following reasons:

01. *Wear and Tear due to usage:* It is the value of portion worn out, due to usage in the useful life of the machine.

02. *Effect of Deterioration due to corrosion:* It is the value of portion corroded, due to usage in seashore area or in a chemical Industry in the useful life of the machine.

03. *Effect of Deterioration due to aging:* It may be, due to its inherent characteristics or due to external factors such as exposure to weather and soil conditions. It can be also be termed as Decay. It need not only be a result of wear and tear, whereas it might be due to its completion of its life on usage. In this case, the depreciated value could be either the salvage value or the scrap value.

3. **Obsolescence:**

The present value of machinery is decided not only by the working condition of the machinery, which accounts for depreciation, but also due to obsolescence that has a crucial importance since it greatly affects the value of the machinery. It could be classified into Technological, functional, psychological, economic, planned obsolescence, and diminishing manufacturing sources and material shortages (DMSMS). Out of these types of obsolescence we will focus on functional obsolescence and economic obsolescence.

3. a. FUNCTIONAL OBSOLESCENCE:

The machinery is seldom replaced for their wearing out nature. They are mostly because of the development in science that had paved way for a more efficient machine.

The new generation machine when compared to the existing one, may excel on the following accounts:

- Higher production.
- Better working environment.
- Easy to operate.
- Easy to maintain.
- Lesser requirement of space for installation.
- Lesser consumption of power.
- Lesser labour Intensive.
- Lesser risk management.

- Lesser storage time.
- Lesser rejection.
- Equipped with self control system.
- Pre - programmed operations.
- Quick work motion duration and so on.

In general, if a new machine could reduce the operational cost and offer better profit potential, it could be preferred. The factors said above pave the way for functional obsolescence. This could be denoted as F_f.

Examples: Electronic Equipments such as Computers, Bio-Medical Equipments, controlling devices of Electronic Equipments, Pouching Machines and Major Mechanical devices with Auto Controls.

3. b. ECONOMIC OBSOLESCENCE:

Economic obsolescence is forced on a machine; it is by the external factors and not due to its own inherent properties. It may be due to any one of the following reasons:

01. Change in planning policy of the Government.
02. Change in import policy of the Government allowing import of the product in abundance.
03. Change in the relationship between the States from where the product is manufactured and the place where it is used.

The examples of the above are:

- Banning of carry bags and restriction in usage of Plastic materials resulted in throw - away price of such Machinery.
- Import of palm oil had ruined the market of edible oil and the plants installed for Extraction and Refining are uncared.
- Rejection of certain products of Tamilnadu in Karnataka due to Cauvery water issue had made the Industry producing these parts sick.

Economic obsolescence is extremely difficult to evaluate, however it causes steep fall in value of the machinery that manufacture the products that are banned or that had lost the market share.
The machine may be perfectly in a working condition and produce such products at competitive rates. However, they may suffer in price in market and the factor behind it, is known as Economic obsolescence. This could be denoted as F_e.

4. PRESENT CONDITION:

The present worth can be arrived by applying a factor after depreciation. This is known as the "*Condition of the machine or equipment*". To fix up this Factor and to substantiate his valuation, a Valuer should be thorough in the functioning of the machine and also in ascertaining the condition of the machine "*It is basically a result of good Maintenance*".

By the performance, a machine could be classified under any one of the five conditions:

VERY GOOD CONDITION
GOOD CONDITION
FAIR CONDITION
POOR CONDITION
SCRAP CONDITION

Let a factor F_c be denoted as a factor of condition

4.01. VERY GOOD CONDITION:

If a machine is capable of working to its specified maximum rated capacity utilization as per the design without modification or without any serious repair, it is rated as a very good machine. It is the condition which does not warrant abnormal maintenance or any repair, foreseen in the near future.

4.02. GOOD CONDITION:

If a machine delivers nearer to the required output after periodical maintenance and some modification, it could be classified under this category.

4.03. FAIR CONDITION:

If a machine delivers goods lesser than the rated capacity and if it requires general repairs or minor replacements to raise its level of utilization to near the rated output, it is classified as machine in fair condition

4.04. POOR CONDITION:

If a machine delivers an output very much lower then its rated condition and if that machine requires extensive repairs or replacements in near future, it is classified as a machine of poor condition.

4.05. SCRAP CONDITION:

If a machine is unable to deliver the goods in its present condition and is beyond the economical repair, it is classified as under scrap condition.

Let a factor Fc be denoted as a factor of condition

APPLICATION OF THESE FACTORS TO ASCERTAIN THE PRESENT MARKET VALUE OF THE USED MACHINES.

