DEFINING A COMPETITIVE STRATEGY FOR THE
MAINTENANCE FUNCTION AT EUROCAN PULP AND
PAPER MILL

by

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ABSTRACT

Eurocan Pulp and Paper Co., Division of West Fraser Mills, Ltd. (the Company or Eurocan), located in Kitimat, BC, operates two paper machines and manufactures unbleached linerboard and kraft paper.

This project defines a strategy for maintenance at Eurocan.

The Company has no sustainable competitive advantage and therefore needs to be competitive based on cost. Maintenance is a significant cost and therefore is subject to analysis.

After examining maintenance, this paper found that Eurocan must continue to improve its maintenance function in order to improve equipment reliability. Additionally the Company must lower the cost of maintenance without affecting the improvement in reliability. Eurocan should continue to improve the performance of its in-house crews. As higher levels of efficiency are reached, the in-house teams can be further utilized by performing some administrative duties, performing more preventative maintenance work, or by taking on work that is currently being contracted out.
EXECUTIVE SUMMARY

Eurocan Pulp and Paper Co., Division of West Fraser Mills, Ltd. (the Company or Eurocan) is situated at the head of Douglas Channel located at Kitimat in north western BC. The Eurocan plant has two paper machines and makes unbleached linerboard and kraft paper from sawmill wood residue.

Most of Eurocan’s plant maintenance is performed by its own crew of 140 unionized employees. Major work is out-sourced for the annual maintenance outage as well as for jobs that require specialized skills or equipment. This paper proposes a competitive strategy for the maintenance function at Eurocan.

Firms in the linerboard and sack paper industry compete predominantly on cost and quality. Eurocan, in order to compete successfully, must compete as a low-cost producer of the given quality of paper it produces. Since the Company has no sustainable competitive advantage it needs to look at all its significant costs. The maintenance function, at 16% of total costs, is a material cost and therefore requires a strategic study.

Eurocan must continue to improve its maintenance function in order to improve equipment reliability. At the same time maintenance costs have to be lowered without affecting improvements in reliability. This paper finds that Eurocan should continue to improve the performance of its in-house crews, possibly through the implementation of a team structure. As higher levels of efficiency are reached, the in-house teams can be further utilized by performing administrative duties, performing preventative maintenance work, or by taking on work that is currently being contracted out.
Although outsourcing of some of the maintenance activities has been and continues to be successful, increasing the outsourcing of work normally performed by internal crews is not recommended due to the only moderate, if any, gains in productivity and unit cost to be achieved and the risk of weakening labour relations.
DEDICATION

To Madeleine.

For her gentle encouragement and self-sacrifice.
ACKNOWLEDGEMENTS

The Kitimat EMBA cohort: instructors for their guidance and knowledge; students for their encouragement.
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1 INTRODUCTION

This paper will recommend a competitive strategy for the maintenance function at Eurocan Pulp and Paper Co., Division of West Fraser Mills, Ltd. (the Company or Eurocan).

Eurocan is situated at the head of Douglas Channel located at Kitimat in north western BC. The Eurocan plant has two paper machines and makes unbleached linerboard and kraft paper from sawmill wood residue. Most of the Company’s plant maintenance is performed by its own crew of 140 unionized employees. Major work is out-sourced for the annual maintenance outage as well as for jobs that require specialized skills or equipment.

The linerboard and sack paper industry will be studied to determine the nature of the competition in this industry. Then Eurocan will be studied to determine if it has any sustainable competitive advantage and, if not, how Eurocan can successfully compete in this industry. The maintenance function at the mill will be examined to see if it is a significant cost component, and if so how it may fit within a competitive strategy. The out-sourcing options available to the Company will be examined in relation to Eurocan’s current practice, the advantages and disadvantages of each option, and the experience of industry.
2 THE PROBLEM

The problem that this paper addresses is one of determining a competitive strategy for the maintenance function at Eurocan that allows the Company to compete more successfully within its linerboard and sack paper industry. Most of Eurocan's plant maintenance is performed by its own crew of 140 unionized employees. The Company utilizes contractors for its boiler, precipitator, and evaporator maintenance during its annual maintenance shutdown. In addition it builds most capital projects using contract crews. There has been a trend in the manufacturing sector towards the outsourcing of maintenance.
3 DESCRIPTION OF THE OPERATION

