# THE IMPORTANCE OF DEPRECIATION IN PRODUCTION COSTS

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## ABSTRACT

One of the most determinative factors of the products produced by the companies is their price in supply and demand point. One of the major factors that constitute product cost is the depreciation cost of the devices used in productive facilities. During operation, devices which are used as fixed assets in productive facilities are worn out and their economic life decrease, and also their material values decrease or get lost over time. In order to facility devices be employed within the scope of depreciation, they must have a certain value, must be registered, they must be in effective use and must have economic life more than a year.

There are a number of methods in the evaluation of the depreciation of the facilities. In this paper; in the scope offixed annual capital cost, annual depreciation rate has been discussed based on the present variable value, economic life, discount rates, recovery value. In a certain economic life, as the interest rate increases depreciation value also increases. During a variety of economic lives the plant, compared to fixed interest rates, it has been seen that depreciation value is high in short-lived plants, and low in long-lived ones. Besides, depreciation value is lower in low-interest rates, and parallel depreciation value increases as interest rate increases.

**Keywords:** Depreciation In Businesses, Engineering Economy, Scrap Value,

## ÜRETİM SİSTEMLERİNDE AMORTİSMANIN ÖNEMİ

### ÖZET

Firmaların ürettikleri ürünlerin en belirleyici faktörlerinden biri de arz ve talep doğrultusunda fiyatlarının belirlenmesidir. Ürün maliyetini oluşturan en önemli unsurlardan biri de üretim tesislerinde kullanılan cihazların amortisman maliyetidir. Üretim tesislerinde sabit kıymet olarak kullanılan cihazlar işletme sırasında eskimekte ve ekonomik ömürleri kısalmakta, ayrıca maddi değerleri de zamanla azalmakta veya kaybolmaktadır.

Tesis cihazlarının amortisman kapsamında kullanılabilmesi için belirli bir değere sahip olması, tescil edilmiş olması, etkin kullanımda olması ve ekonomik ömrünün bir yıldan fazla olması gerekir. Tesislerin amortismanlarının değerlendirilmesinde bir takım yöntemler bulunmaktadır. Çalışmada; sabit yıllık sermaye maliyeti kapsamında, bugünkü değişken değer, ekonomik ömür, ıskonto oranları, geri kazanım değeri esas alınarak yıllık amortisman oranı ele alınmıştır. Belirli bir ekonomik ömürde faiz oranı arttıkça amortisman değeri de artmaktadır.

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Çeşitli ekonomik ömürlerde santralin sabit faiz oranlarına göre kısa ömürlü santrallerde amortisman değerinin yüksek, uzun ömürlü santrallerde ise düşük olduğu görülmüştür. Ayrıca, düşük faiz oranlarında amortisman değeri daha düşük, faiz oranı arttıkça paralel amortisman değeri de artmaktadır.

**Anahtar Kelimeler**: İşletmelerde Amortisman, Mühendislik Ekonomisi, Hurda Değer

## 1. INTRODUCTION

The economics of the production plant is in production it's critical. While the project phase plant is tested in order to determine the economically most application methods. Facility project of providing the requested data is not provided, if the project is sufficient to finance economic control, it is of great importance. Entrance fees during the life of the facility will require the company continuity.

A financing company fails stream leaves a difficult situation, or even termination. Therefore, the company should have the necessary funds in time.

In fact, many methods are used in determining depreciation. Generally, these methods.

Normal depreciation; the company determines the rates to be determined by taking into consideration the useful lives of the economic value of ministry.

Diminishing balance method: corporate depreciated economic values, cannot in accordance with the declining balance depreciation over. Here, the depreciation rate should not exceed 50%.

Extraordinary Depreciation Method: The timeouts can be defined as the economic life of the rapidly declining depreciation methods.

Depreciation cost is not an assessment but may allocate. This cost allocation can depend on many factors; the company's economic life during the first products in a certain period of time will always be able to generate income. Depreciation expense in the accounting period is the amount of cost allocation. Translation loses value over time and only product line is calculated.

