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# USE OF ACCOUNTING FOR THE PHILOSOPHY OF EQUIVALENT PRODUCT PRODUCTION AND PERIOD IN THE PREPARATION OF FINAL RESULTS AND MANAGEMENT OF FIXED RESOURCES

*Gnan abed kachi*[1], *Malath Abdul Jabbar Abbas*[2], *Hussein Ali Hisab*[3]

[1]College Of Biotechnologe Dept Medical University of Al-Qadisiyah, Iraq

[2]College Of Administration and Economics University of Al-Qadisiyah, Iraq

[3]General Directorate of Education in Al-Muthanna

Email: [1]Gnan.abed@qu.edu.iq, [2]Malath.jabar@qiu.edu.iq, [3]husseinhisab@ gmail.com

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## ABSTRACT

The study focuses on the study of the technology of production, with the statement of the management of the results in the form of the balance sheet. The next hypothesis has been formulated: the use of administrative accounting for the philosophy of equivalent product production may facilitate the establishment of result-oriented reserves and the management of fixed resources. The subject matter of the discussion is the formation of Kufa Cement, a single formation of a public company for Southern Cement, and the implementation of the research in the practice of the final financial statements on 31/12/2019. The research reached a set of conclusions, the most important of which are: The philosophy of optimal production technology is a standard approach to dealing with the company through an integrated holistic view for the purpose of identifying and dealing with the constraints that the system faces. The productive mix and managing constrained resources.

## INTRODUCTION

The philosophy of optimal production technology seeks to help the management to re-examine and evaluate the company's activities in light of the existence of activity restrictions, which may be material or refer to the administrative policies of this company, and therefore this philosophy is a set of concepts aimed at helping the management to identify the problems it faces in order to overcome By defining the necessary changes and how to bring about them, the restriction is intended to be something that limits the ability of the system to achieve its goals effectively and efficiently, and the presence of restrictions motivates the company's management to make extraordinary

improvements by stimulating the thought to search for innovative solutions that are compatible with the nature and situation of the company The company can be viewed as a system consisting of a series of interrelated activities whose strength is determined by the weakest link, whereby work is done to rationalize the decisions of the productive mix and manage the restricted resources, thus helping to generate the largest amount of profits by maximizing the achievement or output of the company.

## RESEARCH METHODOLOGY

### *The Research Problem*

The decisions of the productive mix are affected by the restricted resources in the company, and according to the philosophy of optimal production technology, the company is seen as a series of interconnected activities whose strength is determined by the strength of the weakest link in it, as the decisions of the productive mix are taken with what is possible with it to maximize both productivity and profitability. The research problem through the following question: Can the philosophy of optimal production technology be used in a way that helps in rationalizing decisions of the productive mix and managing the restricted resources?

### *The Importance of Research*

The importance of the research stems from the importance of the philosophy of optimal production technology and its role in providing the necessary information to rationalize the decisions of the productive mix, in a way that helps the company to achieve the maximum contribution return by adopting the concept of proportionality between the volume of production and the cost of energy use.

### *Research Objectives*

The research aims to study the cognitive pillars of the philosophy of optimal production technology, with an explanation of the role of the management accountant in rationalizing decisions of the productive mix and managing the restricted resources in light of this philosophy, in a way that helps generate profits through maximizing achievement or outputs.

### *Research Hypothesis*

The research is based on the following hypothesis: (The management accountant's use of the philosophy of optimal production technology can help in rationalizing decisions of the productive mix and managing the restricted resources).

### *Research Sample*

The research sample is represented by the Kufa Cement Factory, one of the formations of the Southern General Cement Company, and the search was

applied in the laboratory for the data for the fiscal year ending on December 31, 2019.

