# The Effect Of the Implementation of *Plant Lay Out* the Right and Availability of Raw Materials on the Production Flow In Indo Karuna Steel

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| Article Info | Abstract: |
|---|---|
| | This study aims to determine the effect of *Plant Layout* and the availability of raw materials on the smooth production at PT. Indo Karuna Steel. The method used is *explanatory research* with analytical techniques using statistical analysis with regression testing, correlation, determination and hypothesis testing. The results of this study *Plant Layout* has a significant effect on the smoothness of production by 46.4%, the hypothesis test obtained t count> t table or (7.390> 1.998). The availability of raw materials has a significant effect on the smooth production of 45.9%, the hypothesis test is obtained t count> t table or (7.304> 1.998). *Plant Layout* and the availability of raw materials simultaneously have a significant effect on the smoothness of production by 57.1%, the hypothesis test obtained F count> F table or (41.268> 2.750).<br><br>**Keywords**: *Plant Layout, Availability of Raw Materials, Smooth Production.* |

## INTRODUCTION

The current global crisis affects the Industrial Presence in Indonesia. At present the industrial sector has suffered from a prolonged crisis, which has caused many businesses to experience difficulties or obstacles in carrying out their business activities. In fact, many companies have gone bankrupt due to the prolonged crisis. For that the company is required to find a way out to overcome the situation, one of the most possible and realistic ways that can be taken by the company is to increase efficiency in all factors, one of these factors is by planning, structuring the existing production facilities at the company. PT. Indo Karuna Steel, located in the Cibitung Industrial area.

Production layout is a layout of facilities used to make the production process run effectively and efficiently (*Gitosudarmo Indriyo*, 2002: 185). Product produced. PT. Indo Karuna Steel is a company producing steel plate materials. PT. Indo Karuna Steel is a company that has supporting facilities for the production process from beginning to end. The choice of layout type used by a

company depends on the type of operation and production process of a company. This is intended to optimize the management of production factors and also to achieve a smooth production flow within the company, in order to obtain efficiency from the production process carried out by the company concerned.

A company will mostly face layout problems . A layout arrangement can be done by the company to optimize the management of production factors, namely the preparation of an efficient facility layout. Layout or layout that is well planned and coordinated is expected to maintain the smooth production process, optimize the machine-machine arrangement, also will maintain the survival or success of a company. With an *layout layout* optimal, it is expected to be able to carry out the production process within the company well.

Establishing a *layout* that will be used by a company must also consider various operational decisions that have been made previously. Operational decisions related to the layout are the product design, location, process and company capacity. Layout planning in general aims for companies to make arrangements for labor, available space, equipment or facilities used so that all kinds of flow in the company in the form of formations and materials can run effectively and efficiently. An effective layout will be able to support the implementation of a predetermined business strategy.

If the existing layout is *optimal* or cannot be optimized anymore,not performed *relayout is*. Thus the existing layout is still used. With the existence of the *relayout* , it is expected to be able to make a positive contribution to the company, such positive contribution for example by increasing employee comfort, increasing production security and increasing company productivity.

As experienced by other companies in general. PT. Indo Karuna Steel is also not free from the tightness of the tight market competition. To be able to survive, PT. Indo Karuna Steel needs to make improvements in its internal environment, one of which is to review the production facilities that have been implemented. It was intended to find out how much the level of efficiency and effectiveness of the production layout that had been carried out at PT Rumpun Sari Kemuning.evaluation *Layout* can be done by using distance load analysis and time analysis methods. The evaluation carried out aims to determine whether the existing layouts can be further optimized. Thus the company management can make the decision whether or not layout needs to be held. Machine processes and materials used always require *layouts* newto support the activities of a company.

According to Pangestu Subagyo (2000: 88) a company determines the layout based on several considerations including production systems, production processes, available production facilities, available resources, and material flows that occur in the company.

Another factor that is also important in production is the availability of raw materials, namely inventory purchased by companies to be processed into semi-finished goods and finally finished goods or final products from the company (Syamsuddin, 2001: 281). All companies that produce to produce one or several kinds of products will always need raw materials for the implementation of the production process. Raw materials are important inputs in various production. Lack of available raw materials can result in the cessation of the production process due to the exhaustion of raw materials for processing.