They want to be equal to the depreciation of production facilities during the economic lifetime. However, the project has a higher present value of depreciation of value of production facilities is causing high in the first year. Therefore, the facility constitutes high income tax.

Physical wear and break of the devices is a technological phenomenon. This does not mean compromising on quality. Depreciation is the relationship of this device Scott [1] . To determine the correct depreciation of the Company will reduce the real rate of interest, in the short term will have an indefinite effect on growth, to space the study period, would reduce the rate of change of the stock per direct capital, so that capital saving has said it will get lower interest rates Aghion [2]. There are many views on depreciation for companies. Cash flow is considered stochastic. However, the accelerated depreciation tax rule is controversial, Davidson [3], Schooner [4], Wakeman [5].

The development of a viable dynamic programming formulation, they said it would be in favor of accelerated depreciation method for the presence of Berger Berger [6], Wielhouw [7]. While investment costs, potential operating cost, cost and scrap value, depreciation have been made about the importance of work. Arkin [8], Mauer [9], Zambujal [10], Handle [11].

Kim at all in the study, They used a rational depreciation method to calculate the cost of the Pyroprocess. He has developed an advanced depreciated method (ADDM). Eventually, it has been determined that the depreciation cost of the ADDM, which assumed a Pyroprocess the life of the facility will be 40 years with a deceleration rate of 5%, takes up 4.14% and 27.74% of the Pyroprocess unit cost in the 1st and final years, respectively, Sungki [12].

Gaétan at al, in the work, They tried to estimate the depreciation rate of innovations usingsurveydata on Australian patent-related revenues. First, directobservation of theincome streams of inventions, laterestimation of theeffect of patent protection on the depreciation rate. The results show that the depreciation rate is in the range of 2-7%, [13].

In addition, the sheer number of assets that are included in the calculation of depreciation and complexity could pose problems in financial terms, therefore 10 quarries in the official gazette of the Ministry of Finance dated 2008 for assets subject to depreciation and amortization in the 26752 numbered notification classifying lands, buildings, fixed assets under construction, advances given for the acquisition of assets and loans are evaluated within the scope of the works of art are not depreciated. The second item of fixed assets, as assets subject to depreciation and amortization, account groundwater and land improvements, buildings account of plant, machinery and equipment accounts, vehicles, accounts, inventory account, other tangible assets account, the rights account, research and development expenses account special costs account other intangible assets account, call expense of other special exhaustion subject to asset accounts, inventories held for resale and tangible assets are listed as the account, "http://www.resmigazete.gov.tr [14].

The constant physical presence in the activities they used to achieve the objectives of the company is called tangible assets. According to this definition, as well as properties owned enterprises, which is used in all kinds of office supplies and business attribute moved, tools and equipment are recognized as fixed assets, Kumar [15].

Many short definitions have been made about depreciation. While dealing with depreciation and depletion depreciation, it was also evaluated by making simple calculations. Subject to depreciation in the project of economic design and practical calculations, this method is used. Here it is evenly distributed throughout the life cycle cost of fixed assets. Thus, annual depreciation, the cost of maintaining a constant value (M) (cost + expenses), in addition, if the scrap value (Hr) after deducting the fixed value of economic life (n) is calculated by dividing.

Depreciation economy, especially in engineering work; focused on the effects on cash flow of the project depends on capital investment.

Fixed scrap of a product (Hr), price (P), in the event of interest will be reduced depreciation over the useful life of value can be seen to increase as interest rates rise.

Loss in the economic value of the products used in the plant is also considered as depreciation. The increase in cash flow in the plant, will increase the annual depreciation value is obvious. The depreciation value, which therefore can be used as an alternative for determining the annual cash flow.

There are many methods of amortization of plant evaluation. Production under constant annual capital costs of the facility where the unit; variable current value, economic life, interest rate changes was discussed on the basis of annual depreciation scrap value.