Eurocan, located in Kitimat, BC, is owned by West Fraser Timber Co. Ltd. (West Fraser). Eurocan manufactures two types of products, linerboard and sack paper. Both are made from brown-coloured, non-bleached pulp which Eurocan produces from wood chips. The wood chips are mostly a by-product of affiliated lumber mills located between Kitimat and Burns Lake. Eurocan transports the chips by railcar and truck. In 2004 Eurocan employed 575 people and produced 445,871 tonnes of paper.¹

3.1 History

The West Fraser company was founded by the three Ketcham brothers in 1955 when they acquired a planer mill at Quesnel, BC. The firm has vertically integrated from the single planer mill to sawmills, to a pulp mill, a group of retail building supply stores, then to Eurocan’s Liner and Sack plant, a newsprint joint venture, two medium density fibreboard plants, then plywood, veneer, and laminated veneer lumber. In 2001 West Fraser sold its building supply retail operations.² In December, 2004 West Fraser purchased Weldwood of Canada Limited, and is now the third largest lumber producer in North America and Canada’s largest producer of plywood.

The Eurocan plant was built in 1969 by Enso Forest Products Ltd. and went into production in 1970 with an adjoining sawmill. The sawmill closed in 1982. West Fraser first purchased a 50% interest, then 100% in 1993.

¹ Eurocan monthly unpublished internal reporting package for December 2004
² West Fraser 2003 Annual Report, 7
3.2 Control and Ownership

The Eurocan division is 100% owned by West Fraser Timber Co. Ltd. West Fraser is a publicly traded company with common shares listed and traded under the symbol WFT on the Toronto Stock Exchange. The Ketcham families, founders of the company, own approximately 24% of the voting shares\(^3\) and Henry H. Ketcham is the Chairman of the Board, President and Chief Executive Officer. At the time of this writing West Fraser owns or has significant interests in nineteen sawmills, seven panel mills, and six pulp or paper mills.\(^4\) All of the fibre requirements of its panel or pulp and paper operations can currently be supplied by its own operations, either directly or indirectly.\(^5\)

3.3 Firm Strategy

West Fraser values employee dedication and strives to remain a low-cost producer of commodity forest products such as lumber, plywood, fibreboard, pulp, and newsprint. In the management discussion in recent annual reports there is a focus on the achievement of greater operational efficiencies and production. The firm is limited in horizontal scope because all the products are generated from the timber resource. Generally higher value timbers (logs that are straight with no rot) become higher value products. The firm produces too much product to sell all of it close to home, and has to look to the US and overseas.

West Fraser has lumber operations in BC, Alberta, Louisiana, and Arkansas and is now the third largest lumber producer in North America with almost 80% of lumber sales to the US and 5% to the Far East. West Fraser panel operations are located in BC and Alberta with about

\(^3\) West Fraser Notice of Annual General Meeting of Shareholders, March 2005, 11
\(^4\) West Fraser 2004 Annual Report, 6
\(^5\) West Fraser 2004 Annual Report, 7
60% of medium density fibreboard sales to the US and 4% to the Far East. About 95% of plywood sales went to Canadian customers with 5% to the US.\(^6\)

West Fraser produces pulp in two pulp mills in Quesnel, BC and one in Hinton, Alberta. In 2004 67% of sales went to the Far East, 26% to North America, and 7% to Europe. The newsprint mill in Whitecourt, Alberta sold about 75% of its product in the US, and 25% in Canada. The firm has many products with many markets. West Fraser tries to be a cost leader and is successful in producing low-cost lumber, panel, paper, and pulp.\(^7\)

### 3.4 Division Strategy

Eurocan’s mission statement reads, ‘Through Full Contribution of all Employees, Eurocan will be a Low Cost and Profitable Competitor in the International Market Place’.\(^8\) In the 2004 Annual Report, the Chairman’s report states that improved productivity and reduced costs were ‘critical to the Kitimat mill’s solid turnaround in operating performance’.\(^9\) Low unit cost as achieved by frugal spending and productivity improvements is definitely the principle being employed at Eurocan to achieve competitiveness. All orders are made to customer specification of such qualities as strength, roughness (printability), elasticity, colour, and brightness. The Eurocan mill uses virtually 100% virgin softwood fibre, and so has an advantage in making strong paper. Eurocan attempts to make the highest quality paper it can in order to demand a better price. Eurocan therefore has an integrated low-cost/differentiation stance.

