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# Analysis of Equipment Layout Factors in Oil and Gas Companies

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***ABSTRACT***

*The equipment layout is one of the essential aspects of the smooth production of oil and gas companies. For this reason, this research investigates the determinants in determining the plan of oil and gas companies. Descriptive research methods used to describe any factors that become the layout. The survey conducted on 63 employees working in oil and gas companies. The results showed that the critical factors that formed the equipment layout were safety, easy operation facilities, easy maintenance facilities, preventing the spread of fire, consideration of expansion, and economic costs.*

*Keywords: layout, equipment, smooth production.*

## INTRODUCTION

One of the oldest engineering activities is to arrange the location of the factory and handle the transfer of production unit materials and supporting materials such as spare parts. The layout of the equipment is related to the planning of the preparation of physical facilities such as machinery and other equipment and the amount of labor needed in the production unit.

In contrast, the role of the equipment layout is to form a smooth flow of material or energy and optimum distance so that the production process can take place efficiently.

Material flow is also supporting material for spare parts in the factory is the artery of production. Therefore the layout must be designed mature so that it does not cause an intricate flow pattern. The layout that is not goodwill causes an imbalance in the flow of material and information. As a result, material transportation costs are considerable. Conversely, a practical layout can provide a pleasant working climate and improve the efficiency of the production process.

The factory layout can define as a procedure for managing factory facilities to support the management of the production process.

(Krajewski, Lee, Malhotra, Manoj & Ritzman, 2016) The design of facilities is one of the critical terms in the preparation of physical elements of factories and also services such as warehousing, post offices, shops, restaurants, and hospitals. Home Industry is one that requires facility design, including design and production layout arrangements.

The problem that often encountered in the layout arrangement is whether the settlement of all production facilities has made as well as possible so that it can achieve the most efficient production process and can support the continuity and smoothness of the production process optimally (Stevenson & Chuong, 2014; Foster & Sidharta, 2019).

Layout arrangement is a necessary arrangement in a company. An excellent method will optimize the relationship between operators, machine tools, material flow, and information flow to achieve business goals, but layout problems are still frequently encountered in the industry. (Mahmood, Rahman, Deros & Mazli, 2011) If this layout problem is left, the company will eventually have difficulty competing with other similar companies.

At the same time, but with a smoother production process, the company's production volume will increase. At the same time, a poor layout can disrupt the continuous production process and will affect the overall system. The company's ability to expedite the production process will change production volumes, reduce production costs, and ultimately increase company profits.

Based on the problem formulation above, the purpose of this study is to determine the equipment layout factors in the Oil and Gas Company.

## RESEARCH METHODS

The research method used is a cross-sectional category, ie, information from a portion of the population (sample of respondents) is collected directly from the location empirically to find out the opinions of some people on the object under study.

Based on the formulation of the problem proposed, the variables used in this study are equipment layout utilizing the concept of Heizer & Render (2016) and company technical guidelines, namely a form of production operation facility design, analyzing, forming an idea, and also at the same time realizing a goods manufacturing system or services in a company.

The research sample is 63 employees working in oil and gas companies in the Java area. In interpreting and analyzing data, descriptive analysis and verification analysis used. Descriptive analysis intended to describe the characteristics of respondents.

## RESULTS AND DISCUSSION

The layout of the equipment measured in 6 dimensions, namely safety, secure operating facilities, easy maintenance facilities, preventing the spread of fire, consideration of expansion, and economic costs.

The security dimension stated to be quite good, and this indicates that security for employees at work is adequate. The lowest value of this dimension is the question "There are data protection arrangements" this shows that the data protection facilities provided by the company are still inadequate.

The dimensions of operating facilities that quickly stated are good enough, and this indicates that the factory operating facilities are sufficient. The lowest value of this dimension is the question "The company makes it easy to mobilize personnel at production facilities," this shows that the company is still inadequate in providing facilities for the mobilization of personnel at production facilities.

The description of the results of this study is consistent with the results of research conducted by Nguyen, Voldsund, Elmegaard, Ertesvåg & Kjelstrup (2014).