## 2. THEORETICAL CONCEPTS

Fixed annual depreciation is a factor affecting the cash flow positively. This means that the annual depreciation of the high net cash flow of the company also means that high. Therefore, businesses prefer the method of calculation where high annual depreciation for tax purposes.

Fixed annual depreciation cost depreciation value of an investment with a certain value determined by the following formula.

$$Ca = P(A/P, i, n) = P\left[\frac{i\,(1+i)^n}{(1+i)^n - 1}\right] \tag{1}$$

Where A / P is determined as the depreciation factor. The economic life of plant (s) over the interest rate (i) the change has been taken into consideration. Scrap value of the economic end of life is very important in plant or machinery for the company and the value of the property at project level are included in the economic calculations. If the scrap value, regardless of economic life will eventually be included in determining the depreciation charge of the sales price is determined by the following formula, Aybers [16].

$$Ca = P(A/P, i, n) - Hr(A/F, i, n) = P\left[\frac{i\,(1+i)^n}{(1+i)^n - 1}\right] - Hr\left[\frac{i}{(1+i)^n - 1}\right] \tag{2}$$

Here the economic life of the plant H (n) is the scrap value at the end.
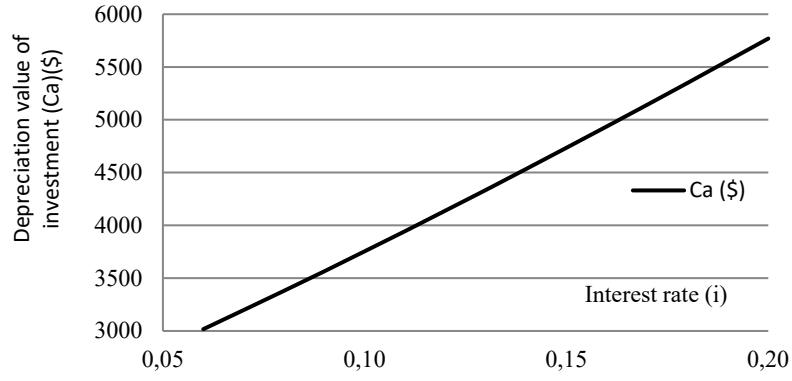
**Figure 1.** Depreciation value of the different interest rate (i) difference

In numerical analysis: the purchase price value P, scrap value at the end of life Hr, the interest rate is good, the economic life of the different years of the machine (s), graphics obtained as Figure 2 when the depreciation charge is assessed.
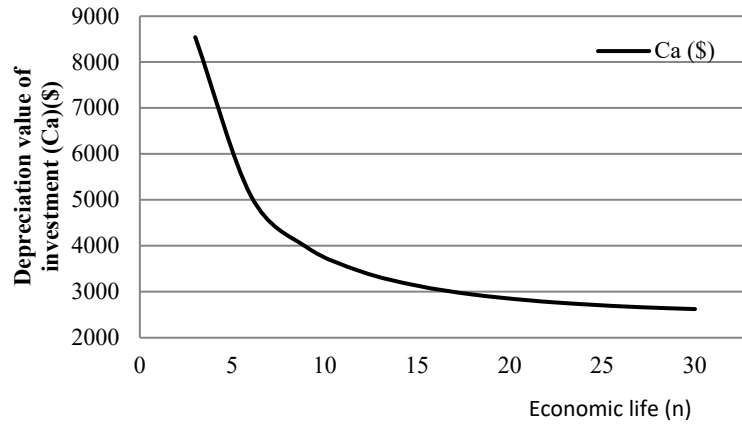