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\(^6\) West Fraser 2004 Annual Report, 12-14  
\(^7\) West Fraser 2004 Annual Report, 14-16  
\(^8\) Internal Eurocan Document  
\(^9\) West Fraser 2004 Annual Report, 4
3.5 The Products

Linerboard is made on one of two paper machines. Liner is the heavier paper and is targeted at 960 tonnes per day production. It is sold to customers who use it for inside and outside surfaces of cardboard box material (corrugated panel) or for boxboard (shoebox type material). Because Eurocan uses very little recycled paper, the product is considered kraft liner (unbleached liner that is more than 80% virgin fibre). Liner that is less than 80% virgin is called test liner, and is used to make the corrugated center of the corrugated panel.

Sack paper is made on the second paper machine. This is a thinner paper, and production is targeted at 340 tonnes per day. Sack paper is sold to bag makers. According to DeKing, grocery and retail bags represent about 43% of total industry shipments, followed by multi-wall bags and shipping sacks at 38% and wrapping and converting papers at 19%. Eurocan Sack paper generally demands from $150 to $300/tonne more in net price than linerboard.

Eurocan shipped its products to customer segments as summarized in Table 1.

---

10 Noel DeKing, "Kraft paper: U.S. decline of bag and sack papers continues" 
Table 1 Customer-Product Matrix

2004 Annual Sales (millions $ of net sales) by Customer Segment

<table>
<thead>
<tr>
<th>Products</th>
<th>Linerboard</th>
<th>Sack Paper</th>
<th>Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>41</td>
<td>12</td>
<td>53</td>
</tr>
<tr>
<td>South East</td>
<td>29</td>
<td>6</td>
<td>35</td>
</tr>
<tr>
<td>Asia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Europe</td>
<td>30</td>
<td>1</td>
<td>32</td>
</tr>
<tr>
<td>Canada</td>
<td>24</td>
<td>6</td>
<td>30</td>
</tr>
<tr>
<td>Far East</td>
<td>21</td>
<td>3</td>
<td>24</td>
</tr>
<tr>
<td>Mexico</td>
<td>11</td>
<td>9</td>
<td>20</td>
</tr>
<tr>
<td>Middle East</td>
<td>-</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>9</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>159</td>
<td>65</td>
<td>224</td>
</tr>
</tbody>
</table>

Source: Table by Author, data from Internal Eurocan Reports

3.6 The Manufacturing Process

The Eurocan plant has three major components: the pulp mill, the chemical recovery unit (CRU), and the paper mill. The overview is depicted in Figure 1, the pulp mill in Figure 2, the CRU in Figure 3, and the paper mill in Figure 4.
3.6.1 Pulp mill

The pulp mill screens the wood fibre and generates four types of pulp. Sawdust is cooked to produce a sawdust pulp using a single continuous feed process. Chips are cooked in eight batch digesters to produce either base stock or top stock. The Chemi Mechanical Pulp (CMP) plant was added to the mill in 1989 and adds another form of pulp using more chemical and less fibre in its process. The cooked pulp is washed and stored in five tanks before being fed into the paper mill. There are two tanks of base stock (from the batch digesters), one of top stock (batch pulp which is refined more and used in sack paper and the surface of linerboard), one tank of CMP stock, and one of sawdust stock.
3.6.2 Cooking Liquor Cycle

The active ingredients of the cooking liquor that is used to cook the chips are Sodium Hydroxide and Sodium Sulphide. The liquor is applied along with heat to separate the wood fibres from the resins. The cooked pulp is then washed and the wash water recycled in order to recover the cooking chemicals.

The recovery of the chemicals goes through several stages. Water is evaporated to a 68% solids mix and then the resulting strong black liquor organics are burned in the recovery boiler.

---

The energy is used to generate steam to power the mill. The inorganic smelt from the boiler is dissolved in water to yield green liquor. This liquor is clarified to remove insoluble material and slaked (reacted with water) to form calcium hydroxide from lime.\textsuperscript{12} The calcium hydroxide in turn reacts with sodium carbonate to form the active sodium hydroxide. This white liquor mix is clarified to remove lime mud, which is re-burned and regenerated in the kiln. Make-up chemicals are added to replace system losses. The white liquor is ready for cooking chips again.

\textsuperscript{12} G. Smook, 152 - 153
3.6.3 Paper Mill

The Eurocan plant has two paper machines. The process is similar for each machine. The head box sprays the stock uniformly across a 6.5 meter wide fabric moving endlessly between rollers. The fibres form a matted web as the water is suctioned away through the fabric (the
fourdrinier table named for the Fourdrinier brothers of 1807). In the press section the paper is pressed between opposing rolls to remove more water. The dryer section uses steam heated cylinders to further dry the paper. The calendar stack (consisting of three rolls at Eurocan), further squeezes the paper and smooths the surface.

