

A Lumber Mill's Renaissance

Cultural Change for Success

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In the spring of 2000, Kenora Forest Products, a Prendiville Industries Company, located in Kenora, Ontario was a moderately successful lumber mill (Stud Mill), producing SPF (Spruce, Pine & Fir) studs and fencing products for buyers in Canada and the U.S. The Kenora Forest Products (KFP) mill's work force consisted of approximately 10 maintenance personnel and 80 production personnel, one Maintenance Superintendent, and one electrical/instrumentation supervisor. Mill output was approximately 52 million board feet per year. The mill's work force was very capable and knowledgeable. Knowledge, as used here, is defined as the capability for understanding and being able to use information and processes. The KFP mill, through work process improvements only, increased their output to more than 80 million board feet per year. How was a stud mill able to increase production by 54% without capital equipment/plant expansion? - Through a complete cultural renaissance within the mill's work force.

Pre-Renaissance

Kenora's work force possessed an embedded, almost instinctive, knowledge of the mill's own routines and processes. Within the mill's maintenance organization these processes were, what is best described as, reactive. The plant culture, that is it's mind-set gained through long term practices, was to react to failures, fix broken equipment and, in general, respond to production slow-downs and stoppages.

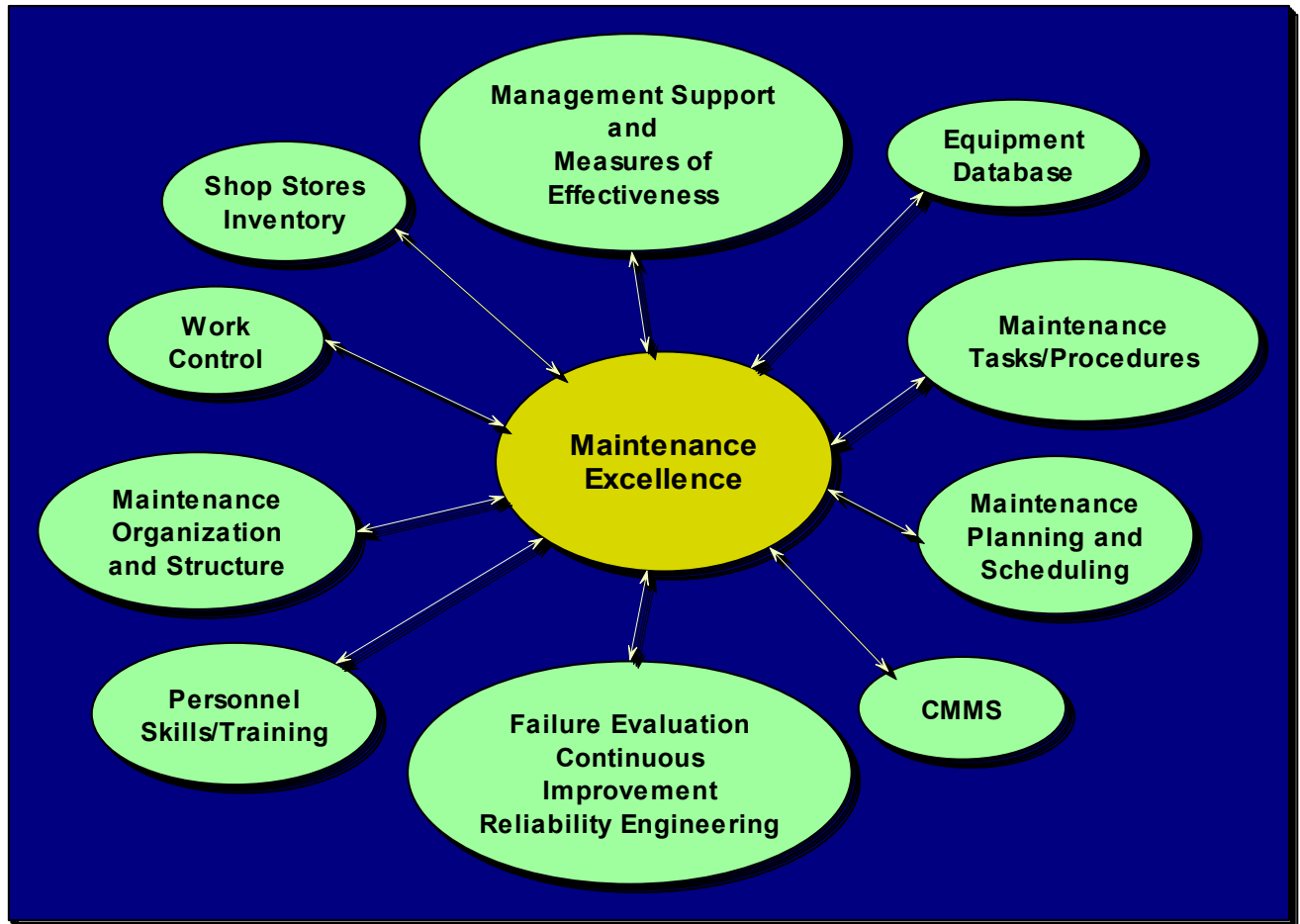
Kenora's "repair-focused" culture was typified by attitudes that *production runs it until it breaks* and *the maintenance crew is simply responsible for fixing the problem, without looking at its cause*. This approach led to repetitive "fixing" of symptoms rather than resolving the problem causes. The general condition of the mill's equipment was steadily deteriorating. The mill did not have a Computerized Maintenance Management System (CMMS) and the storeroom was snarled with a multitude of parts being ordered daily for jobs to be completed in the current week or even the current day. The parts that were in stock were not uniformly identified or systematically stored.

