



Center for Paper Business and Industry Studies

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Research Update: Maintenance, Repair & Operating Supply Chains

Dr. Soumen Ghosh is a Professor of Operations Management in Georgia Tech's College of Management. In the October, 2001 issue of this Newsletter, he described a research project that had just re-received CPBIS support and would soon be



Ghosh

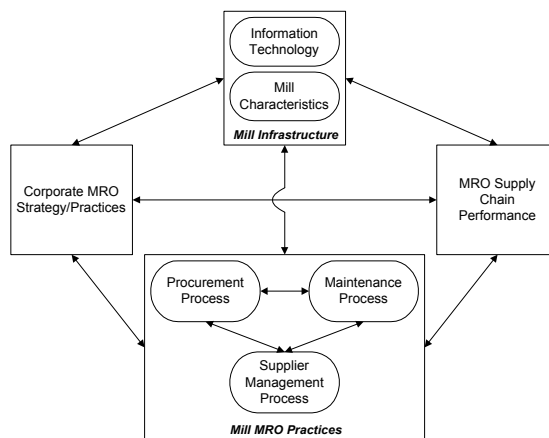
initiated. The project was entitled, "A Study of the MRO Supply Chain for Pulp and Paper Mills." His desire to unravel the complexities of this subject was shared by the other members of the project team, Dr. Yih-Long Chang, Dr. Cheryl Gaimon and Dr. Vinod Singhal, all of whom are also members of the GT Management faculty. Together, they have made considerable progress toward this goal, in spite of some unanticipated obstacles.

The objectives of the research are:

- to develop an in-depth understanding of current supply chain practices;
- to understand the critical factors that determine supply chain performance; and
- to propose specific initiatives that will improve supply chain performance, together with quantitative assessments of their

bottom-line impact and guidelines for their successful implementation.

Visits to paper mills and suppliers provided the research team with an understanding of the key issues faced by MRO suppliers and their 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, in turn, became the basis for a carefully crafted survey instrument. Data collection by means of this survey instrument is now in progress.



Within the MRO supply chain framework, the maintenance, procurement, and supplier management processes are the key mill MRO practices under investigation, as shown in the figure above. Elements of mill infrastructure, including mill characteristics and the role of information

technology, are also considered. The mill's MRO practices are impacted by corporate strategy and practices, as well as being influenced by feedback from assessments of MRO supply chain performance.

The survey will generate information on 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 on coordination with procurement and production. The procurement process focuses on forecasting and inventory management techniques. The supplier management process includes supplier selection, communication with suppliers and identification and deployment of supplier expertise. Infrastructure encompasses mill characteristics such as the age and size of the mill and the manner in which the mill uses information technology. Performance is measured in terms of how effectively the MRO supply chain is being managed with respect to the consumption of resources and the extent to which performance is tracked and used to drive initiatives for improvement.

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Pollution is History

Each year, CPBIS offers research fellowships for highly qualified graduate students pursuing research that is relevant to the Center's mission. Last year, one such fellowship was awarded to Philip Unger, a Ph.D. candidate in Georgia Tech's School of History, Technology and Society. The object of his research is to examine the relationship between technological innovation and environmental regulation in the United States, in particular with regard to the development of pulp bleaching technology. While environmental regulations are often simplistically viewed as added costs of doing business that drive technological innovation by firms, this study adopts a more holistic approach. It will consider the historical development of various bleaching technologies, the way in which the resulting technological knowledge influenced environmental regulations, and how specific producers have decided to implement technological alternatives. It is expected that this historical perspective will contribute to a deeper understanding of the relationship between environmental policy and industrial practices.

A preliminary examination of post-war bleaching process innovation at kraft mills in the United States suggests a very complex relationship with the emergence of environmental policy. The bleaching part of the pulp production process has significant

implications not only for effluent quality but also for resource consumption and product value. Given this, producers have long studied alternative bleaching technologies, steadily advancing their knowledge of the chemical interactions involved in each, while also developing comparisons of cost and quality factors. The chronology of such research and the achievements of the industry and related organizations during the 1930s, 40s, and 50s provides ample evidence of the emergence of technological alternatives that both predated and subsequently served to meet pollution control requirements.

Federal consolidation of environmental regulation occurred with the establishment of the Environmental Protection Agency (EPA) in 1970. Before that time, the U.S. pulp and paper industry responded primarily to state and local actions on environmental issues. These highly localized situations encouraged introduction of production techniques that fit site-specific demands. The complexity of the regulatory-innovation interface can be appreciated when one studies the growing importance of scientific research done in response to local situations during this period. The ascendancy of Federal authority over environmental matters, at least in terms of standard setting and enforcement processes, has obscured the continued significance of site-specific development from the view of historians and other analysts. It is important to capture what may otherwise be overlooked by examining the basis of technological choices made by particular mills in response to local conditions. A major portion of this study will, therefore, focus on the "roll-out" of bleaching technologies during the post-EPA period at specific sites that undertook notable departures from the norm, particularly decisions by mills to implement reduced-chlorine bleaching systems before they were mandated. It is anticipated that the nature of these decisions and the way in which they were made will help focus the regulatory-innovation discussion.

Upcoming Events

"Management Development for Enhanced Performance," A unique paper industry continuing education opportunity, Atlanta, May 10-14, 2004. See: <http://www.cpbis.gatech.edu/mgtdev>

"How Pulp and Paper Professionals Attain Successful Outcomes," Distinguished Lecturer Series presentation by Frank A. Dottori, Pres. & CEO, Tembec. Friday, March 26, 11:00 a.m. Kress Auditorium, IPST, 500 10th St. NW, Atlanta. Webcast: <http://www.cpbis.gatech.edu/dls2004> ■