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Proceeding

6th INTERNATIONAL SEMINAR ON INDUSTRIAL ENGINEERING AND MANAGEMENT (6th ISIEM)

"Sustainable innovation on enhancing industrial management, technology, and information"

Harris Hotel Batam Center, Batam, Indonesia
February 12th - 14th, 2013

Organized by:

PASUNDAN UNIVERSITY

UAI Universitas Al Azhar Indonesia

TRISAKTI UNIVERSITY

ATMA JAYA

Supported by:

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Supported by :

Indonesian Industrial Engineering Higher Education Association

FOREWORD

In this 6th International Seminar on Industrial Engineering and Management (ISIEM) Seminar issues is **Sustainable on Enhancing Industrial Management, Technology, and Information**, and wide area of Industrial Engineering including Quality Engineering, Supply Chain Management, Production System, Operation Research, Decision Support System, Ergonomics, Artificial Intelligent, Industrial Management, and Entrepreneurship.

All of papers received were review by a peer of reviewers and published for 55 papers from various Indonesian University and abroad, and be presented by 52 presenters.

Historical, the ISIEM is an annual seminar event organized by 6 universities that run Industrial Engineering Department, which are Triskati University Jakarta, Atmajaya Catholic University Jakarta, Tarumanagara University Jakarta, Esa Unggul University Jakarta, Al-Azhar Indonesia University Jakarta, and Pasundan University Bandung. The seminar took different places annually in all over Indonesia.

I would like to thank you to all committees for the efforts, all Reviewers, Mr. Predeep Nair from Schneider Manufacture Batam, Prof. Dr. Rosnah Mohd. Yusuff from Department of Mechanical and Manufacturing Engineering Universiti Putra Malaysia, Prof. Frits Blessing from Rotterdam University/Rotterdam Business School, for the Keynote Speeches, all Participants to join the Seminar, and everybody who helped us to make this seminar happen.

At last, enjoy your stay in Batam and have a good Seminar.

Ir. Wahyukaton, MT.
(Pasundan University Bandung)

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A G E N D A

Day 1 (February 12th, 2013)

Opening ceremony

Gala Dinner

Keynote #1

Mr. Pradeep Nair

Plant General Manager PT Schneider Electric Manufacturing Batam

Day 2 (February 13th, 2013)

Keynote #2

Prof Rosnah Mohd Yusuff

Department of Mechanical and Manufacturing Engineering, Faculty of Engineering, Universiti Putra Malaysia

"Innovations In Manufacturing For Sustainable Growth"

Coffee Break

Parallel Session #1

Lunch

Keynote #3

Prof. Frits Blessing

DINALOG & Rotterdam University of Applied Sciences

"I Have To Change To Stay The Same"

Coffee Break

Parallel Session #2

Day 3 (February 14th, 2013)

Tour to Singapore

TABLE OF CONTENT

SCM – Supply Chain Management

OR – Operation Research

ER – Ergonomics

ER – Ergonomics

DSS – Decision Support System and Artificial Intelligence

PS – Production System

PS – Production System

IM – Industrial Management

CERTIFICATE

Present to:

Lina Gozali

as

Presenter

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THE PROPOSED LAYOUT DESIGN USING FACTORY SYSTEMATIC LAYOUT PLANNING METHOD AT PT. JASA LAKSA UTAMA

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[1,2]Lecturer at Industrial Engineering Department, Tarumanagara University, Jakarta
[3]Student at Industrial Engineering Department, Tarumanagara University, Jakarta
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ABSTRACT

PT. Jasa Laksa Utama is a manufacturing company that produces conveyors for material handling in mining coal industry. The great development in this similar industries that cause emerging PT. Jasa Laksa Utama to continue expanding in order to enhance productivity and effectiveness to meet the desires and customer satisfaction. But things happen in the real situation are still barriers that prevent optimal productivity of the company. This is because they lack of good plant layout that exist today, especially in the production. Using Systematic Layout Planning methods based on the comparison of the calculation of the Material Handling Planning Sheet (MHPS) initial plant layout with Material Handling Evaluation Sheet (MHES) proposed layout would be advised to the company. It is expected that the proposed plant layout design can better lead to increased productivity and efficiency of the PT. Jasa Laksa Utama.

