RATIONALIZATION OF SMALL FISH SHIPYARD IN MALUKU PROVINCE

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ABSTRACT

Rationalization is one of the methods that is very important and useful for industries in increasing both productivity and efficiency. Rationalization in the shipyard" can be carried out with relay/out, renovation of the facilities, reorganization, and relocation. PT. Waiame Shipyard can be developed with the rationalization method. emphasizing on: reusing management, relay-out, renovation of the buildings. Improvement of the material handling equipment, investment on plate bending machines and reorganization of the shipyard. Based on the present market it is "recommended that this shipyard should concentrate on the maintenance and - repair of trawler ships. The im piemen tali on of rationalization programme, together uim product method like Zone-Oriented Approach^ Accuracy Control(A/C) and Qualm Control (QC), is recommended, resulting in productivity increase to be 4 limes of previous the productivity. Resides, average docking days; can be reduced from ~ days to 5.6 days, efficiency can be increased from 17.5% to 85%. Profit per year is 3837.01522 millions rupiah

***Keywords**: rationalization, repair, increasing productivity and efficiency*

Introduction

I.1 Definition of Rationalization

According (Al Bary 1994). rationalization is economical sources of labour in industry to increasingly, productivity with using ratio and logical thinking. According (Propper.K.R 1977;, rationalization is attitude to try overcome problems wilh using ratio. According (Guritno.1993), rationalization is reorganization industry to increasingly productivity, efficiency and effectivity. (Steller.M.E and Dibner.B 1985), to explain that basicly the analysis of shipyard with using rationalization which is suggestion can be improved it. Besides, can be increasingly productivity when used suitable management and effective and also can help in decesion making whenever, reduced report production cost and to influent operation management. Thus. implentation rationalization method can be improve shipyard industries. And then we can be know what is the productivity. Productivity is divide between the average value out put(totnl output) with total inpu Yamit 1996.

1.2 Management Approach

Management Approach is only one system management to ship repair and maintenance has been by function.(Storch 1995) This was because the work definition, design, estimating, purchasing, planning, and testing were all done by systems, the same system that were the exclusive responsibility of spesific trade skill function. The pipefitter did pipe system, the shiptirter built hull structure, electricians ran wire and hooked up electrical equipment, machinists worked on machinery, and the sheet metal workers did ventilation.

This approach can be effective for smaller shipyard, simple jobs involving only a few system. However, *can be a compariement on the ship, only part of that compaitemenl, a group of coniparteinents, a system,* part of system, a group of system, 01 a prefabricated unit being built in a shop. It can be any collection of tasks, grouped logically tor efficient performance. As with product-oriented new construction, sequencing is done in terms of problem areas and stages within a problem area. One component might even be part of different zones at various stages of the work. The zone concept allows task grouping, source allocation, and iiiterdependency decisions to be made earlier and from a project w[r]ide perspective of the a single waterfront foreman.

In general, the terminoiogy of zone-onented repair and maintenance u the same as for zone -

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oriented construction. Problem areas and pallets, for iulance. are defined exactly the same as for new construction. Zones are generally considered to fall into the following three categories ;

Geographic Zone is system area of the zone in the ship Functional Zone is Subdivision of the ship that includes alJ equipment associated with a particular system or component, such as all piping and pumps associated with a particular tank, as weltas the lank itself. - Variable -zone is combination of functional zone and geographic zone that organizes the work by process, also known as a work zone. A stage is substep or a band of time during art can be a eompartement on the ship, only part of that compartemeni. a group of conipaitemen is. a system, part of system, a group of system, 01 a prefabricated unit being built in a shop. It can be any collection of tasks, grouped logically tor efficient performance. As with product-onented new construction, sequencing is done in terms of problem areas and stages within a problem area. One component might even be part of different zones at various stages of the work. The zone concept allows task grouping, resource allocation, and interdependency decisions to be made earlier and from a project wide perspective of the a single waterfront foreman.

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Future Demand Projection

Forecasting with using time Series/Trend is basically an activity to estimate in the future events.

Time series method is only one method is very important to make forecast demand and sale in the future.

According (Giiosudarmo 1996), Forecast is facilitate to estimate situation ill the future.

The general formula of Time Series Method that is:

$$Y = a + bx. \quad (2.1)$$

Where :

Y = Demand (Unit), it show at vertical position.

X - The year of demand, it show at horizontal position.

a. = The permanent component and demand every year.

b. = The quantity of demand in the first year.

Estimate **profit or** losses **can** be formulated **that IK :**

Profit or Losses = Total Revenue total Cost. Can be written

$$Z = TR \quad TC$$

$$OrTC = TFC + TVC \quad (2.7)$$

Where :

TC = Total Cost TFC = Total fixed Cost

TVC - Total Variable Cost TR = Total Revenue

Discount Cash Flow.