The depreciated value due to physical Deterioration can be calculated as said above

Depreciated value for the purpose of valuation	=	*Replacement value of the machinery*	-	*Depreciation value*

"Present worth" is the value that a machine can fetch on sale in the open market, without any abnormal conditions of sale, between a willing Buyer and a willing Seller, both having prudent knowledge about the product

Let F_f be the Factor for functional Obsolescence, F_e be the Factor for Economical Obsolescence and F_c be the Factor of Condition.

Present worth = Depreciated value x F_f x F_e x F_c *of the machine*

Hence, the depreciated value of the machine can never be the market value

The above passage deals about individual machineries However in the case of an industrial unit several other factors are also to be considered.

5.0. LIFE EXPECTANCY:

As said in Life span column, it is the expected life of the machine as such without any addition or alteration.

This is not constant for all the machines.

This is also not constant for a particular type of machine.

A machine that works for all the three shifts may wear out more than a machine that works for restricted hours in a shift. However, if it is periodically maintained, not much of difference is seen in the life span.

A machine of a chemical industry or a machine in an industry situated in sea shore may corrode and fetch a lesser value than the machine in other places.

Life span of some of the machines are listed hereunder which can be taken as a guideline.

Machinery installed	**Life expectancy**
Machinery in generating Stations:	
▪ Hydro-electric	35 year
▪ Steam-electric	25 year
▪ Diesel electric	15 year
Cooling towers and circulating Water systems.	30 year
Transformers, Transformer Sub-station equipment and other Fixed apparatus (including plants foundations)	
▪ Transformers(including Foundation)having a rating of 100 kilovolts amperes and over	35 year

Lightning arrestors

- Station type — 20 years
- Pole type — 15 years
- Synchronous condensers — 35 years

Underground cables including joint Boxes and disconnecting boxes	40 years
▪ Cable duct system	60 years

Overhead lines including supports

▪ Lines on fabricated steel supports operating at nominal voltages higher than 66 kilovolts.	35 years
▪ Lines on steel supports operating at nominal voltages, higher than 13.2 kilovolts but not exceeding 66 kilovolts.	30 years
▪ Lines on steel or reinforced Concrete supports.	25 years
▪ Lines on treated wood supports	20 years
Meters	15 years
Air- conditioning plant	
▪ Static	15 years
▪ Portable	7 years
Office Equipments:	
▪ Office furniture and fittings	20 years
▪ Office equipment	10 years
▪ Internal wiring, including fittings and apparatus	15 years
▪ Street-light fittings	15 years

7.0. CONCLUSION: I

When we say that depreciation is not constant and varies with usage, we have to consider the point of maintenance also.

If it is related only to shift hours, the motor having a life span of 20 years in a continuous processing industry should fetch 60 years of life in a single shift industry. The Valuers are aware that it is not so. Then, what is the life of a motor in an industry continuously used and in an industry run shift-wise. It is almost the same or it differs by a small percentage only and is not directly proportional.

Machine life is closely related to the rate of its wear and tear which again depends on many factors discussed above. It is the period during which a machine will work economically with very reasonable expenses.

Fixing the life span and applying depreciation plays a vital role in valuation of Machinery. However, these factors will help one in arriving at a THEORETICAL Market Value alone. The prudent and experienced Valuer has to apply his mind to determine the life span and arrive at the present worth of the machine by applying factors namely, the Factor for functional Obsolescence Ff, the Factor for Economical Obsolescence Fe, and the Factor of Condition Fc. The value arrived at on considering the above points will be nearer to the real market value of the machine.

II. VALUATION OF INDUSTRIAL UNIT AS A WHOLE

In an industrial unit as a whole value depends on several other factors, in addition to Land, Building and Machinery.

They are:

1. To consider the entire entity as a plant
2. Geographical advantage of the location
3. Availability of skilled Labour
4. Availability of power
5. Clearance from Pollution control board
6. Registration with concern Departments
7. License
8. Experience in running the plant
9. Adequate knowledge about the plant as a whole
10. Gestation of Time
11. Goodwill that has been earned
12. Amount spent on promoting the brand

In a nutshell, it is valuing a business and not only the asset.

To sight an example, if a bus route is to be valued, It is not merely the bus, but it is with the route.

Here, we don't value the bus alone; we consider, how busy the route is, the collection it makes, number of trips it is permitted and the collection it makes.
So as to say, if a car is valued, it is the car as a whole and we do never do a biopsy and value component wise such as value of engine, transmission shaft wheels and tyres

> *For Example,* to highlight about the goodwill and the amount spent, ULTRATECH CEMENT LIMITED, Grasim cements, has spent in 2022-2023 Rs. 477.22 Cr. as advertisement charges to achieve a sales Target of 100.6 million Metric Tons for a turnover of Rs. 60,463 Cr.
> where are we to observe this much of value?

