CHAPTER 6
CONCLUSION AND RECOMMENDATION

6.1 Conclusion

This study is starting with the current process and scheduling model of the foundry. The problem analysis is also performed to understand more and nail down the source of problems and constrains.

In the current situation that manufacturing does not have enough capacity to support all the requirements, and customer does not have the second source, customer will set the priority for some shipments. That means all the priority jobs cannot be delayed or missed. But the normal jobs are allowed to delay if necessary.

From the analysis, it clearly shows that the company needs some scheduling system in order to improve the mean tardiness as well as the % missing shipment. Moreover, with the rapidly increasing of customer and product ranges, it is too complicate for human to make a scheduling effectively. So, the company has to start setting a plan for scheduling improvement.

The source of problems is narrowed down to three main groups: supply chain problem, scheduling model problem, and shop floor control problem. For the short-term strategy, the problem from scheduling model and shop floor control is focused. The problem from supply chain is considered for the long-term strategy.

The next step is to find the solution fitted with the current situation and constrain. The dynamic programming has been taking into account because the priority setting and due date constrain are major concerns at this moment. The backward scheduling is, also, introduced for the backend process. The reason of using different techniques is because the process characteristic and constrains are different. Thus, the front process, melting and molding process, has a major bottleneck that needs priority function. So, it is fitted with dynamic programming technique while the backend process that does not have bottleneck is fitted with the backward scheduling.

The data using in this evaluation is historical data from June – November, 2004. The Johnson's law is used to be a comparator since current process can be considered as two-machine process. This is to compare the result under the same assumption.

Regarding the result comparing across three methods – current method, developed method, and Johnson's law method, the developed method significantly shows the improvement on both mean tardiness and % missing shipment. The % missing shipment reduces from 10% to 3.5%. The mean tardiness of current method is difficult to quantified due to too many missing shipment. However, from the cumulative plot, the developed method shows very promising result.

However, the developed method has many constrain that has to be considered. The major constrain is the sample size limitation. However, for the short-term improvement, it is a promising method for moving forward. But, the company has to start developing the scheduling model in order to support the increasing demand in the future.

6.2 Recommendation

Further Improvement of Scheduling Model

As addressed before, the company has to have both short-term and long-term improvement plan. This is to support the market growth in the future.

6.2.1 Short-Term Improvement Plan

Since the company never has any scheduling model before, implementing the developed model will be resulting in better mean tardiness and % missing shipment. So, it will be a good start for the company. However, there are still have some constrains that need to be improved as below:

- Sample Size Limitation

This is a major constrain for dynamic programming. Even this technique can be used for now, it might not be capable in the future when the product ranges and shipment increase.

- Calculation time

Since the dynamic programming use the recursion technique, the calculation time is relatively high comparing with other methods such as EDD, Johnson's Law, and so on.

- Backend process

There is a room of improvement for the backend process. Since the backend process is a flexible process, the backward scheduling technique will not give the optimum solution. However, it has to be evaluated in order to trade off between benefit and cost and complexity. Most of the flexible scheduling will have high cost and complexity that might not be required for simple process like this.

- Batch Size Optimization

Currently, the company processes by order. So the batch size is equal to the job order from the customer. But, in reality, the production batch size has to depend on the furnace capacity. So, optimize the batch size will result in lower inventor y and faster processing time. For instance, the job A requires 2.1 ladles to complete this job. But the company has to process 2 furnaces, equal to 4 ladles, for this job because it cannot switch to new product until whole material in the furnace is used.

On top of these, the company has to establish the shop floor control system. This is a very important supported system. It will improve the control and tracking system in the production line.

6.2.2 Long-Term Improvement Plan

As addressed earlier, the company needs to think about supply chain management (SCM). However, to implement the SCM does not easy. It needs high collaboration from all the parties. Figure 30 is an example for the supply chain implementation phrase.

SCM tends to increase sales, reduce costs, and make full use of assets by improving the interaction and communication of all participants through the supply chain. SCM solutions use networking technology to link suppliers, distributors, and other business

partners to better satisfy the end customer, while feeding real-time data about customer demand into the partners' production and distribution processes

Normally, there are six steps for supply chain implementation.

- Business Assessment and Requirements

To evaluate current supply chain processes, identify a strategic SCM vision and mission, obtain senior management sponsorship, and select specific performance measurements and metrics.

- Evaluate and Select Technology

To determine the best technology to support SCM business needs and strategic vision

- Build Model and Test

To connect business process to technology features, referred to as mapping, customizing configurations, and test.

- Pilot

To test technology in a controlled deployment relevant to selected areas of the supply chain.

- Training

To educate users with new technology, business tools, processes, and operating activities.

- Full Deployment

To implement the full solution to the entire organization.

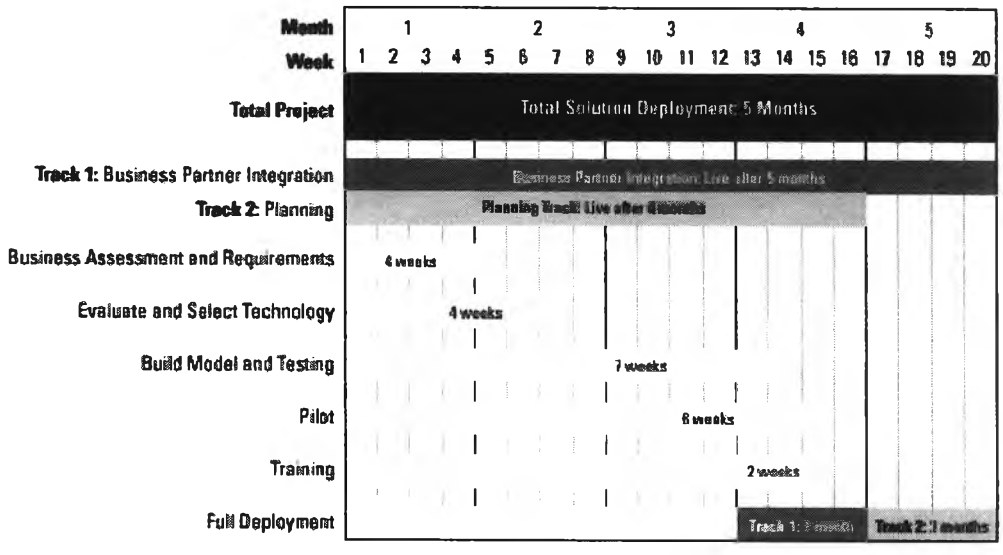

Figure 31 The Supply Chain Management Implementation Model [www.cisco.com].