However, too much raw material can cause a high inventory in the company that can cause various risks and high costs incurred by the company against the inventory. Understanding Raw Materials according to Hanggana (2006: 11) is something that is used to make finished goods, materials must stick together with the finished goods. In a company, raw materials and auxiliary materials have a very important meaning, because they are the capital of the production process until the production results. The grouping of raw materials and auxiliary materials is aimed at controlling the materials and charging the cost of goods manufactured. Material control is prioritized for materials with relatively high value, namely raw materials.

In times of increasingly advanced development, companies often make internal changes in anticipation of business shifts. These changes can be associated with efforts to optimize the problem of the use of production time, line balance and labor, therefore the company needs to evaluate whether the layout currently used is in accordance with these internal changes. Based on the description above, it can be appointed to analyze the *layout* at PT. umpun Sari Kemuning and make in the title "The Effect of *Plant Layout* and the availability of raw materials on the smooth production at PT. Indo Karuna Steel.

*Plant Layout*

Layout is an important decision that determines the efficiency of an operation in the long run. The layout has many strategic impacts because the layout determines the company's competitiveness in terms of capacity, process, flexibility, cost and quality of work environment. According to Lee Krajewski, Larry Ritzman, and Manj Malhotra (2007: 302) which means, "Layout is a plan that involves decisions regarding the preparation and arrangement of the layout of a center of economic activity needed by each facility that has a variety of processes"

Availability of raw materials

In a company, every operational manager is required to be able to manage and hold inventory in order to create the effectiveness and efficiency of operational activities. And according to Rangkuti (2007) Raw material inventory is: "Raw material inventory has an important position in the company because the supply of raw materials has a very big influence on the smooth production process."

Smooth productionproduction

Aprocess can be said to be smooth if the production process does not experience obstacles in producing an item, so it can produce products that are in accordance with the planned quantity and quality and the results of the production process can be completed. The definition of smooth production according to the Big Indonesian Dictionary (2015) is "Current going fast or moving forward quickly, while smoothness is a state of smoothness (something) development is very dependent on the facilities, energy and costs available"

## RESEARCH METHODOLOGY

Population in this study amounted to 65 respondents PT. Indo Karuna Steel. Sampling technique in this study is saturated sampling, where all members of the population are sampled. Thus the sample in this study amounted to 65 respondents. Type of research used is associative, where the aim is to find out the relationship between variables. In analyzing the data used instrument test, classical assumption test, regression, coefficient of determination and hypothesis testing.

## RESEARCH RESULTS AND DISCUSSION

Descriptive Analysis

This test is used to determine the minimum and maximum, *scoresmean scores* and standard deviations of each variable. The results are as follows:

Table 1. Results of Analysis *Descriptive Statistics*

Descriptive Statistics

|  | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| Plant Layout (X1) | 65 | 31 | 48 | 38.17 | 4,259 |
| Availability of Raw Materials (X2) | 65 | 31 | 49 | 38.40 | 3,778 |
| Production Smoothness (Y) | 65 | 33 | 46 | 39.37 | 3,520 |
| Valid N (listwise) | 65 |  |  |  |  |

*Plant Layout* obtained a *variance* minimum of 31 and a *maximum variance of* 48 with a *mean score* of 3.81 with a standard deviation of 4.259. The availability of raw materials obtained a *variance* minimum of 31 and a *maximum variance of* 49 with a *mean score* of 3.84 with a standard

deviation of 3.778. Production smoothness obtained a *variance* minimumof 33 and a *maximum variance of* 46 with a *mean score* of 3.93 with a standard deviation of 3.520.