According (Asdjudiredja. Permana 1990), Discount cash Flow or Present Value method is one the method to estimate present value from post input and post output

$$\text{- KI}$$

$$^{J}(1 + K)' \quad <U$$

Where: CF = Cash Flow

1 = period

K = discount rate

Sn = Salvage Value at period n.

Net Present Value(NPV)

According (Pindyck.Rubinfeld 1995), NPV criterion is Invent if the present value of the expected future cn>,h flows from tin investment in larger itian the cost of She investment.

$$\text{- } ^{2} \quad \text{.....}$$

$$(1 + R) \quad (1 + R)^2 \qquad (l + K)^n$$

Where:

C = a capital investment cost

*Table 1.0 Data Docking in PT.Waiame during 5 years (1*4-1998)*

YEARS	*AR S CODE (X)*	*Y*	X^2	*XV*
1994	*0*	*62*	*0*	*0*
1995	*1*	*52*	*I*	*52*
1996	*2*	*46*	*4*	*92*
1997	*3*	*50*	*9*	*150*
1998	*4*	*65*	*16*	*260*
Total (I)	*10*	*275*	*30*	*554*

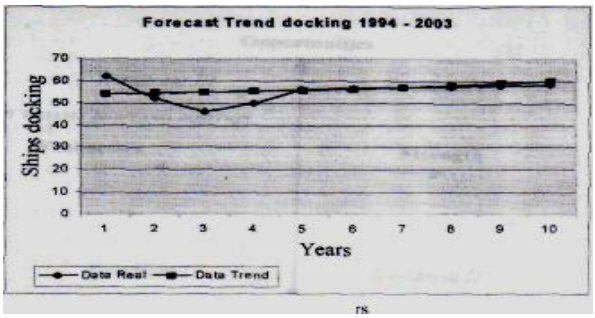
With using the formula (2.2) and (2.3) we can be calculated a and b

(275 X 30) - (10X54)
5(30) - (10)2 8250-
5540 150-100

= 54,20
5(554)-
(l(l)(275)
5(30)-()0)2
b. - 0.40

After we can get a and b so that subsitution in equation (2.1) and then we can forecast shipyard docking service demand for 1999 or fifth year like this below :

Y,,, - a + b.X
-54.20 + 0.40(5) Y», - 56.20



Method of Research.

If the company to consider as the system that's way to match the rasionalization PT Waiame shipyard diagram Model,

The research stages and phases can he discussed in the Research Flow Rationalization Diagram Model below The research phases can be done like this :

1 To collect data and information from the company.
2 Identification and definition problem.
3 To identify the alternatives.
4 To evaluate the alternative from economic side and technics side.
5. To choose a good alternative which it is can be increasingly productivity, efficiency and effeetiviry.

Estimate Shipyard Effectivity

if the average productivity per year is 55 ships The average Bruto Register Tonage (BRT) is 58.33 (BRT) The average docking days **is** 7.0 (days) Capacity of Slipway is 2X500 (TLC) Capacity of Slipway is 1 X 1000 (TLC)

F, E, h.C

= 0.80.0.80.300.(2x500)

= 27428.5714 BRT . 27428.5714
258.333 K -106.175

Thus, the production service docking is 106 ships per year (For slipway2X 500 TLC) For Slipway Capacity 1000 TLC, ihe production service docking is : K - 106 ships per year

Estimate the areas after relayouf shipyard.

The total areas of PT Wataine shiyard is : 158725 M^2 'ITie areas location which is using for project **development** PT. Waianic shipyard that is : 01991M^2(After relayout).

Thus, in percent is: $\frac{101991}{158725} X \; I00\%$

64 25 % (can he follow Andal procedures)

Where, Standard or procedures Andal(Analisa ampak Lingkungan) that is establish 70% for industry areas and 30% for green land areas.fSuharto 19921 Relayout can see in appendix.

Investment cosl Hi improve {'I. Waiame shipyard M emphasize :

I. Yard facilities

li. Cost of steel stock house no(15) with areas 280m^2 ..... Rp164.000,000.
2). Cost of Outfitting shop no(12), with areas 300 m^2 ..... Rp.153.000.000.
3). Cost of Wood shop no(14) with areas 300 in^2 ..... Rp.153.000,000.
4). Cost for renovation ex mechanics shop no(5) .....Rp.185.000.000.
5). Cost of side track 2x500 TLC no(!9) Rp. ..... ……400.000,000.
6) Cost of plate shop no(16) with areas 280m^{l} Rp ..... `…….164,000.000
7). Cost of cafetana no(ll)with areas 206,032 m^2 ..... Rp75,000.000
8). Costofbank no(IO) with areas 30 m^{1},, Rp .) Tones), I un .....…….60.000,000

IT. Material handling Equipment

I). Costofffatbedlruckf it
2). Cost of Mobile Crane (5 Tones), limit
3). Cost of Forkim lunit
4). Cost of overhead Crane (5Tones), 2 units..