## THE THEORETICAL FRAMEWORK OF THE RESEARCH

### *The Concept and Importance of The Philosophy of Optimal Production Technology:*

The philosophy of optimal production technology is seen as a general philosophy of the company's management, which seeks to help the administration to re-examine and evaluate its activities in light of the presence of restrictions in the activity, which may be material or related to administrative policies (Al-Kashef, 2001: 3). Towards maximizing profit in the long term for the company by addressing organizational bottlenecks or constrained resources (Hilton, 1999: 224). The philosophy of optimal production technology relies on the systems approach, as the system as a whole is treated as a continuum of operations instead of dealing with each process alone. As in the case of the traditional approach (Sytsma, 2003: 4), either Blocher defined it as a strategy for company management to improve product cycle time to ensure optimal production flow (Blocher, 1999: 14). Thus, it is a management philosophy that relies on a continuous process of determining System constraints and their removal to ensure optimum utilization of resources and increase output for finished products in the largest possible volume to ensure increased profitability. Among the procedures that can be followed to increase the strength of the performance of the following chain of operations: (Hussein, 2000: 210)

1. Identify the weakest process in the chain of production processes.
2. It is not allowed to load the chain of operations with a production capacity that exceeds the capacity of the weakest process in it.
3. Work to focus improvement efforts in order to strengthen the weakest process in the chain of operations.
4. If the efforts to improve the company's operations are successful, then the energy of the weakest process will increase, leading to the emergence of a new production process that may become the weakest process in the chain of operations, but it is not the same as the weakness of the previous process.

As for the importance of the philosophy of optimal production technology, it appears from its being an integrated view of the system as a whole instead of the fragmented view of the constituent elements, and thus this theory has a positive impact on the overall performance of the system in the company (Dettmer, 2019: 3), as it helps focus on Understanding the overall goal of the company as a whole as a prerequisite for success, and this understanding is based on the premise that the resources available to managers are limited, and then these resources must be directed towards goals that are clearly understood and defined (Tollington, 2008: 45).

The philosophy of optimal production technology describes methods of maximizing operating income when the company faces some of the operations

that represent bottlenecks and others that may not represent bottlenecks. It also defines three measures as follows: (Hornkern et al. 2009: 1263)

1. Output Contribution: It is the net sales minus the cost of direct materials.
2. Investments: It is the sum of the costs of each of the raw materials, production in operation, complete production, research and development costs, and others.
3. Operating costs: These are all other operating costs except for the cost of direct materials that contribute to achieving the outputs.

The philosophy of optimal production technology helps in solving the problems of production bottlenecks, reducing inventory and making continuous improvements in the system under its constraints to achieve streamlining performance through compatibility between the speed of restricted resources and inventory (Sytsma, 2004: 1-2)

***Assumptions and Principles of The Philosophy of Optimal Production Technology***

The philosophy of optimal production technology is based on a set of assumptions to measure the impact of the results achieved as a result of its application, as follows: (Holmen, 1995: 44), (Kashif, 2001: 10)

1. The existence of a restriction that impedes the company's ability to achieve the required level of performance, as the existence of this restriction leads to a reduction in the value of the overall achievement of this company.
2. Direct wages are not a variable cost. The philosophy of optimum production technology assumes that labor costs (in the short term at least) are not a variable cost.
3. The goal of the activity is to generate profit, as the main objective of the company is to achieve the largest possible amount of achievement in a way that leads to maximizing both profit and profitability.
4. The scheduling of production flow through the supply chain, whereby scheduling of production flow through the supply chain begins, in a manner that leads to maximizing the outputs of restricted operations. The scheduling process is based on two assumptions, which are as follows: (Huang 1997: 14)

a. There is a possibility to define restrictions when suffocation arises from unforeseen events.
b. The existence of continuity and stability in the mixing and demand in the various resources necessary for the production process, which will not be achieved if there are any fundamental changes in production.
As for the principles of the philosophy of optimal production technology, there are a set of principles that can be explained through the following: (Seiyaka, 2002: 11), (Salafations, 1995: 57)

1. The level of output at the level of unrestricted resources is determined by the level of restricted resources: - The difference of available energies during the production stages is the main reason for the emergence of bottlenecks. Therefore, operating production processes to their full capacities will lead to

the accumulation of stocks between production stages due to the inability of the low stages Energy from absorbing all production of the higher energy's stages.