2   Verification Analysis.
This analysis is intended to determine the effect of independent variables on the dependent variable. The test results are as follows:
a.   Multiple Linear Regression Analysis
This regression test is intended to determine changes in the dependent variable if the independent variable changes. The test results are as follows:

Table 2. Results of Multiple Linear Regression Testing

Coefficients[a]

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 11,096 | 3,154 | | 3518 | .001 |
| | Plant Layout .352 .087 .426 .000 | | | | 4,033 | (X1) |
| | Availability of Raw Materials .386 .098 .415 .000 | | | | 3,927 | (X2) |

a. Dependent Variable: Smooth Production (Y)

Based on the test results in the above table, the regression equation Y = 11.096 + 0.352X1 + 0.386X2 is obtained. From the equation explained as follows:
   1)   A constant of 11,096 means that if there is no *Plant Layout* and the availability of raw materials, then there has been a smooth production value of 11,096 points.
   2)   regression coefficient *Plant Layout* of 0.352, this number is positive meaning that every time there is an increase in *Plant Layout* of 0.352, the smooth production will also increase by 0.352 points.
   3)   Regression coefficient of raw material availability by 0.386, this number is positive meaning that every time there is an increase in the availability of raw materials by 0.386, the smooth production will also increase by 0.386 points.

b.   Correlation Coefficient Analysis Correlation
   Coefficient analysis is intended to determine the degree of relationship strength of the independent variables on the dependent variable either partially or simultaneously. The test results are as follows:

Table 3. Test Results ofCorrelation Coefficients *Plant Layout* Against Smooth Production.

Correlations[b]

| | | Plant Layout (X1) | Production Smoothness (Y) |
|---|---|---|---|
| Plant Layout (X1) | Pearson Correlation | 1, | 681[**] |
| | Sig. (2-tailed) | | .000 |
| Production Smoothness (Y) | Pearson Correlation. | 681[**] | 1 |
| | Sig. (2-tailed) | .000 | |

**. Correlation is significant at the 0.01 level (2-tailed).

b. Listwise  N = 65

Based on the test results obtained a correlation value of 0.681 means that *Plant Layout* has a strong relationship to the smooth production.

Table 4. Correlation Coefficient Testing Results Availability of raw materials Against Production smoothness.

Correlations[b]

| | | Availability of Raw Materials (X2) | Production Smoothness (Y) |
|---|---|---|---|
| Availability of Raw Materials (X2) | Pearson Correlation | 1 | .677** |
| | Sig. (2-tailed) | | .000 |
| Production Smoothness (Y) | Pearson Correlation | .677** | 1 |
| | Sig. (2-tailed) | .000 | |

**. Correlation is significant at the 0.01 level (2-tailed).

b. Listwise  N = 65

Based on the test results obtained a correlation value of 0.677 means that the availability of raw materials has a strong relationship to the smooth production.

Table 5. Test Results of Correlation Coefficient *Plant Layout* and Simultaneous Availability of raw materials Against Production smoothness.

Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .756[A] | .571 | .557 | 2.343 |

a. Predictors: (Constant), Availability of Raw Materials (X2), Plant Layout (X1)

Based on the test results obtained a correlation value of 0.756 means that *Plant Layout* and the availability of raw materials simultaneously have a strong relationship to the smooth running of production.

c.   Determination Coefficient Analysis Determination
Coefficient analysis is intended to determine the percentage of influence of the independent variable on the dependent variable either partially or simultaneously. The test results are as follows:

Table 6. Test Results for Coefficient Determination *Plant Layout* of Production Smoothness.

Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .681[a] | .464 | .456 | 2,597 |

a. Predictors: (Constant), Plant Layout (X1)

Based on the test results obtained by the value of determination of 0.464 means that *Plant Layout* has an influence contribution of 46.4% on the smooth production.

Table 7. Test Results for the Determination Coefficient The availability of raw materials for production smoothness

Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .677[a] | .459 | .450 | 2,611 |

a. Predictors: (Constant), Availability of Raw Materials (X2)

Based on the test results obtained a determination value of 0.459 means that the availability of raw materials has a contribution of 45.9% of the smooth production.

Table 8. Test Results forDetermination Coefficient *Plant Layout* and Raw Material Availability on Production Smoothness.

Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .756[A] | .571 | .557 | 2.343 |

a. Predictors: (Constant), Availability of Raw Materials (X2), Plant Layout (X1)

Based on the test results obtained a determination value of 0.571 means that *Plant Layout* and availability of raw materials simultaneously have an influence contribution of 57.1% to the smooth running of production, while the rest of 42.9% influenced by other factors.

d. HypothesisHypothesis

Test PartialTest (t test)

Hypothesis testing with t test is used to find out which partial hypotheses are accepted.