This 'repair focused' culture began its renaissance in this first spring of the new century when a wellspring of change was created in Kenora, Ontario. One of the Kenora Mill's staff attended a seminar entitled *Maintenance Excellence* presented by Life Cycle Engineering, Inc. (LCE), a company specializing in maintenance engineering. Their seminar addressed the essential elements for initiating transition to a "World Class" maintenance operation. It also addressed the dramatic changes in equipment reliability, production and profitability that could be expected from achieving Maintenance Excellence. The seed for cultural change at the Kenora Forest Products Stud Mill had been planted.

The employee attending the seminar brought a wealth of information back to Kenora, Ontario and, over the course of several discussions, provided the information to the Mill Manager, Rod

McKay. McKay enthusiastically received the information and concluded that the Maintenance Excellence philosophy must be applied to his mill's maintenance operation and to the overall cultural mind-set of the mill's work force. McKay set out to reshape the mill in the form of the Maintenance Excellence model.

Figure 1 Maintenance Excellence Model



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The Path to Cultural "Renaissance"

Maintenance Assessment

The process for change was initiated through the performance of a maintenance assessment at the Kenora Stud Mill. The purpose of the assessment was to:

- > identify and prioritize the maintenance process problem areas
- > define the solutions and goals of changed processes
- > to establish a base line of the maintenance effectiveness of the existing organization so that progress towards achievement of Maintenance Excellence could be accurately gauged.

In order to conduct an unbiased, objective evaluation, McKay decided to seek an outside contractor to perform an evaluation of Kenora Forest Products maintenance operation as well as to provide support services and technical and management guidance to the mill for reconfiguring for maintenance excellence. He selected Life Cycle Engineering (LCE), the same maintenance engineering firm that had presented the Maintenance Excellence Seminar. LCE sent trained specialists to the mill to perform a comprehensive and structured Maintenance Assessment. Following the assessment, an analysis of the gap between existing work processes and the *Best Maintenance Practices* of Maintenance Excellence was performed to identify and prioritize the areas where changes were required.

Developing a Plan

Based on the Maintenance Assessment Report and Analysis provided by LCE, a Master Plan of Action (MPOA) was developed to organize for and apply the Maintenance Excellence Model within the mill. Major action items in the plan included:

- ❑ Selection and implementation of a functional Computerized Maintenance Management System (CMMS)
- ❑ Performance of equipment condition upgrade and restoration activities on critical, failure prone equipment
- ❑ Identification of key maintenance effectiveness metrics (what data to collect, analyze and track that could measure - and quantify - the impact of process changes on the effectiveness of maintenance activities)
- ❑ Development of equipment maintenance plans (EMPs) to provide the foundation of a formal Planned Preventive Maintenance (PM) program
- ❑ Development of Bills of Material to serve as the basis for determining storeroom stocking parameters
- ❑ Creation and establishment of the maintenance planning and scheduling function.