Key words: *Systematic Layout Planning, Material Handling Planning Sheet (MHPS), Material Handling Evaluation Sheet (MHES).*

1. INTRODUCTION

PT. Jasa Laksa Utama is one of the manufacturing company that producing a material control, namely the manufacture of conveyor which focused on the removal of coal. To remain competitive and produce products in accordance with the desires of consumers, these companies should have the line of the production process effectively and efficiently.

PT. Jasa Laksa Utama required layout in accordance with the process of working to achieve the production process, because during the production process running on PT. Jasa Laksa Utama assessed as having shortages caused by the process of repetition that does not comply with the order of the production process.

In this research, data collection will be cycle time, operation mapping, routing sheet, MPPC (multi-product process chart), calculate area, MHPS calculation (material handling planning sheet), followed by the processing of data, such as the manufacture of FTC (from to chart), ARD (area relationship diagram), AAD (area allocation diagram), MHES (evaluation sheet material handling), and manufacturing layouts to support systematic layout planning aimed at proposing improvements in the production plant layout.

2. THEORETICAL BACKGROUND

The layout is a major cornerstone in the industrial world. Factory layout can be defined as a procedure for setting the factory facilities to support the smooth production process. In general, the layout of a well-planned plant will also determine the efficiency and in some cases will also maintain the viability or success of the industry's employment.

Plant Lay Out Method

1. Form To Chart
   From To Chart is sometimes also referred to as trip frequency chart or travel chart is a commonly used conventional techniques for factory layout planning and material movement in a production process is very useful technique for the conditions in which a lot of items that flow through the area such as job shop, machining workshop, office

and others. From to chart will show the total of the weight of the load to be moved, the material displacement distance, volume or combinations of these factors.

2. Activity Relationship Diagram
   Activity relationship diagram is a block diagram showing the relationship approach activity, which shows each activity as a single activity model (no suppression chamber).

3. Making Area Allocation Diagram
   Area Allocation Diagram is a tool that is closest to the actual layout of the plant, which will make the allocation of facilities in activities such as the production plant, office, plant service, warehouses and dormitories and other facilities.

4. Preparation of Material Handling Evaluation Sheet
   It is a calculation sheet that will result in the total costs required to transfer each material on the production floor.

5. The depiction of a New Map Of The Production Department
   Making a depiction in accordance will result the analysis of the AAD to be proposed as a design improvement.

3. DATA PROCESSING AND ANALYSIS

Processing begins to test the adequacy and uniformity of data from each process that occurs in the production to get the standard time. After obtaining the time process then will be continued by making a map of operating process, manufacturing process flow chart and making routing sheet (calculating the number of machines). The next sheet is a table comparing the number of machines needed in theoretical and actual number of machines (Table 2).

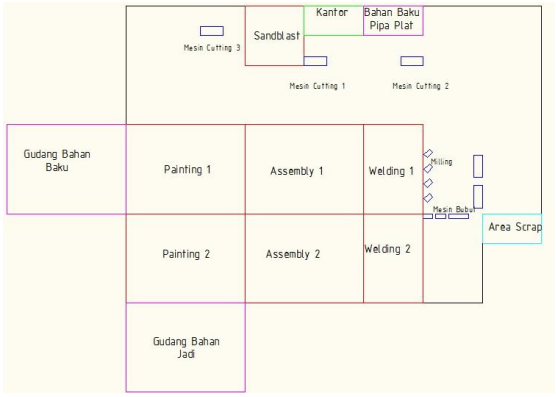


Figure 1 : Beginning Lay out of the factory

Table 1. *Multi Product Process Chart* for *Hopper*

Nama proses	*Shell*	*Rib*	*Liner*	*Stiffener*	Jumlah mesin teoritis
Raw material	S1	S2	S3	S4	-
Marking	O1	O4	O6	O8	-
Cutting	O2	O5	O7	O9	3
Drilling	O3				2
Fit Up	C1	C2	C3	C4	-
Welding	A1	A1	A1	A1	2
Assembly	A2	A2	A2	A2	2
Finishing	O10	O10	O10	O10	2
Painting	O11	O11	O11	O11	2
Checking	C5	C5	C5	C5	-
Fiinish goods	S5	S5	S5	S5	-