First Hypothesis: There is a significant influence between *Plant Layout* on the smooth production.

Table 9. Results of theHypothesis Test *Plant Layout* Against Smooth Production.

Coefficients[a]

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 17,873 | 2,927 | | 6.107 | .000 |
| | Plant Layout .563 .076 .681 | | | (X1) | 7,390 | .000 |

a. Dependent Variable: Production Smooth (Y)

Based on the test results in the table above, the value of t arithmetic> t table or (7.390> 1.998), thus the first hypothesis proposed that there is a significant influence between *Plant Layout* on the smooth running of production is accepted.

Table 10. Hypothesis Test Results Availability of raw materials Against Production smoothness.

Coefficients[a]

| Model | | Unstandardized Coefficients | | Standardized Coefficients | | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | t | |
| 1 | (Constant) | 15,142 | 3,333 | | 4543 | .000 |
| | Availability of Raw Materials .631 .086 .677 7,304 | | | | (X2) | .000 |

a. Dependent Variable: Production Smooth (Y)

Based on the test results in the table above, the value of tcount> t table or (7.304> 1.998) is obtained, thus the second hypothesis is proposed that there is a significant influence between the availability of raw materials on the smooth production is accepted.

Simultaneous Hypothesis Test (F Test)
Hypothesis testing with the F test is used to find out which simultaneous hypothesis is accepted.
The third hypothesis There is a significant influence between *Plant Layout* and the availability of raw materials on the smooth production.

Table 11. Results ofHypothesis Tests *Plant Layout* and Availability of Raw Materials Against Smooth Production.

ANOVA[a]

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 452,912 | 2 | 226,456 | 41,268 | .000[b] |
| | Residual | 340,226 | 62 | 5,488 | | |
| | Total | 793,138 | 64 | | | |

a. Dependent Variable: Smooth Production (Y)

b. Predictors: (Constant), Availability of Raw Materials (X2), Plant Layout (X1)

Based on the test results in the table above, the calculated F value> F table or (41.268> 2.750), thus the third hypothesis is proposed that there is an influence significant between *Plant Layout* and the availability of raw materials to the smooth production is accepted.

**DISCUSSION RESEARCH RESULTS**

1. Effect of *Plant Layout* Against Smooth Production
   *Plant Layout* has a significant effect on smooth production with a correlation of 0.681 or has a strong relationship with a contribution of 46.4%. Hypothesis testing obtained t value> t table or (7.390> 1.998). Thus the first hypothesis proposed that there is a significant effect between *Plant Layout* on the smooth production is accepted.
2. Effect of Availability of Raw Materials on Production Smoothness
   Availability of raw materials has a significant effect on production smoothness with a correlation of 0.677 or has a strong relationship with a contribution of 45.9%. Hypothesis testing obtained t value> t table or (7.304> 1.998). Thus the second hypothesis proposed that there is a significant effect between the availability of raw materials on the smooth production is accepted.

3. The Effect of *Plant Layout* and Availability of Raw Materials on the Smooth Production of
   *Plant Layout* and the availability of raw materials have a significant effect on the smoothness of production by obtaining a regression equation $Y = 11.096 + 0.352X1 + 0.386X2$, the correlation value of 0.756 or has a strong relationship with the contribution of influence of 57, 1% while the remaining 42.9% is influenced by other factors. Hypothesis testing obtained F value> F table or (41.268> 2.750). Thus the third hypothesis proposed that there is a significant effect between *Plant Layout* and the availability of raw materials on the smooth production is accepted.

**CONCLUSION**

   *Plant Layout* has a significant effect on the smooth production with a contribution of 46.4%. Hypothesis testing obtained t count> t table or (7.390> 1.998). The availability of raw materials has a significant effect on the smooth production with a contribution of 45.9%. Hypothesis testing obtained t value> t table or (7.304> 1.998). *Plant Layout* and availability of raw materials have a significant effect on the smooth production with a contribution of 57.1% while the remaining 42.9% is influenced by other factors. Hypothesis testing obtained the value of F count> F table or (41.268> 2.750).

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