2. The time margin achieved at the level of the restricted resources is equal to the increase in the rate of the output of the restricted resources: According to the concept of the philosophy of optimal production technology, the company's resources are divided into restricted resources and unrestricted resources, and that the energy of unrestricted resources is determined by the energy of the restricted resources, and accordingly the time spent on Unrestricted resources will consist of both initialization and running time and downtime.

3. The time margin achieved at the level of unrestricted resources can be considered a complete delusion: - Saving one hour of initialization time on unrestricted resources means increasing one hour of wasted time, and then increasing the stock of production in operation as a result of the large waiting for units in front of the resources. Restricted.

4. Efficiency and utility of resources are not synonymous: - Effectiveness is represented by the extent of the system's ability to achieve its goals regardless of the level of energies used in the production process within the company, while the benefit is by operating unrestricted resources at full capacity for the purpose of reducing waste to the maximum possible extent.

5. The production batch is variable: The change in the production batch can be considered a function of the difference in energies between production processes, and thus a function of the occurrence of restrictions in the production process, as the size of the variable batch depends on taking into account the balance between the components through the production process as well as Parts flow and storage costs.

6. The transition batch is not equal to the production batch: - The transfer batch is the number of resources transferred from a production process to a subsequent process, as it represents the batch size from the point of view of parts and the size is fixed and usually less than the size of the production batch, either the production batch is the quantity of materials produced Between work centers in the company.

***Steps to Implement the Philosophy of Optimal Production Technology:***

The optimization production technology philosophy emphasizes that dealing with constraints must be done continuously during production processes, by following a set of steps, as follows: (Goldratt, 1988: 453), (Dugdale & Jones, 1996,24)

First: Determining the system's constraint or restrictions: A constraint is seen as any attitudinal factor that makes the achievement in the company more difficult, and thus it prevents the system from achieving its goal, which is to increase the company's funds now and, in the future, and there appears one restriction that is the most influential among other restrictions. Attention can be focused on for the improvement process.

Second: Determining how to exploit the restriction and then overcome it: The exploitation of something means how to use the registration activity more

effectively and efficiently by converting the physical restrictions into expected or potential effects and dealing with the registration in light of the final goal of maximizing the achievement, as the loss of one hour of the registration activity indicates to an hour loss on a system-wide level.

Third: The dependence of any other factors on the decisions related to overcoming the constraints: - The overall performance of the activity is affected by the restricted activities, and this requires harnessing all the energies of the unrestricted activities in line with the energies of the restricted resources in order to achieve the maximum productivity of the restricted resource and the maximum efficiency and effectiveness of the system as a whole through Facilitate the flow of production in a manner that prevents the accumulation of in-progress production between multiple operations and activities.

Fourth: Improving the performance of the registration activity as a whole: Improving the performance of the production system does not depend on harnessing all the energies of the unrestricted activities only in a manner consistent with the energies of the restricted resources, but activating the restricted resources can improve their performance in order to achieve the greatest possible benefit from the resources. Unrestricted, which operates at the level of the restricted resource in the company after optimization, and this is what leads to maximizing the achievement of the system as a whole.

Fifth: Evaluating the improvement and treatment of the registration activity, starting from the first step: a reference to the concept of continuous improvement, when overcoming the system's restrictions and removing their effect, another constraint will appear to us, but it does not affect the same strength as the previous ones, and here we must return to the first step in order to search for the main reasons for this the limitation is to be addressed in a way that optimizes the system.

