PRODUCTION PLANNING IMPROVEMENT IN STAMPING PLANT COMPANY  
( CASE STUDY: PT TDS )

Dian Indahsyarie and Mursyid Hasan Basri  
School of Business and Management  
Institut Teknologi Bandung, Indonesia  
dian.indahsyarie@sbm-itb.ac.id

Abstract— PT.TDS is a stamping plant company located in Bekasi, Indonesia. Their main customers are automotives spare-parts and component suppliers. In early 2012, PT.TDS experience loss due to the high number of cost of good sold (COGS) which cover 89% of revenue. It is estimated that the company will have a loss in the end of the year. Therefore, the company need to find alternatives to avoid and minimizes the estimated loss. Problem is cause by internal and external factors. This paper will focus on the internal factors that influence the high of overtime wages which representing approximately 3 to 6 % cost of good sold monthly. Root cause of high overtime wages are includes poor productivity planning, increase absenteeism, and increase of reject rates. A good production planning for PT.TDS should be able to lower overtime wages while at the same time anticipated increase of absenteeism and accommodate rework due to reject parts. Problem solution for PT.TDS are include improvement in production planning by using constant output strategy, controlling overtime through different working hour policy based on job classification and new working scheduling system. By conduction recommended production planning improvement the company should be able to reduce COGS/sales from 89% to 84%. As the result, cost analysis of implementation shown that not only the company could avoid loss in future years but is also could generate profit. Proposed problem solution required participation from all departments related to production activities. To ensure related department received adequate knowledge regarding their roles in the new production system, development of proposed solution and training need to be conduct.

Keywords: Stamping plant, COGS reduction, Production planning

1. Introduction

PT. TDS is a metal stamping plant company located in Hyundai Industrial Estate, Cikarang. Their operation activity includes die making, stamping, JIG, checking fixture, welding assy and assembly. Their suppliers are metal (iron and steel) producer, delivered to the company in a shape of sheet, tube and many other. Their business can be classified as business to business commerce. In 2012 PT.TDS financial report has shown a decline in profit compared to last year sale. The decline in profit began in April and continued gradually to August 2012. At first, PT TDS assumed the decline was due to the decrease of monthly order volume from their major customer who held about 50% of their market share. To overcome this problem the company start to increase order volume from other customers, but this attempt could not prevent the company from loss in Q2. Comprehensive analysis of financial condition has indicated the increase of COGS/sales annually from 75% in 2008 to 89% in 2011 (Figure.1). Using historical data analysis, it is projected that the company will encounter loss in Q4 up to 941 million IDR.
2. Business Issue Exploration

The objective of this paper is to find alternatives for PT.TDS in reducing their COGS/sales to the level where the company still gain profit. Metric use is assessing the success of propose solution is percentage COGS/sales with a baseline of 89% (2011). Propose solution should be able to provide acceptable service fee to customer, minimize loss for shareholder and creating effective working environment for employee.

4. Conceptual Framework

Convention or tradition ratio analysis is used as conceptual framework to find the root causes of business problem (Figure 2). Consideration in deciding conceptual framework is including product customization and varies service profit. Product delivered by PT.TDS is customized in accordance to customer requirement. Conventional or tradition ratio analysis provides information of what contributed to the increase of cost of good sold.

Include in PT.TDS cost of good sold are material cost, labor cost, production support cost, and other production cost. Analysis of production performance is also use to provide linkage between financial performance, operation performance and resource performance.
B. Method of Data Collection and Analysis
Data used for this paper are combination of quantitative and qualitative data. Primary data for this paper is the quantitative data consist of archive document and internal reports from department related to discussion topic. Include as quantitative data are financial reports, production reports, quality management reports and other reports. Personal interviews are used as secondary data, applied to gather detailed information which could not be provided by quantitative data.

C. Analysis of Business Situation
Some factors could be classified as external factors which is inevitable and need anticipation actions. Including external factors are:

a. The increase of raw material price accompanied by the stagnant stamping manufacture (service) price. This problem related with the market price of steel which is influence by external factors such domestic consumption which leads to material scarcity, exports- imports activity and metal works global industry. The company could only anticipate the price fluctuation.

b. The increase of standard minimum wages in Cikarang-Bekasi. The increases of standard minimum wages in Bekasi reach approximately 7% to 17% annually. Similar to material price, the company could only anticipate the increase of minimum wages.