The paper is wound onto a steel core known as a jumbo reel. There is room to store 19 reels between both paper machines and their winders. Once the reel is full (at about 28 tonnes) the jumbo spool is moved to the winder. Here the paper is wound onto cardboard cores and cut to the customer-specified width. The paper rolls, varying from one half to three tonnes, are forwarded to the single finishing line for labelling and wrapping or strapping. The finished paper is moved to the ‘2 day’ warehouse and loaded onto railcars for North American sales or trucked to the terminal warehouse. At the terminal warehouse the rolls of paper are loaded onto barges and shipped to Vancouver or onto ships and sent overseas. A small amount of paper is loaded onto trucks for sales in Canada.

The majority of paper is made to customer order, and varies in thickness, diameter, roll size, quality specifications, and paper strap and wrap. A small amount of paper is made as stock when customer orders dwindle during times of low demand. This paper, although counted as production (throughput), is often eventually sold as cull or reworked.

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13 G. Smook, 227
Figure 4 Paper mill Flowchart

Sawdust Stock Storage

Base stock Storage

CMP Stock Storage

Top Stock Storage

Linerboard machine

Sack Kraft machine

Paper Reel Storage

Paper Reel Storage

Winder

Winder

Finishing Line

Terminal Warehouse

2 Day Warehouse

Ship or Barge Loading

Truck Loading

Railcar Loading

Source: Figure by Author
4 INDUSTRY AND EXTERNAL ANALYSIS

It is useful to analyze the industry in which Eurocan competes to ascertain whether it is a desirable industry to be in and what key success factors are needed to give a firm a competitive advantage. First the author will present a description of the industry and then analyse the industry using Porter’s Five Forces augmented model. This is followed by a discussion of the key areas that a successful company has to perform well in.

4.1 Description of the Industry

The industry in which Eurocan competes is worldwide. Box plants using linerboard and bag producers using sack paper are Eurocan’s customers. There were about 800 independent corrugated converters and sheet plants in the US alone in 2000. Eurocan produces about 75% liner, and 25% sack by weight.

Eurocan is an independent producer, whereas most of the industry is integrated with box plants or bag plants. In the US in 2000, 25 to 30% of containerboard production was available for independent box plants while the rest went to integrated box plants. Also in the US about 30% of mills were integrated with pulp production while 70% were independent.

The world unbleached kraft linerboard industry was concentrated in the US in 2000 as in Table 2. Although 75% of the world’s unbleached liner was made in the US, only about 40% of world containerboard was made in the US in 2000.

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15 Containerboard: the material used to make cardboard boxes; this material has two outer layers of linerboard and a corrugated middle layer of lower quality paper
Table 2 World Linerboard Production Capacity, 2000

Unbleached Kraft Linerboard
World Capacity (thousands of metric tonnes)

<table>
<thead>
<tr>
<th>Country</th>
<th>Tonnes</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>19,044</td>
<td>75%</td>
</tr>
<tr>
<td>Indonesia</td>
<td>2,459</td>
<td>10%</td>
</tr>
<tr>
<td>Brazil</td>
<td>1,420</td>
<td>6%</td>
</tr>
<tr>
<td>Sweden</td>
<td>897</td>
<td>4%</td>
</tr>
<tr>
<td>Austria</td>
<td>340</td>
<td>1%</td>
</tr>
<tr>
<td>Other</td>
<td>1,145</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td>25,305</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: Table by Author, data from “Containerboard Industry Review 1970-2000” Centre for Paper Business and Industry Studies 21

The linerboard industry shows low concentration in linerboard production, since there are at least 36 linerboard manufacturers worldwide. According to the American Department of Justice, the Herfindahl-Hirschman Index (HHI), a measure of industry concentration, shows an indicator of fewer than 500 for linerboard where an HHI number below 1,000 is considered unconcetrated. The Sack paper industry also has low concentration, since there are at least 25 producers worldwide.