It is also learnt that the investment cost of a Cement Mill is valued at Rs. 25,000/Ton of production and not by adding the value of individual assets such as value of Land, Building and Machinery.

In a similar way the investment in a sugar mill, without value of land component was estimated on a Thump rule basis for a crushing capacity of 2500 tons processing capacity, the cost of the plant and machinery is approximately Rs 40 to 50 Cr. In addition to the present, we have to add on real estate, structures, working capital, etc. The total expenditure required to fix an Indian sugar mill is at least Rs 125 C

Hence, doing a biopsy and valuing the machinery on by applying depreciation will never be the right method of doing valuation of an industry. Once again **we have to value a business and not only the asset**

Hence, Depreciated value of a individual machine or an industry as a whole will never be equal to the market value. Application of mind and the experience that a Valuer possess alone, will take it to a nearest value.

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Please find here below the tentative cost estimate for the erection of different sizes of the Sugar Mills with the Co-Generation power plant and Distillation Alcohol Plant.

Cost Estimation for the erection of the Sugar Plant with the Co-Generation Power Plant and Distillation Alcohol Plant.

B	C	D	E	F	G	H	I	J
Please find here below the tentative cost estimate for the erection of different sizes of the Sugar Mills with the Co-Gen								
Sl.no	Description	Proposed Sugar Crushing Capacity (In Metric Tons of crushing per day TCD)	Size of the Co-Generation power plant. (In Mw)	Size of the Distillation Alcohol Plant (in Klpd)	Cost for the Proposed Sugar mill – Mill House and Boiling House (Rs in Crores)	Cost for the proposed Co Generation power plant. (Rs in Lacs)	Cost for the Proposed Distillation Alcohol Plant. (Rs in Crores)	Cost for th Infrastructu edevelopme such as office, war house etc (I in Crores
1	Small Capacity Sugar Mills	2500 to 3000	10 to 12	30 to 40	250	125	85	40
2	Medium Capacity Sugar Mills	5000 to 6000	20 to 25	60 to 80	450	250	170	70
	Large							

<u>Assumptions:</u>

Please note that these above estimates are approximate and may vary depending on the following various factors such as:

a. Technology and equipment selection

b. Location and logistics

c. Labor and material costs

d. Government policies and incentives

e. Project implementation schedule.

The offers from the plant and Machinery are to be collected for arriving at the exact cost of the proposed sugar plant with the co generation and Distillation Alcohol plant after finalizing the design of the plant and energy conservation practices to be implemented in the proposed plant.

Additional Costs:

The following additional cost (Approximately) shall be taken in to consideration while during the project preparation stages.

1. Land acquisition and development: 50-100 Crores

2. Working capital and contingency funds: 100-200 Crores

3. Interest and financing costs (during construction): 50-100 Crores

Approximate Break up prices for the Civil construction Cost:

Detailed Split Up Cost (Approx.) for the Civil Related expenditures for the erection of the Sugar Mill with the Co-Generation and Distillation Alcohol Plant.

B	C	D	E
Sugar Mills	**Small Capacity**	**Medium Capacity Sugar Mills**	**Large Capacity Sugar Mills**
Descriptions	**(2500 to 3000 tcd)**	**(5000 TO 6000 tcd)**	**(8000 to 10000 tcd)**
1. Sugar Mill Building:	15-20 Cr	30-40 Cr	50-65 Cr
2. Boiler House	8-12 Cr	16-24 Cr	28-40 Cr
3. Turbine House	10-15 Cr	20-30 Cr	35-50 Cr
4. Distillation Plant Building	8-12 Cr	16-24 Cr	28-40 Cr
5. Storage Godowns	5-8 Cr	10-16 Cr	20-30 Cr
6. Office Building & Amenities	5-8 Cr	10-16 Cr	20-30 Cr

Please Note:

a. These estimates are approximate and may vary depending on location, soil conditions, and other factors.

b. Costs are based on average rates in India and may fluctuate depending on region and market conditions.

c. These estimates do not include costs for equipment, electrical, mechanical, and other works.

d. To have a detailed Consultation with civil engineers, architects, and contractors for arriving at the more accurate estimate for your specific project.

Also, the following involved cost are also to be suitably considered for arriving at the Civil Cost for the erection of the Sugar Mill.

a. Land acquisition and development costs

b. Working capital and contingency funds

c. Interest and financing costs (during construction)

d. Other infrastructure costs (water supply, electricity, etc.)

***Opinion of the valuer*:**

While doing valuation of Plant & machinery, if we value the land, Building & Machinery alone, by a method of biopsy, how will be able to value the features said above