Other root causes are considered internal factors which could be managed and controlled by the company. Includes as internal root cause are:

a. Customer satisfaction policy which required 100% quality check of finish product. Further study to whether this policy is suitable to be implemented to all customers should be conduct.

b. High human error in production process together with 100% quality check has cause an increase in detected reject parts. Further study to how to minimize product variety cause by human error should be conduct.

c. Declining working motivation is related with human resources department which did not exist in the company. Further study to what is influencing the motivation of employee should be conduct.

d. Increase of absenteeism rate also related to employee motivation.

e. Lack of knowledge in production planning is related to how the company manages its operational activity in meeting demand over supply. Available resource conduct production planning based on delivery schedule. Working schedule is arranged to be flexible without any concern to overtime cost.

f. Lack of control for overtime in the system is related with the absence of the responsibility in managing overtime cost. Control for overtime is essential to ensure that overtime cost is within production budget.

This paper will focus on the factors that influence to the high of overtime wages which representing approximately 3% to 6 % cost of good sold. Productivity emphasis on meeting production targets, resource management-related overtime costs have not been well thought out in production planning.

3. Business Solution

Production planning is the company ability to arrange the optimal combination of resources and production target or keep demand and supply in balance. According to Jacobs (2009), this term is referred to as aggregate operation plan, which translates annual and quarterly business plans into broad labor and output plans for the intermediate term (3 to 18 months). Aggregate operations plan objectives is to minimize the cost of resources required to meet demand over that period. In PT.TDS case, aggregate operation plan aims to minimize overtime cost to a level where the company is still gain profit from their operation.

Production planning is in line with strategic planning through shop floor activities. Proposed business solution is adapting the major operation and supply planning activities framework (Figure.3). Since
overtime cost is related to human resources working schedule, focus discussion of this paper will be on the scheduling system.

![Business Solution Framework](image)

**Figure 3. Business Solution Framework**

To be able to produce aggregate planning, strategic capacity planning (SPC) must firstly be defined. The process continues by determining monthly forecasting and demand management using linear regression analysis including seasonal trend. After SPC and demand forecast is compute, alternatives of production planning strategies should be conduct. Chosen production planning strategies will later used as the based on designing weekly and daily workforce scheduling system.

### D. Alternative of Business Solution

There are three proposed alternative production planning strategies for PT.TDS. The first is ‘constant output’ which maintains production (stroke per hour) at the level above demand forecast. Second alternative is ‘stable workforce’ which ensures the availability of worker at the level of average monthly production forecast. When sales in above average monthly production the company conducts overtime to their worker. The last alternatives is ‘machine maximum capacity’ which supply worker to ensure each machine is operation non-stop. The third alternative is what the company is currently implemented in their production process.

Constant output and no improvement output if scheduled properly should not need any overtime in the process. Stable workforce alternatives provide lowest cost to the company. However, stable workforce also requires the company to let go 26 employee which could deteriorate working environment in the company. Another option is conducting no improvement to current strategies or third alternative. Since production capacity is design over demand forecast, loss due to idle time is relatively high compared to other alternatives (Table.I).

| Table I. Production Planning Strategy Alternatives |
|---------------------------------|----------------|----------------|----------------|
|                                 | Constant Output | Stable Workforce | Machine Max. Utilization |
| Cost (IDR)                     | 1.276.552.860    | 1.128.245.190   | 1.686.096.000   |
| Idle time/loss (IDR)           | 214.317.420      | 43.088.130      | 618.361.000     |
| Overtime                       | 0               | 66.617.000      | 0               |
| cost (IDR) Layoff cost (IDR) Machine operator | 112,502,000 | 187,356,000 | 0 | 37 | 28 (varies) | 54 |

Analysis for the most compatible solution for PT.TDS current condition is based on some criteria, including:

a. Demand fluctuation, alternatives must accommodate daily demand fluctuation.
b. Overtime control, alternatives must include the control for overtime
c. Psychological effect, alternatives with low emotional impact due to removing people is preferable
d. Cost risk, alternatives with the lowest cost is preferable

### TABLE II. PRODUCTION PLANNING STRATEGIES ANALYSIS

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Constant output</th>
<th>Stable workforce</th>
<th>No improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand Fluctuation (Yes) Overtime control (Yes)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Preferable</td>
<td>Medium</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Psychological effect (Low) Labor Cost (Low) Other Investment</td>
<td>Medium</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>- Training for production (order) manager - Training for schedule (staffing) manager - Cross-division training</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

Based on the financial and non-financial analysis, constant output alternatives is the recommended production planning strategies for PT.TDS.