Development of Guidelines and Methods to Define Mill's Goals and Objectives

In order to successfully execute the MPOA, the mill's next step was to develop a set of governing principles and operating practices that would define the mill's goals and objectives, organizational strategies, and mill operating guidelines which were then agreed upon by all plant management, union, maintenance and operating personnel. The mill's new principles, the defining factors of the new culture, were documented, signed by all participants and prominently posted within the mill. Applicable parameters and measurement / tracking methodologies (Performance Metrics) were identified to monitor, measure and track the progress towards achieving Maintenance Excellence. This document has served as a reminder for all on how business would be conducted from that day on.

The pursuit of several of the major action items was facilitated through the creation of *Focus Teams*, staffed by both operations and maintenance personnel, and provided with designated team leaders, to develop the details of individual action plans. Their objective was to move promptly into implementation and execution as soon as management approval of the plans was obtained.

The Renaissance

The Reconstruction Process

A *CMMS Selection/Implementation Focus Team* was chartered to select and implement a Computerized Maintenance Management System (CMMS). The Focus Team was provided coaching and technical expertise from LCE to assist in the CMMS selection and implementation process. Through the use of a proven CMMS vendor selection process, three systems were identified and evaluated. Based on responses, budget, and vendor demonstrations, C.K. Systems' MAINTMIZER® 2000 was selected and implementation activities were initiated. A detailed Standard Operating Procedure (SOP) was developed, to ensure all process and utilization decisions were documented, which would later become the mill's "Maintenance Bible."

A *Reliability Focus Team* was chartered to address equipment reliability issues, which included evaluating and, where necessary, upgrading equipment condition and performing general restoration activities. The Focus Team also developed equipment maintenance plans (EMPs) making use of the current knowledge level and conditions observed during the equipment reliability evaluations and condition upgrades. The EMPs would be the basis for development of the mill's Planned Preventive Maintenance Program. The Reliability Focus Team's activities accomplished a number of positive results such as:

- > identifying the repairs, modifications and upgrades required to restore the mill's equipment to optimum operating condition
- > build a backlog of maintenance that would be required for proper planning and scheduling
- > very quickly begin to influence operations through steadily increasing production output.

LCE again provided expertise to work with the maintenance staff to assist, coach, and mentor team members during these activities to ensure effective maintenance techniques were utilized.

A *Maintenance Planner* was selected from the existing team, and he was provided with extensive planner/scheduler training and follow-up, in-mill, coaching from LCE. Among the Maintenance Planner's first responsibilities was the development of an equipment hierarchy (identification, parent-child and ownership relationships, standardized nomenclature, redundancy and commonality, etc.) for the entire plant. The equipment hierarchy provided the basis for tracking and relating labor, parts and material and other costs to systems and equipment, down to the component level, as well as to catalogue equipment history for each item in the mill.

The decision was also made to acquire a *Material Management Specialist* who worked with the planner, plant maintenance, and purchasing personnel to establish a functional storeroom. This allowed parts, materials and consumables to be provided for maintenance tasks on a pre-planned basis and to establish more effective cost control measures. The almost immediate result was a significant improvement in parts availability. Total cost of inventory was dramatically reduced and costs for emergency parts procurements were nearly eliminated. The implementation of bar coding, integrated into the CMMS, further enhanced the efficiency of storeroom operations.

The final action item undertaken to imprint the change of culture within the mill involved mill wide *Training* on the newly established work flow and all new work processes as well as CMMS operation and utilization, Root Cause Failure Analysis, storeroom procedures and, through utilization of the metrics of maintenance effectiveness, the constant improvement process.

The Renaissance Completed

Maintenance Effectiveness Metrics

Within a few months of implementing these initiatives the measures of maintenance effectiveness were showing that, through the performance of planned maintenance, more work was being accomplished and equipment reliability was improving steadily. Even more significant, were the increase in production and the resulting climb in total sales revenues. With improved maintenance, the mill was able to start a third operating shift over the weekend. The combined effects boosted annual volume by 54% to 80 million board feet and reduced the operating cost per board foot produced dramatically.

Within two years of adopting the Maintenance Excellence culture at Kenora Forest Products Mill, the results were more dramatic. The return on investment (ROI) of the cost of implementation of Maintenance Excellence was nearly ten-fold. Rod McKay is convinced that, had Kenora Forest Products not embraced the tenets of Maintenance Excellence, the company would not have survived the volatility of the lumber market and the increasing burden of tariffs imposed upon the company.

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