

MRO Supply Chain

A Study of Maintenance, Repair and Operating (MRO) Supply Chain for Pulp and Paper Mills

Summary

The primary objective of this research is to understand and document opportunities that create value among supply chain partners in the pulp and paper industry. More specifically, in the context of the MRO supply chain for paper mills, we propose the following: 1) to develop an in-depth understanding of current supply chain practices including the challenges of integrating supply chains across organizations; 2) to gather information on supply chain performance and its primary drivers; 3) to rigorously analyze the information to identify the critical areas that provide the greatest opportunity to improve the effectiveness and efficiency of the supply chains; and 4) to identify specific initiatives to improve supply chain performance, quantify the bottom-line impact of these initiatives, and develop approaches to successfully implement the most critical initiatives.

Our research approach is based on data collected from field site visits, a comprehensive mail survey, and on secondary sources of information. Information gathered from the site visits and mail survey will provide the necessary data and insights to understand, describe, analyze, and recommend initiatives to improve the performance of the supply chain, and to develop a baseline against which the future performance can be compared. It will also allow us to develop economic models to project the operational and financial benefits from effective supply chain management initiatives. This project is approximately 40% complete, and is dependent on results from an industry-wide survey.

Value Proposition

Management tools developed in this project can help plants reduce overall costs by coordinating maintenance and repair more effectively with fluctuations in demand for finished product. Surveys of other industries have indicated that on-average supply chain disruptions result in a decrease in stock price of 9%. Other findings have shown that a 15% reduction in indirect or MRO purchases can translate into a 50% improvement in profits.

Key Questions

- ▶ What are the best opportunities for improving the effectiveness and efficiency of supply chains?
- ▶ What are the best approaches to achieving improved performance, and what financial benefits will they provide?

Key Results to Date

We have visited three paper mills and conversed with one major supplier in the paper industry. While the paper industry is mature and produces primarily a commodity product, we found diverse maintenance, procurement, and supplier management processes in practice. By comparing the practices used in the mills participating in our site visits, we observed several key distinctions. For example, one mill completely outsourced maintenance while another mill employed maintenance personnel to perform all needed maintenance except for the bi-annual mill shutdowns. Second, we found that

maintenance and procurement departments are separate in some mills but combined in others. Also, we found different perspectives regarding inventory management, inventory reporting, and ownership of inventory.

Based on these visits, we have developed a preliminary understanding of the key issues faced by MRO suppliers and their associated paper mill partners, the supply chain initiatives that are being pursued, and the impact these initiatives are likely to have on long-term financial performance. This understanding provided the foundation for the development of a framework of the MRO Supply Chain Process, which is the basis of our survey instrument.

Within this framework, the maintenance, procurement, and supplier management processes represent the Mill MRO Practices under investigation. Elements of the Mill Infrastructure are also considered including Mill Characteristics and the role of Information Technology. The MRO practices and mill are impacted by Corporate Strategy and Practices, as well as influenced through feedback loops from assessment of MRO Supply Chain Performance. More specifically, we have identified activities that are associated with each of the factors in the framework. The Maintenance Process focuses on those activities related to predicting and planning maintenance activities as well as the coordination efforts with procurement and production. The Procurement Process focuses on the forecasting and inventory management techniques. The Supplier Management Process considers supplier selection along with communication with suppliers and the mill's approach to effectively identify and deploy supplier expertise. In terms of infrastructure, we consider Mill Characteristics such as the age and size of the mill and the manner in which the mill

uses Information Technology. Lastly, we measure MRO Supply Chain Performance in terms of how effectively the MRO supply chain is being managed with respect to resource consumption (e.g., material, labor, and services). Also, we consider the extent to which performance is tracked and used to drive initiatives for improvement within Mill MRO Practices, Corporate MRO Strategy and Practices, and Mill Infrastructure (i.e., through feedback loops).

The next major phase of this project is to collect and analyze industry-wide data from the developed survey. Industry response from the first mailing was very poor (< 1% response). A second mailing is being pursued to gather the needed information to enable analysis of MRO systems and development of the appropriate models in which to identify value creation for the industry.

Implications for Industry

Both hard and soft factors that drive supply chain performance will be examined in this project. For example, we will explore the impact on the MRO supply chain in relation to hard attributes such as the existing capacity and location factors, existing process technologies, investments in new technologies, and the information technology (IT) infrastructure. On the soft side, we will study organizational issues such as the integration across various supply chain partners, collaboration among partners, sharing of information and plans, existing practices for coordination and control of the supply chains, incentives issues, performance metrics used and how they influence decisions and behaviors.

Anticipated Results and Implications

The outcome of this project will enable us to prescribe initiatives to improve the MRO portion of pulp and paper mill supply chains.

Potential implications for the paper industry from our project will be to help improve the cost and performance effectiveness of the MRO supply chain, by providing the industry with (i) understanding of current practices concerning the MRO supply chain, (ii) providing information on MRO supply chain performance and its primary drivers, (iii) identifying specific initiatives to improve MRO supply chain performance, and (iv) developing approaches to successfully implement the initiatives.

Industry Involvement and Impact

We have visited three mills and corresponded with managers at one supply firm.

Publications

- ▶ Singhal, V. R., “MRO Practices and Their Link to Improved Competitive Performance,” paper presented at the TAPPI Fall 2003 Technical Conference, Chicago, IL, October 27, 2003.

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