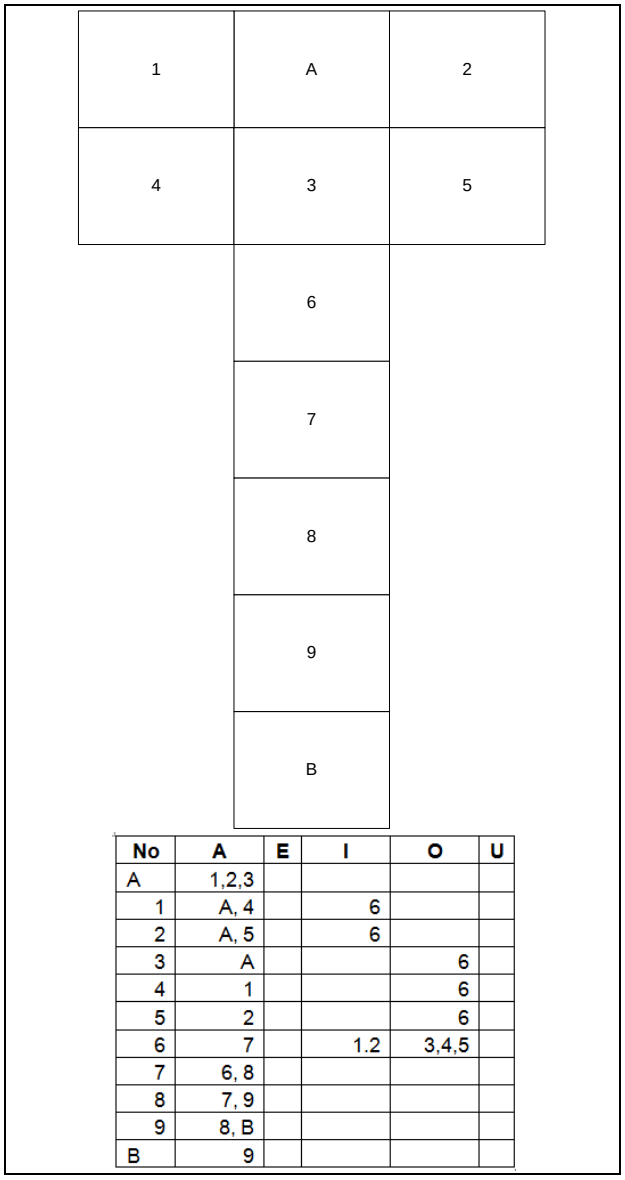
Tabel 2. Number of Lack, Excess and broken machine

No	Machine Name	Number of Theoretical Machine	Rounding Up number of theoretical machine	Number of active machine	Number of Back up Machine	Lack number of machine	Excess machine	Number of broken machine
1	*Cutting Machine*	2.38	3	3	0	0	0	0
2	*Milling Machine*	2	2	4	0	0	2	0
3	*Work Bench 1*	1.72	2	2	0	0	0	0
4	*Work Bench 2*	1.72	2	2	0	0	0	0
5	*Work Bench 3*	1.72	2	2	0	0	0	0
6	*Sandblast Room*	1.86	2	1	0	1	0	0

It can be seen that there is a shortage for 1 sandblast room machine and the excess of 2 milling machines.