III. Machine

Hydraulics Bending 1 unit
. Study/1 raining

3 J.Cosil of CAD/CAM Trailing I person!! for 3 months .....
2). Cost of Quality Control Training I personil for 3 months .....
3).Costof Accuracy Control Training ! personil for 3 months ..
4). Cost of CNC Training 1 personil for 3 months

5). Cost of Refrigeration Training 1 personil for 3 months .....
6). Cost of Welding Training 1 personii for 3 months
iota **I Cost**
Note :
The average Change values of American Dollars versus Rupiahs
Or The values 10,000 Rupiahs per OneDollars American

Evaluation Cost Investment Of PT .VVaiamc Shipyard.

Estimate feasible or mteasible osinvestment can be estimated with using Discount Cash Flow(DCF), method and Payback with Net Present ValuefNPV), method Estimate planning project rationalization PT.Waiame Shipyard can be sec in table 5.1 A, 5.1B and 5.1c below :

In the table 5.1 A, can be explained the stimate with using Discount Cash Flow(DCF), for rationalization project PT.Waiame shipyard which is credit 60% (discount rate 12%). self capital 40%(discount rate 14%).
In this method. Cash inflows for tit the future and during investmeiU to go on so

EXPLANATION	.	*I 2005*	*2 2006*	*i 2007*	*| 2008*	*5 2009*
Investalion	*2,824,000,000*					
+ Bruto Revenue		*2,016.000,000*	*2.052,000,000*	*2088,OOQ,000*	*2,124,000,000*	*2,160,000,000*
+ Another Revenue (5%xPK)		*100.800,000*	*102,600,000*	*104.400.000*	*106,200,000*	*108,000,000*
= Total Bruto Revenue		*2.116.800,000*	*2,154,600,000*	*2,192.400,000*	*2,230,200,000*	*2,268,000,000*
- Another Cost /out put (3%)		*63,504,000*	*64,638,000*	*65,772.000*	*66,906,000*	*68,040,000*
-Operational Cost (10 % JPK)		*211.680.000*	*215,460,000*	*219,240,000*	*223,020,000*	*226,800,000*
= Netto Revenue		*1,841,616.000*	*1,874,502,000*	*1,907,388,000*	*1,940,274,000*	*1,973,160,000*
- Tax 25 %		*460.404.000*	*468,625,500*	*476.847,000*	*485,068,500*	*493,290,000*
- Cash Flow after Tax		*1,381.212.000*	*1,405,876,500*	*1,430.541,000*	*1,455,205,500*	*1,479,870,000*
/ Discount Rate (DR) 1 7 6 %		*1 176*	*1.383*	*1 62b*	*1.913*	*2.249*
= Discount Cash Flow (DCF)		*1,174,500,000*	*1,016,558,856*	*879,586,073*	*760, 842,*	*6 5*
TOTAL		*1,174,500,00*	*2,191,*	*3,070,644*	*3.831,*	*4,4*
Net Present Value (NPV) Internal Rale of Return (IRR) =	*1.665,428,924 40.99%*	*(1.649,500,000) 1,007,487,913*		*(632,941,144) 1.665,428,924*	*246,644,928*	
Benefit Cost Ralio (BCR)	*1.590*	*0416 357*	*0.776 1.590*		*1.087*	*1*

Estimate with Discount Cash Flou fur Rasionalization Project PT Wayame Ambon Credit 60%(DR-20%), Self Capital 40 % (DR- 14%)

Explanation:
With proportion Credit 60 % (DR= 20 %}, Self Capital/equity 40 % (DR= 14 %)and Invest Rp. 2.824.000.000,- And estimate with using DCFmethod so that rasionalization project PT. Waiame is feasible

CONCLUSION

Based on the pioblems in the shipyard, solving problem and purpose of this research can drawn :

1. Rationalization method can be introduced and implementation in the slu'pyard to improve productivity with some way that is : planning in the management especially for repair and maintenance (Project Management Approali), relayoul, renovation facilities, reorganization and to improve material handling equipments.
2. Estimate with using Discount Cash Flow and "Net Preseni Value with Payback period method to indicate that rationalization project PT.Waiame is feasble.
3. The implementation of programme rationalization, together Zone -Oriented approach(ZOA), and Accuracy Control(AC), Quality Control! QC).is recommended resulting in productivity' increase productivity to be 4 times of previous productivity. Besides average docking days can be reduced from 7 days to 5.6 days.
4. Tlie average efficiency can be increased from 17.50 % to 80 %.

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