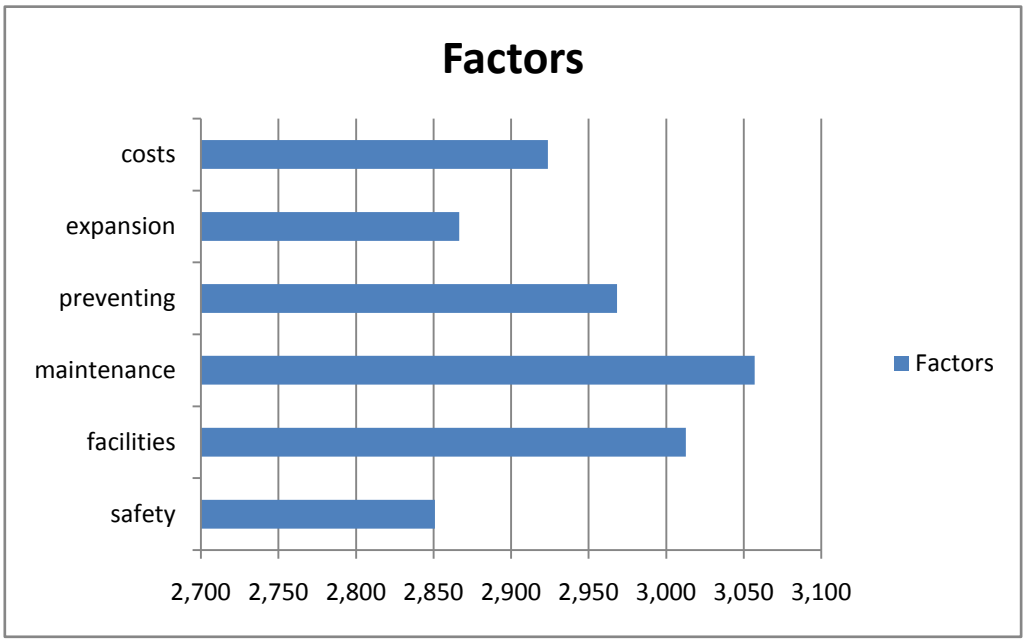
The dimensions of maintenance facilities that quickly stated are good enough, and this indicates that the treatment facilities owned by the company are adequate. The lowest value of this dimension is the question "The company builds facilities by considering the ease in mobilizing maintenance work tools," this shows that the company is still inadequate in considering the ease of mobilization of maintenance work tools.

The dimension of preventing the spread of fire stated to be quite good, and this indicates that the company is adequate in preventing the spread of fire. The lowest value of this dimension is in the question "The company builds facilities with the placement of equipment following applicable rules.", This description shows that there are still equipment placement failures that are not following applicable rules.

The dimensions of considerations for expansion stated to be quite good, and this indicates that the company is sufficient in considering expansion in the future. The lowest value of this dimension is the question "The company always considers the provision of needs for consumers," this shows that the company is still inadequate in providing the needs for consumers.

The economic cost dimension stated to be quite good, and this indicates that the company is sufficient in considering economic costs in managing the facility. The lowest value of this dimension is in the question "Equipment used in handling raw materials following the planned production," this shows that there is still equipment used in handling raw materials inadequate production.

Table 1. Results of Equipment Layout Factors



Recapitulation of the results of respondents' answers regarding the layout of equipment has an average of 2,947, and this indicates that the layout of the material is very varied; therefore, there is still a need for efforts to improve the layout of the equipment more evenly.

Based on the results of the research descriptively layout of the equipment is known that it can conclude that the layout variable with an average is quite good. In this layout variable, the most prominent dimension is security, while the smallest size is accessible maintenance facilities. The highest aspect is security protection for workers, and the minor element is the ease in mobilizing maintenance work tools. In the current condition of the company, it is clear that the company has a working principle that safety is the first thing/safety first, and there are several conditions in the location of the mobilization of work equipment that is less clever, and this is something that needs to improve. (Witter, Tenney, Clark & Newman, 2014).

According to Joseph, Gunasekaran, Musa, El -Berishy, Abubakar & Ambursa (2013) While the characteristics of the respondents also affect the current state of the company, where the educational factors of which most undergraduate as much as or about 96% of total respondents understand well about the rules of work safety are the main factors in working for oil companies and natural gas.

## CONCLUSIONS

The overall condition of the equipment layout is in the category of good enough, with the highest average value is security. This result can be understood because the oil and gas company holds the principle, "safety first at work/safety first," while the smallest dimension is accessible maintenance facilities. The highest aspect is the security protection of labor. While the lowest point is the ease of mobilization of maintenance work tools, the equipment layout is one of the elements that need to consider because if the layout is well structured, the production process will run well, and maintenance activities will be easy.

To improve the layout of the management of the production process, oil and gas companies expected to further enhance the layout of the equipment, especially for aspects: ease in mobilizing maintenance work tools. Concrete steps that need to be taken by oil and gas companies, improving the layout of equipment, include: building production facilities by considering aspects of ease in mobilizing adequate maintenance work tools for maintenance activities. In addition to the engineering function, maintenance functions must also be involved in planning the construction of production facilities. As well as creating or making practical procedures regarding equipment layout.

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