4.2 Porter’s Five Forces

Suppliers of raw materials, power, electricity, labour, equipment, consumables, and expertise have varying amounts of power compared to a liner or sack company. Suppliers of wood chips present a moderate threat to rents of pulp mills in the industry. Pulp mills need to assure a constant chip supply in order to maximize up-time and achieve full capacity utilization. If sawmill residual chips are not available locally, they may transport chips over a longer distance, utilize whole-log chipping, or use recycled paper as an input. Sawmills, on the other hand, need to sell their chips (a lumber by-product) for several reasons. First, piles of unused wood waste would be scrutinized by government bodies. Second, piles of wood waste become

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18 “Pulp and Paper Web Directory – Manufacturers” Pulp & Paper Canada
20 “Pulp and Paper Web Directory – Manufacturers” Pulp & Paper Canada
difficult to store. Third, the by-product revenue of wood chips presents a significant portion of the total revenue of the sawmilling industry. If pulp mills cannot take the residual wood chips, then the chips must be transported to another pulp mill, particle board mill, or oriented strand-board mill at an additional expense. West Fraser, like many other forest companies, has integrated sawmills with pulp mills, removing the threat to both sectors.

In the BC pulp and paper industry of 19 pulp or paper mills, the labour employed is mostly unionized. Labour presents a strong threat to rents of the pulp industry in BC, where labour presents a significant cost component and has a history of disruptions.

Electricity and natural gas are utilized as power sources by many pulp mills and often represent significant costs. Suppliers of utilities tend to be monopolistic yet grant manufacturing plants low rates as significant customers. Utility suppliers represent a moderate threat to the pulp industry. As demand for these resources increases in populated areas, the cost rises.

Suppliers of equipment, consumables, and expertise are numerous and therefore present low threat to rents of the pulp industry. Overall suppliers present a moderate threat to the linerboard and sack paper industry.

Buyers of linerboard are mostly containerboard plants and box plants which make packaging for appliances and commodities. Buyers of sack paper make grocery bags, and bags for such goods as dog food, cement, flour, and sugar. Switching costs to substitutes are high, while switching costs to other firms making the same product is low. Buyers exert a moderate threat to rents.

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21 "Forest company, unions join forces" Canada.com (2003), 1
Substitutes for sack paper and linerboard are wood and plastic. For instance the plastic shopping bag has replaced the paper grocery bag in some countries. The plastic box has replaced the cardboard box in some business to business transactions where the plastic box can be recycled back to the supplier. Businesses may be resistant to change from cardboard to plastic because the change involves reorganizing their shipping process to recycle plastic boxes. Cardboard and paper are, in some cases, preferred for shipping and wrapping many products due to workability,
uniformity, strength, appearance, stacking ability, printability, and price, among other characteristics. Overall threat from substitutes is moderate to high.

Entry barriers are low to moderate. A new entrant needs access to a wood chip supply, clean water, electric power, capital to build a mill, labour, and expertise. Also the capital will be sunk (not portable) and the new entrant will need to establish customers. Environmental regulations raise entry barriers by requiring expensive closed-loop processes, back-up plans and equipment, and environmental monitoring. Generally a pulp mill will need either cheap labour or inexpensive chips to be successful. On the other hand, a sawmill will need to ensure that a customer is available to buy its wood waste. A large sawmilling company may need to integrate into the pulp mill industry to guarantee a customer for its wood chips, even if the pulp industry is not attractive. The threat of new entry to rents is moderate to high.

Rivals are numerous. There are at least 36 linerboard producers and 25 sack paper producers worldwide. Many of the producers use recycled paper and many are integrated with box or bag plants. Since there are many firms of unequal size, the product is somewhat differentiated, entry and exit is moderate, profits are low on average\(^22\), and the rivalry appears mainly to be based on cost and quality, the market structure can be considered a competitive selection.\(^23\) There is often over-capacity in the industry\(^24\) and this encourages price competition.\(^25\) The overall threat from rivalry to rents is high.

Technology provides increasingly efficient and reliable equipment which reduces unit cost and increases paper quality. Technology also allows some players to become more competitive than others. In the 1990s the use of thermo mechanical pulp mills allowed new mills to use the less expensive fibre found in the South-eastern United States and Latin America. That,

\(^{22}\) Karen S. Kaplan, "Consolidation and Containerboard". *Boxboard Containers International* (2001), 1
\(^{23}\) Daniel Shapiro, "Strategic Management Classroom Notes – External and Industry Analysis" *Simon Fraser University MBA 607*(Spring 2005), 17
\(^{24}\) William Pollert, "Conduits bounce back, come of age" *Primedia Business Magazines and Media*, (2005), 1
\(^{25}\) Daniel Shapiro, 30
along with the increasing use of recycled paper, reduced the Canadian advantages of low-cost fibre and proximity to market.26

Complementors affecting demand for linerboard and sack paper are companies that manufacture or grow products that require packaging, such as televisions or bananas. The supply of products and therefore demand for packaging materials is dependant on the general world economy. Complementors affecting the supply of raw fibre are construction companies or home builders that use lumber in construction, since much of the fibre is in the form of chips cut from saw log waste material. Lumber is in fairly constant demand in North America. However, if construction is down, as measured by US housing starts, and some sawmills close, the supply of chips can be increased through more expensive whole log chipping.