### *An Overview of The Kufa Cement Plant*

The Kufa Cement Factory is one of the formations of the Southern State Company for Cement Industry affiliated to the Iraqi Ministry of Industry and Minerals. The plant was established in 1977 in order to support the national economy as well as meet the needs of customers in terms of regular cement and resistant cement. The plant is located in Najaf Al Ashraf Governorate / Kufa District / Al Barakia City. The design capacity of the plant is 1,781,000 tons of cement annually, and the cement that is produced conforms to the Iraqi specification No. (5) for the year 1984, and although the products of the factory compete with foreign products in terms of quality, they are not exported outside the country for several reasons related to export laws and high costs. And there is a group of factors that push the factory to develop its production, and one of the most important of these factors is that the factory has qualified administrative, engineering and technical cadres that follow up on modern technological and industrial developments in the cement industry, as well as conducting periodic market research to identify the actual needs of customers, and with regard to the accounting system used. In the laboratory,

the research sample is the unified accounting system, as chapters (5) to (9) have been devoted to cost accounts divided between each of the production centers. C and service centers, where cost accountants prepare cost lists to determine the cost of the produced unit (in tons), depending on the actual cost system, and these lists are submitted to the administration, which in turn transfers these lists to the pricing committees in order to determine the selling prices.

2-3 Application of the philosophy of optimal production technology in the Kufa cement plant and its use in rationalizing decisions of the productive mix and managing the restricted resources:

In order to apply the philosophy of optimal production technology in the Kufa Cement Factory the research sample, it is necessary to determine the products that are subjected to restrictions, as the factory produces two types of products, namely, regular cement and resistant cement, and that these two products are subjected to restrictions represented by direct working hours and machine operating hours, as the The presence of these restrictions limits the plant's ability to achieve the required level of performance and thus reduces the overall achievement of the plant, due to the inability to achieve the maximum return on the output contribution.

After determining the lab's producers, the research sample that is subject to restrictions or limitations, the return on the output contribution for these two products will be calculated according to the following equation:
Output Contribution Yield Per Ton = Selling Price Per Ton - Direct Material Cost Per Ton

The return on the output contribution for the producers of regular cement and cement set up for the Kufa cement plant can be shown as shown in the following table:

**Table (1)** Revenue of Output Contribution for Producers of Regular Cement and Refractory Cement

| CEMENT | ORDINARY CEMENT | THE DETAILS |
|---:|---:|---:|
| **88000** | **60000** | **Selling price per ton** |
| **(72000)** | **(48000)** | **Direct material cost per ton** |
| **16000** | **12000** | **Output contribution revenue per ton** |

**Source:** Prepared by The Researcher.

It is noticed from the above table that the selling price of one ton of a regular cement product is 60,000 dinars and of a resisting cement product is 88,000 dinars, either the cost of direct materials has reached 48,000 dinars for regular cement and 72,000 dinars for resistant cement, and accordingly the return on the output contribution for the regular cement product is 12,000 dinars, the

return on the output contribution for the resistant cement product is 16,000 dinars.

It is possible to clarify some data on the restrictions that the laboratory producers are exposed to, the research sample, and as shown in the following table:

**Table (2)** Some Data on The Restrictions That the Research Sample Lab Producers Are Exposed To

| Cement | ORDINARY CEMENT | THE DETAIL |
|---|---|---|
| 4 | 3 | The direct labor hours required to produce one ton of cement |
| 2 | 3 | Operating hours for the machines to produce one ton of cement |
| 2,100 hours are available during the year | | Direct work hours available during the year |
| 1500 hours are available during the year | | The operating hours of the machines are available during the year |

**Source:** Prepared by The Researcher.

It is evident from the above table that the direct work hours required to produce one ton of regular cement and one ton of resistant cement are 3, 4 hours respectively, and the operating hours of machines required to produce one ton of regular cement and one ton of resistant cement are 3, 2 hours each. Respectively, and the factory only has 2,100 direct work hours and 1,500 machine operating hours during the year.