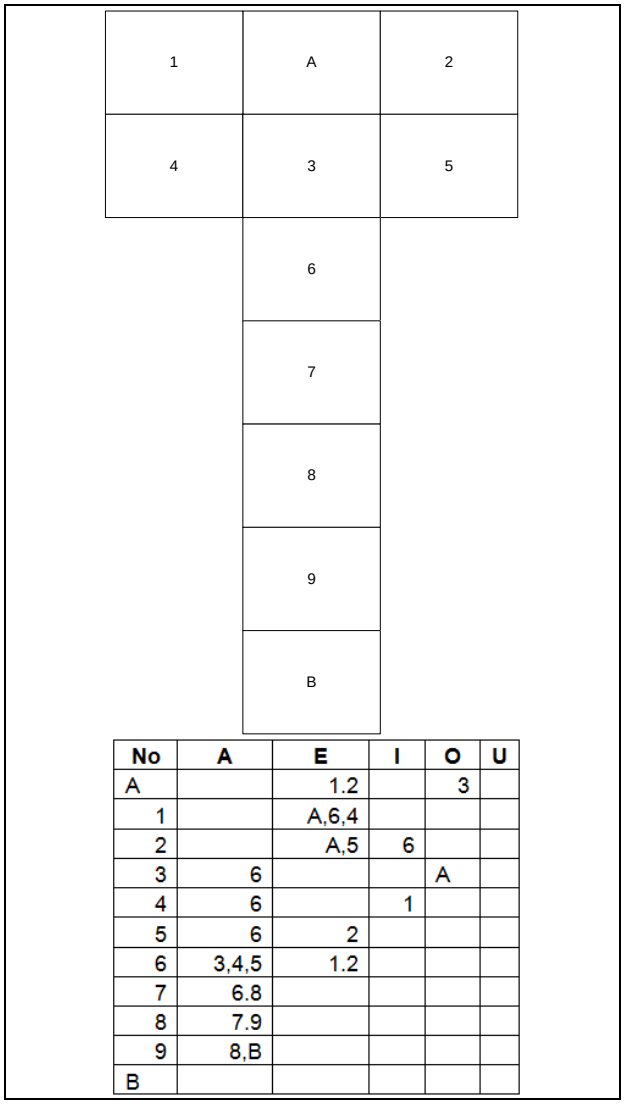
After making the comparison, it will be followed by calculating the area required based on the number of machines required theoretically totaling 3467 m². Furthermore, calculating the cost of the transfer will be made of material that occurs in the production of the initial layout intended as a comparison with the cost of removal of material proposed layout plan.

Then the next step is made from to chart based on cost, from to chart inflow and outflow from to chart as the basis for manufacturing area relationship diagram. Here is the result of the creation inflow ARD, ARD outflow along with the degree of importance.



No	A	E	I	O	U
A	1,2,3				
1	A, 4		6		
2	A, 5		6		
3	A			6	
4	1			6	
5	2			6	
6	7		1.2	3,4,5	
7	6, 8				
8	7, 9				
9	8, B				
B	9				

Figure 2 ARD *Inflow*



No	A	E	I	O	U
A		1.2		3	
1		A,6,4			
2		A,5	6		
3	6			A	
4	6		1		
5	6	2			
6	3,4,5	1.2			
7	6.8				
8	7.9				
9	8,B				
B					

Figure 3 ARD *Outflow*

After making ARD based on *inflow* and *outflow*, then will continue making AAD for *inflow* and *outflow* with material movement calculation. Following picture is about figure of AAD *inflow* and AAD *outflow.*