Government has an impact on the attractiveness of the industry. Forest policy and regulations tend to be more stringent in developing countries; however these countries have the least capacity to enforce the rules.27 There is considerable variation of rules even within countries.28 British Columbia forest land is mostly Crown-owned, where the harvesting of timber is more easily regulated than on private lands.29 These regulations increase the cost of harvesting timber (although they also ensure a continuing forest resource), and therefore can put upward pressure on the cost of fibre to pulp mills. As the cost of fibre increases, driving up paper costs, the plastic substitutes become more attractive.

In summary suppliers present a moderate threat to rents, buyers have moderate bargaining power, substitutes present a moderate to high threat, new entrants present a moderate to high threat, and rivals present a high threat to rents. Combined, this makes the linerboard and sack paper industry a challenging business to be in. While this analysis considers the linerboard

26 Roger L. Martin and Michael E. Porter, “Canadian Competitiveness: A Decade after the Crossroads” (2001), 13 C.D. Howe Institute
27 Benjamin Cashore and Connie McDermott, “Global Environmental Forest Policies, Canada as a Constant Case Comparison of Selected Forest Practice Regulations” International Forest Resources (2004) Ch. 7, 3
28 Benjamin Cashore and Connie McDermott, 2
29 Benjamin Cashore and Connie McDermott, 9
and sack paper industry a relatively unattractive industry to be in, individual companies will range in profitability depending on the presence of competitive advantages and how well they perform in a few key areas.

4.3 Key Success Factors

'The competitiveness of each firm in an industry depends on how well it performs in a few key dimensions called success factors'. The Company focuses on the following key areas.

Eurocan tries to operate efficiently at full capacity to achieve the lowest possible unit costs. This is measured with such indicators as tonnes per day of production, up-time percent of paper machines, and percent of cull paper (reject paper). The faster the machine speed, the more up-time, and the less reject paper, the more units of production there are to spread the fixed monthly costs over, and therefore the lower the unit cost. If Eurocan can lower its unit cost then it can raise its monthly profit. Unfortunately all plants in the industry strive to achieve maximum up-time and production per day for the same reason. When capacity exceeds demand (and capacity of existing and new mills is always increasing), the lowest cost producers tend to set the market prices.

Eurocan needs to have inexpensive inputs such as fibre, labour, and energy, in order to have a cost advantage. Since there is no single competitive advantage existing for Eurocan in this area, the Company tries to maximize value in all areas through studying unit costs on a monthly basis.

The Company has a monthly scorecard to track injury rate, environmental incidents, machine efficiency and production, fibre cost, energy cost, productivity per person, overtime,

30 Daniel Shapiro, 35
shutdown start-up success, total cost per tonne; and for maintenance the total maintenance cost per tonne as well as the contract maintenance cost per tonne. These indicators are compared to industry benchmarks as well as past performance.\textsuperscript{31}

\textsuperscript{31} Internal Eurocan Document
5  INTERNAL ANALYSIS

In this section the author will examine where the value of the forest products is captured in West Fraser, and the impact this has on Eurocan. Then Eurocan's relationships will be examined in order to uncover any sustainable competitive advantages. Finally a sustainability analysis will be used to look at long-term threats to the competitiveness of Eurocan. This section, along with the industry analysis, should give Eurocan an indication of how it can compete.
5.1 Value Chain Analysis

Figure 5 Eurocan’s Supply Chain

Source: Figure by Author

The supply chain for Eurocan (Figure 5) is similar to other firms in the forest industry. Logging contractors harvest the timber, which West Fraser and other sawmills have rights to under forest licensing agreements. The logs are milled into lumber and the residual wood material is cut into wood chips. The wood chips are trucked or hauled by railcar to Eurocan for processing into pulp, and then into paper.
Table 3 Value Creation in the West Fraser Supply Chain

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sawmill and Harvesting</td>
<td>19%</td>
<td>20%</td>
<td>6%</td>
<td>4%</td>
</tr>
<tr>
<td>Panels</td>
<td>11%</td>
<td>16%</td>
<td>6%</td>
<td>6%</td>
</tr>
<tr>
<td>Pulp and Paper Products</td>
<td>-1%</td>
<td>-2%</td>
<td>-5%</td>
<td>-5%</td>
</tr>
</tbody>
</table>

Source: Table by Author, data from West Fraser Timber Co. Ltd. Annual Reports 2004, 2003

Table 3 demonstrates that most of the value is retained in the lumber and panels sectors (solid log processing). West Fraser received 19% and 6% for 2004/2003 operating earnings divided by capital employed. This compared to 11% and 6% for panels and -1% and -5% for pulp and paper products.