Accordingly, these restrictions or limitations prevent the factory's ability of the research sample to produce the targeted quantities of producers of regular and resistant cement that can meet the needs of the market, and thus not achieving the required level of performance by reducing the value of the total achievement of the factory during the research year, as if The direct working hours and the operating hours of the machines are restrictions for the production of normal cement and resistant cement in the factory, which requires the optimization of these restrictions in order to achieve the highest possible contribution return.

According to the philosophy of optimal production technology and using the principles of linear programming, some mathematical equations represented by the target function can be prepared to achieve the maximum contribution return to the output, and the goal function can be clarified through the following equation:

Maximum Contribution Return of Output = 12,000x + 16,000p
Where:
Q: The number of units produced and sold per ton of regular cement product.

Y: The number of units produced and sold per ton of a product of resistant cement.

The mathematical equations for the objective function or the constraints for producers of regular and resistant cement can be illustrated through the following:
Direct work hours restriction: -3h + 4am 2100
Machinery operating hours restriction: -3h + 2am ³ 1500
Where: - x £ 0, y £ 0

In order to reach the optimal solution, a set of calculations must be performed based on the principles of linear programming in order to facilitate the work of the graph and determine the area of the optimal mix of laboratory products for the research sample, and these calculations aim to determine the value of both the x-axis and the y-axis to restrict the direct working hours and limit the operating hours of the machines , In order to be represented graphically, and it is possible to clarify the calculation of the value of (x) and (y) for each entry through the following table:

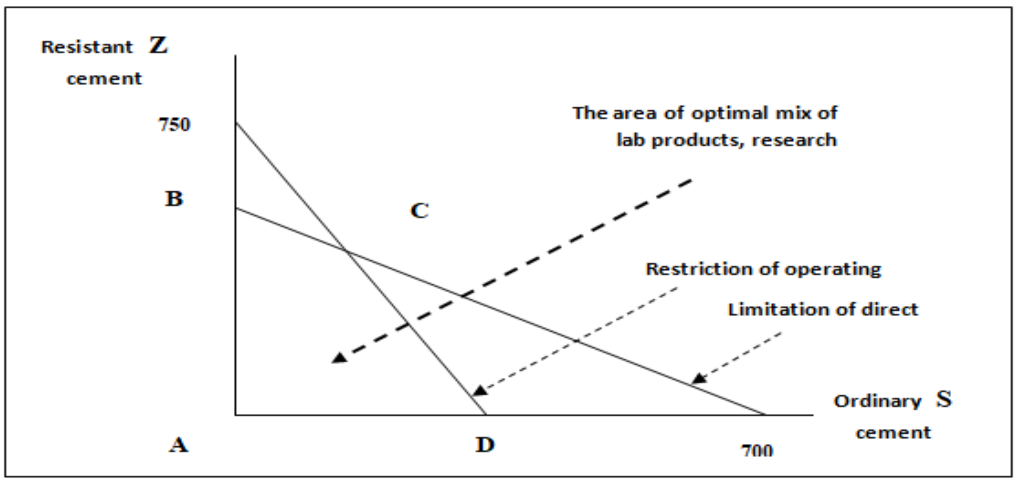
**Table (3)** Calculating the Value Of (X) And (Y) For the Direct Work Hours and Machine Operating Hours

| (Z,S | Z | S | LIMITATIONS |
|---|---|---|---|
| (525 ، 700) | Z = 2100 ÷ 4 = 525 | S = 0 | Direct working hours |
| | ص = 0 | S = 2100 ÷ 3 = 700 | |
| (750 ، 500) | Z= 1500 ÷ 2 = 750 | S = 0 | Machinery Operating Hours |
| | Z = 0 | S = 1500 ÷ 3 = 500 | |

**Source:** Prepared by The Researcher.

It is evident from the above table that the value of (S) for the direct labor hours constraint is 700 and the value of (Z) 525, either for the constraint of operating hours of machines, the value of (S) 500 and the value of (S) 750, and accordingly, the graph can be prepared to determine the optimal mix of producers as follows:

**Figure (1)** Determine the Optimal Mix of Lab Products for The Research Sample




**Source:** Prepared by The Researcher.

It is noticed through the above figure, that the optimal mix of laboratory products of the research sample is located in the region (A, B, C, D), which is the region that can achieve for this laboratory the optimal solution that leads to achieving the maximum possible output contribution return, so the output contribution return must be calculated At each of these points, and after that the maximum output contribution return that the laboratory can achieve is determined, meaning that the point that achieves the highest output contribution return represents the optimal solution that leads to maximizing the value of the contribution return in the laboratory, and the maximum return on the output contribution of the plant producers can be calculated from Through the following schedule:

**Table (4)** Calculation of The Maximum Return on The Output Contribution of The Producers of Regular and Resistant Cement

| أقصى عائد مساهمة المخرجات ( Z16000 + S 12000) | Quantity produced and sold - tonnes | | POINTS |
|---|---|---|---|
| | Z (resistant cement) | Q (regular cement) Y (resistant cement) | |
| 0 = (0)16000 + (0)12000 | 0 | 0 | A |
| = (500)16000 + (0)12000 8000000 | 500 | 0 | B |
| (400)16000 + (200)12000 8800000 = | 400 | 200 | C |
| = (0)16000 + (350)12000 4200000 | 0 | 350 | D |

**Source:** Prepared by The Researcher.

It is clear from the above table that point (C) represents the ideal solution through which the return of the output contribution can be maximized at 8,800,000 dinars, and therefore the optimal plan is to produce and sell 200

tons of the regular cement product and 400 tons of the resistant cement product during the year. Thus, the philosophy of optimal production technology can help the management accountant in determining the optimal mix of products and thus help in rationalizing the decisions of the production mix and managing the restricted resources effectively and efficiently, as the philosophy of optimal production technology deals with all the elements of cost except the cost of direct materials as a period cost. The decision of the production mix is represented in point (C) as it achieves the highest possible contribution return if 200 tons of regular cement are produced and sold and 650 tons of resistant cement are produced and sold during the year. Suitable for determining the optimal mix of its products and managing the constrained resources. Accordingly, the research hypothesis has been proven.

## CONCLUSIONS AND RECOMMENDATIONS

### *Conclusions*

1. The philosophy of optimal production technology is a general philosophy of the company's management, which seeks to help the management to re-examine and evaluate its activities in light of activity restrictions or restrictions, which may be material or may relate to the administrative policies of this company.
2. The Optimum Production Technology philosophy aims to improve the company's ability to generate profits through an interconnected series of operations in the presence of a set of system constraints.
3. The philosophy of optimal production technology is based on a set of assumptions, the most important of which is the existence of one or more restrictions that impede the ability of the economic unit to achieve the required level of performance.
4. There are five main steps to implementing the optimal production technology philosophy, which are definition or determination, determination, dependency, activating the record and then returning to the starting point. These steps are repeated over and over until the restriction is broken.
5. The philosophy of optimal production technology is important in making decisions about the optimal product mix in companies as well as improving the effectiveness of these decisions.

### *Recommendations:*

1. The necessity to develop cost accounting systems in line with the concept of optimizing production technology philosophy in order to identify the system’s constraints and address them properly.
2. The necessity to efficiently and effectively manage the constraints faced by the company in order to succeed in achieving the required level of performance and achieving the goals effectively and efficiently.
3. Adherence to the assumptions and principles of the philosophy of optimal production technology and their correct understanding, due to the change in the cost structure in a manner that is compatible with the environmental requirements.

4. Emphasis on adherence to the five steps to implement the philosophy of optimal production technology in order to reach the set objectives effectively and efficiently.
5. The necessity of using the philosophy of optimal production technology in making decisions about the optimal mix of products in order to help improve the effectiveness of these decisions.

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