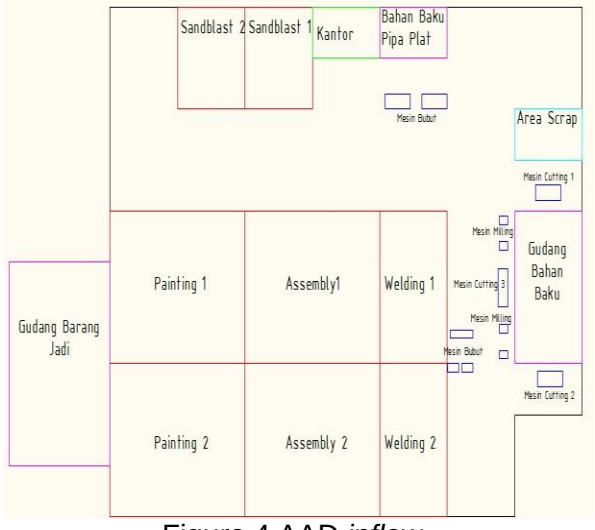


Figure 4 AAD *inflow*

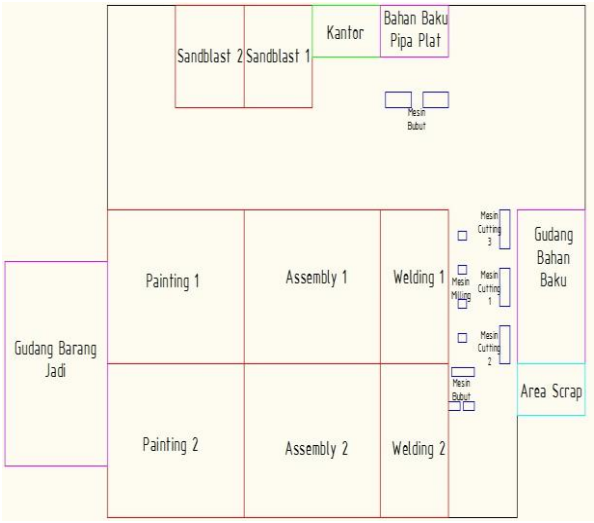


Figure 5 AAD *outflow*

Following table is comparison about cost material movement from the existing lay out with AAD *inflow* and AAD *outflow.*

Lay out type alternative	Movement Frequency per day	Total Cost Movement per day
Current MHPS	286	Rp 945.193,82
MHES *Inflow*	286	Rp 817.790,24
MHES *Outflow*	286	Rp 782.553,96

From above comparison table will obtain the information that material handling cost based on MHES *outflow* is more efficient than existing MHPS and MHES *inflow* or in other words calculating the *material handling cost* at MHES *outflow* result the small cost. Because of that, from this three lay out alternatives will be chosen as the best lay out based on AAD *outflow by PT Jasa Laksa Utama* (Figure 6). The result will reduce the number of material handling cost Rp 162.639,86 compare to existing material handling cost. Following figure describe the new lay out based on AAD *outflow*.

4. CONCLUSION

1. The Location of warehouse and cutting machine is too far, and location each cutting machine is separated too long.
2. Inefficient location between warehouse and cutting machine cause deviation in work processing map and reduce the productivity factory performance.
3. After relay out the location between warehouse and cutting machine will result the reducing material handling cost as Rp162.639,86.