In a supply chain most value is appropriated by owners of scarce resources and where competition is limited.\(^{32}\) In the BC forest industry the rights to a secure timber resource may reduce competition through the ownership of a scarce resource. Another reason for value capture at the sawmilling and panels sectors could be a chip-pricing formula based on the market price of pulp.\(^{33}\) As the price of pulp goes up, some of the profitability is therefore transferred to the primary processing operations through the chip price formula. The lower profitability then attracts less investment and therefore lower technology at the pulp and paper sector; for instance within

\(^{32}\) Daniel Shapiro, 12
\(^{33}\) Pope & Talbot Inc. 2004 Annual Report, 7
West Fraser in 2004 capital expenditures were 3% of identifiable assets for pulp and paper operations as opposed to 5% for sawmills and 3% versus 8% in 2003.\footnote{West Fraser 2004 Annual Report, 61}

5.2 Stakeholder Analysis

The Company has relationships with corporate management and the West Fraser sawmills, CEP Union, customers, suppliers, the communities of Kitimat and Terrace, the Haisla Nation, the Federal government (Dept of Fisheries, Ministry of Environment), the Provincial government, Kitimat Valley Institute, and transportation companies. The suppliers include Pacific Northern Gas, BC Rail, chemical suppliers, and many contractors that provide maintenance service and materials, consulting, trucking, and engineering services.

Corporate management represents the shareholders through the Board of Directors. Corporate management has input into the mill operation through funding approval for spending, since the shareholders supply the capital, and enforcement of company policy. The Union negotiates the labour agreement, which now has a five year term, and has a large impact on employee motivation and cooperation. Customer relationships affect sales price and volume. It is critical to maintain these customer relationships by supplying service, quality, and care. The purchase of materials and services keep a purchasing department of four very busy. Some suppliers are long-term and negotiate yearly supply and price levels. Some chemical suppliers have a representative on site and manage the chemical usage as well.

The communities of Kitimat and Terrace provide good home environments in which employees enjoy living and raising their children. Without the many facilities and a good reputation in the community, Eurocan would find it more difficult to find good, qualified employees to relocate to Kitimat. To promote itself within the community Eurocan provides
donations and scholarships. The company has an increasingly close relationship with the Haisla Nation. Fish-tainting in the Kitimat River from mill effluent has forced ongoing talks and a new level of cooperation. West Fraser gave up its timber rights in the Kitlope Valley in 1994 in order that the provincial government could preserve this ancestral Haisla territory and coastal watershed. The Company has also involved Environment Canada and Fisheries and Oceans Canada in the discussions on tainting. Eurocan has also sold hot water to the federal fish hatchery in Kitimat for many years. The Company has long-term contracts with both Pacific Northern Gas and BC Hydro to ensure the supply of natural gas and electricity at reasonable prices.

Maintenance materials and service providers (not including parts from stores or parts and services for capital projects, consultants or engineering companies) numbered 254 to 312 per year in the last five years. 52 companies were paid at least $100,000 during this period. Of these 12 are located in the Northwest area and include a fabricator, electrical shop, communications company (provides radio service), a crane provider, a dock repair expert (piling), parts supplier for mobile equipment, excavator, painting and sandblasting expert, electric motor repair shop, and two construction companies. The local companies have an advantage over the others in that they can provide service on a daily basis at a lower cost (no transportation cost). Some keep trailers on site to provide an office, lunchroom, and storage area. The 52 companies include two companies that perform boiler work during the annual shutdown, one company that does all significant scaffolding (and keeps some scaffolding material stored on site), one company that performs paper machine gear work, machine shops, a company that tests vessel walls with x-ray technology, a rail-yard maintenance provider, a firm that provides underwater maintenance service for the river intake pumps and lagoon aeration, two companies that provide maintenance of air compressors, a water filtration company, two companies that repair and recover paper machine rolls, a company that puts protective spray paint on metal, electric motor rewind shops,
and a heavy freight carrier. The top 20 companies averaged revenues from Eurocan of $200,000 to $1 million per year from 2000 to 2004.