**Figure 2.** When the depreciation charge is assessed

The facility is evaluated with a fixed interest rate during different economic lives of ephemeral installations in high depreciation value has decreased depreciation in value of long lasting. In addition, low interest rates, depreciation of the value of the lower interest rate is no longer parallel to the increase of depreciation value.
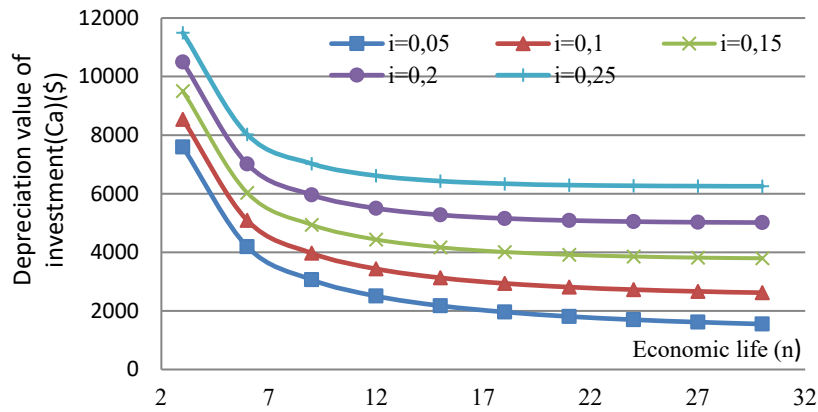
**Figure 3.** Ca, value change at different interest rates and different economic life times

Another factor affecting the depreciation value of the property is salvage value. Figure 4 is also examined at different scrap value. By scrap value increases it was observed to decrease the depreciation value. The scrap value is evaluated at different interest rates. The higher the interest rate, the higher the depreciation value.
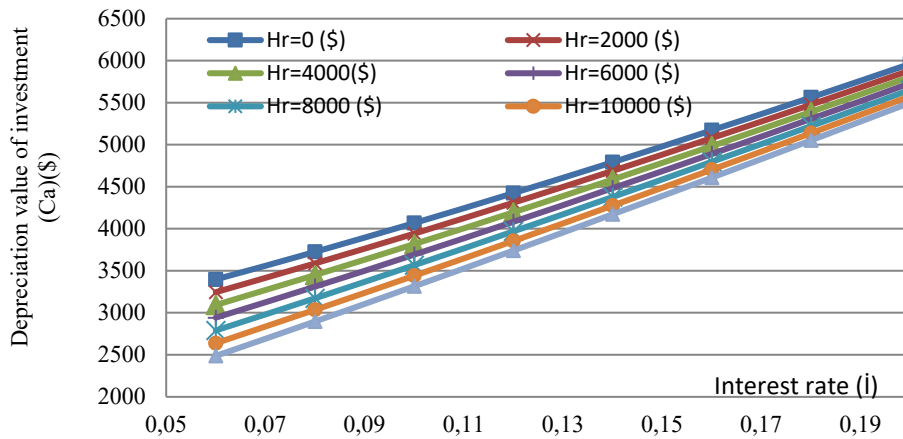


**Figure 4.** Ca, value change at different interest rates and different scrap values

## 3. RESULTS

Production facilities, tear value of long-lived device (physical depreciation) as discussed, the purchase price and the value of the property P, scrap value at the end of life (Hr), interest rate, (ii) economic life in different years, a machine (s), depreciation cost it was evaluated. Depreciation is determined as a certain percentage of economic loss and now, during the economic life of the facility will provide the right economic decisions taken.

Purchase price value P, scrap value at the end of life Hr, the interest rate is good, the economic life of the different years of the machine (s), the depreciation charge is considered useful lives no longer as depreciation value is reduced.

The facility is evaluated with a fixed interest rate during different economic lives of ephemeral installations in high depreciation value has decreased depreciation in value of long lasting. In addition, low interest rates, depreciation of the value of the lower interest rate than is now parallel to the increase of depreciation value.

At the end of the economic life of the plant it is very important for businesses to scrap value. The high scrap value reduces the depreciation value.

The increase in the amount of depreciation expense recorded each year. This can happen if the asset's useful life is shortened, the salvage value decreases, or the depreciation method changes.

**SYMBOLS**

Hr: Residual Value
P: Present value
F: future value
A:Installment value
i: Interest rate
n: economic life
Ca: depreciation value

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