5. REFFERENCE

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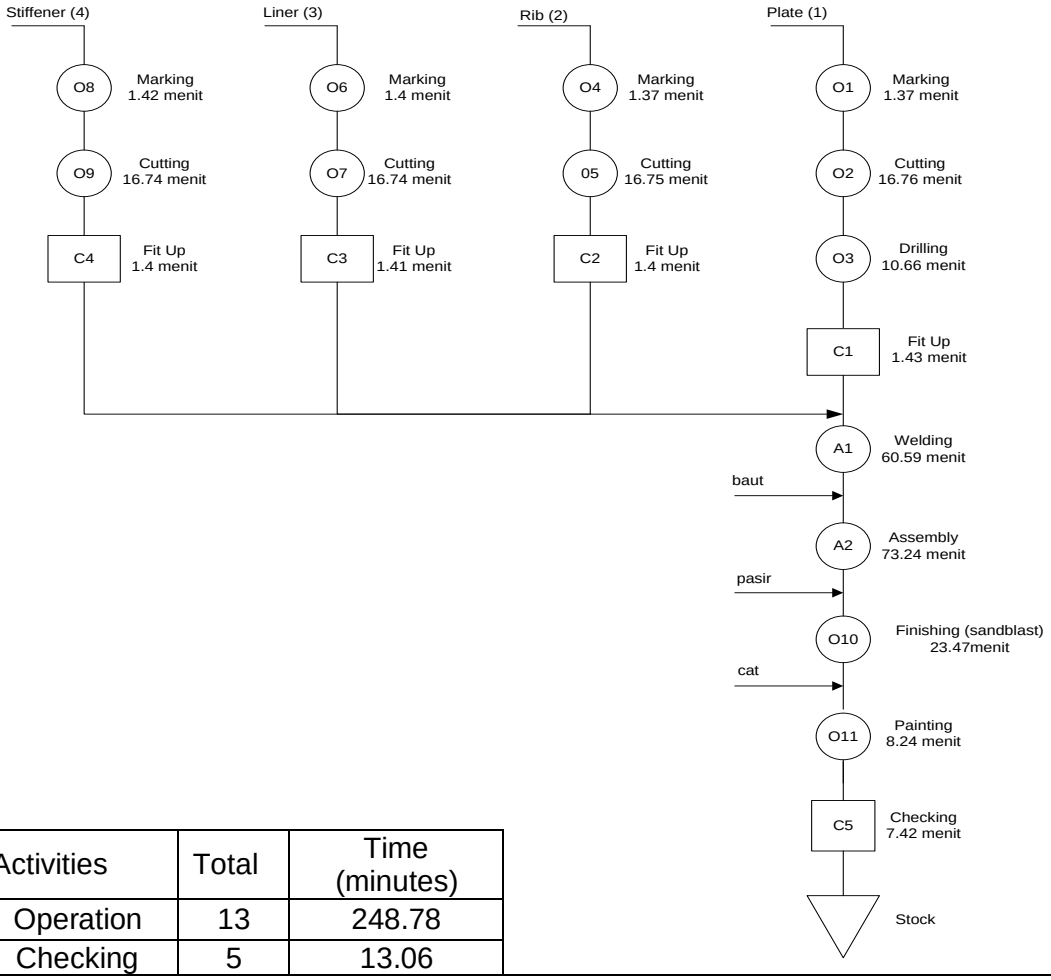
2. Tompkins, James A. (2003). *Facilities Planning*. United States of America: *Hamilton Printing Company*
3. Wignjosoebroto, Stritomo. (1996). Tata Letak Pabrik dan Pemindahan Bahan. Surabaya: Guna Widya,

Attachment

Operation Process Chart

Product : *Hopper* Made by : Leowendo P.



Activities	Total	Time (minutes)
Operation	13	248.78
Checking	5	13.06

Figure.2 Peta Operation Process Chart for Hopper

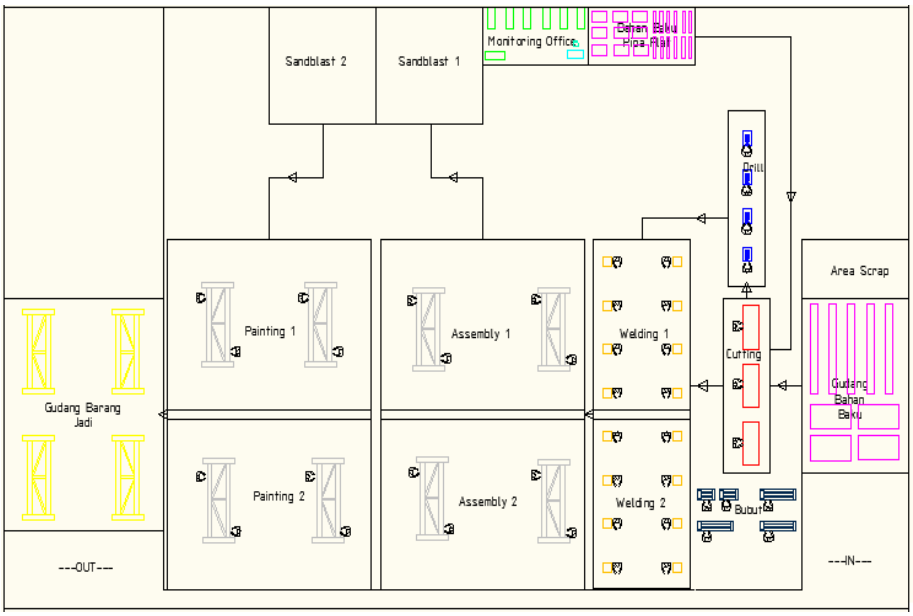


Figure 6 Plant lay out based on AAD *Outflow*