The next process is weekly workforce scheduling system design. Workforce schedule in Indonesia is regulated under Indonesian Act number 13 of 2003 concerning Manpower. Referred to the regulation, there are two types of available working hour system; (1) regular, 8 hour per days and 40 hours a week (2) shifts is mostly use for continuous working, 7 hour per days and 40 hours a week working hour. In addition, Manpower act also regulate overtime cost. Therefore, weekly workforce scheduling system should be based on national regulation and job description. Since PT.TDS production activities is consist of continue and non-continue process, working hour system should be differed between regular and shift with different overtime control system through job classification using simple algorithm.
Proposed daily workforce schedule is design based on daily production planning target and weekly working hour system. Using ‘constant output’ strategy as production planning target and also weekly working hour capacity, daily schedule system is conduct. The designated workload is 18% in weekdays, 9% in Saturday and 0% in Sunday (Figure.4). Company production policy is two days safety stock, which means that delivery for Monday should be produce on Thursday of the previous week. Saturday and Sunday should not be set as working days since there is no delivery on weekend.

![Graph](image)

**Figure 4. Daily production planning**

**E. Analysis of Business Solution**

The baseline in analyzing problem solution is COGS/sales in 2011 which is up to 89%. Cost analysis is conduct to determine the impact of the chosen solution to the cost of production in the company. The analysis also includes external factors which are the increase in material price and the increase of labor cost. As the result, if the company pursues its current production strategies, estimated loss will reach 1.5 billion IDR. By implementing propose solution, COGS/sales is calculated to be 84% (below 89%), moreover the company could generate profit in end year.

However, there is a possibility that the local government will increase standard wages in 2013. If the increase of wages is include in the calculation then the proposed solution could only lower COGS/sales to 88%. Additional business solution should be found in order to avoid the company from future loss (Table.III). This paper is conduct before the there is any formal statement regarding the increase of standard wages in Bekasi.

**TABLE III. BUSINESS SOLUTION COST ANALYSIS (COGS/SALES)**

<table>
<thead>
<tr>
<th></th>
<th>No Increase Wages</th>
<th>Increase Wages</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>No Improvement</strong></td>
<td>89%</td>
<td>96%</td>
</tr>
<tr>
<td><strong>Improvement</strong></td>
<td>85%</td>
<td>88%</td>
</tr>
<tr>
<td><strong>COGS/sales changes</strong></td>
<td>4%</td>
<td>8%</td>
</tr>
</tbody>
</table>

Improvement in production planning strategies accompanied by new scheduling system could lower the COGS/sales of PT.TDS from 89% to 85%. It is estimated that the company could avoid loss up to
1.5 billion IDR and by implementing proposed problem solution. Moreover, if the government approved to increase of standard wages in Bekasi, problem solution could help the company reducing approximately 8% of their COGS/sales. Therefore it is very recommended that the company conduct production planning improvement.

4. Conclusion and Implementation Plan

Propose solution implementation consist of solution development phase, pilot project phase, technical preparation, training and trial phase. Solution development and pilot project could be done parallel. The process will be continued by technical preparation phase, training and lastly trial phase. Implementation plan will involving top to bottom human resources. Top management is important in determining strategic production planning and providing demand forecast. Their other role is finding new breakthrough for the company to reduce COGS/sales as an anticipation of increase of standard basic wages. Managers have a major role in regulating the implementation of the project solution. Their involvement is intense throughout the whole process. Training of the new scheduling system should be done to manager and supervisor level. General Affairs (GA) is important in conducting documentation of employee performance evaluation.

As a conclusion, profit loss in PT.TDS is related to how the company manages working hour and production target. Good production planning strategies could help the company in minimizing overtime cost and determining effective number of employee. Moreover, production planning in PT.TDS should not only emphasize on order volume but also on resource daily workload capacity. Improvement in production planning could help the company in reducing their COGS and generate profit in future year.

References


PT.TDS Company Profile, un-published document.

PT.TDS Financial Statement, un-published document


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