Eurocan does not have many formal relationships with maintenance providers. The Company will do business with a historic service provider but will utilize another if the cost is lower or if the original provider is not performing quality work. Eurocan will put major projects out to bid, if time allows, in order to lower costs. If there are two or more companies that give comparable service then Eurocan will sometimes provide each with work in order to maintain competitive pricing. Companies that provide unique services to Eurocan may have longer term contracts.

5.3 Sustainability Analysis

For Eurocan competition is based on cost and quality. Eurocan has access to expensive softwood fibre that produces strong paper, yet has limited access to recycled paper. In order to be successful, Eurocan must make the best quality paper it can from the fibre it has, and combine that with cost control. Since Eurocan has limited capital to modernize and no Research and Development department to pursue further differentiation through quality improvements, it must continue to compete on cost. In the future, it is most likely that Eurocan’s environment will become increasingly cost-competitive, as firms in the linerboard and sack paper industry invest in advanced technologies, in order to compete on costs.

Part of the reason Eurocan has survived 35 years is that it is integrated with profitable sawmills in the Northwest that provide the fibre supply. Without the Kitimat pulp mill to take the chips from the sawmills, the sawmills would have to ship the fibre further away to other mills, at a greater transportation cost causing a loss of net revenue to the sawmills. Even though Eurocan is integrated with the sawmills, Eurocan must continually improve its position and strive to become a low-cost producer. The Company does not have a sustainable competitive advantage as
such, but it does have a combination of factors that allow it to compete. One is the proximity to sawmills, which enables a constant fibre supply. Any future development that would reduce the fibre supply to West Fraser sawmills would also restrict the chip supply to Eurocan. Also a newer pulp mill, particle board plant or oriented strand board mill in the Northwest could threaten to take away some of the fibre supply.

In summary Eurocan’s current position in the industry is weak as it has no single long-term competitive advantage. However, given Eurocan’s current strategy of increasing cost control, its position is improving.
6 THE DESCRIPTION OF THE MAINTENANCE DEPARTMENT AT EUROCAN

Before discussion of the results of the external and internal analysis and their affect on how maintenance should be managed at Eurocan, the author will describe the current maintenance department as well as the current Eurocan policy on the practice of contracting out maintenance.

6.1 Structure

The current maintenance department has area-based mill maintenance crews. Seven crews, comprising 135 active hourly employees, work in the areas as in Table 4. Contractors supply scaffolding, cranes, and perform the large jobs during the annual shutdown. Parts are sent out for rebuilding. Motors are sent out for rewinding.

<table>
<thead>
<tr>
<th>Crew</th>
<th># Workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper mill</td>
<td>31</td>
</tr>
<tr>
<td>Steam plant</td>
<td>39</td>
</tr>
<tr>
<td>Project Crew</td>
<td>4</td>
</tr>
<tr>
<td>Pulp mill</td>
<td>34</td>
</tr>
<tr>
<td>Mobile Equipment</td>
<td>8</td>
</tr>
<tr>
<td>Outside Areas</td>
<td>9</td>
</tr>
<tr>
<td>Central Shops</td>
<td>10</td>
</tr>
</tbody>
</table>

Table 4 Breakdown of Maintenance Crews at Eurocan as at June 2005

Source: Table by Author, data from Eurocan Internal Reports
A project crew was formed in late 2000 consisting of eight workers\(^3\), allowing the maintenance department to take on more work in the contractor's traditional domain of specialty work. This crew allowed the company to take advantage of worker availability through trade flexibility and the adoption of preventative maintenance programs. In 2003 a Central shops group was formed, which included a key reliability team. This team consists of lubrication mechanics, vibration analysts, and two engineers. These people focus on diagnosis and then finding the root causes of failures. On finding root causes they then initiate projects or programs to remedy the failures. This team also works closely with the rebuild shop to ensure that rebuilds are precisely to specification. Figure 6 shows the overall maintenance manning over time.

![Figure 6 Maintenance Department Manning](image)

Source: Figure by Author, data from Eurocan Internal Reports

6.2 Eurocan Current Policy on the Outsourcing of Maintenance

Eurocan's current policy on contracting out is stated in the 2003 - 2008 labour agreement with Local 298 of the Communications, Energy, and Paperworkers Union of Canada. The policy

\(^3\) Eurocan monthly unpublished internal reporting package for December 2000 and 2001
of the company 'is to avoid, wherever possible, contracting out of work or repairs normally done by and within the capacity of the Maintenance crew'. Furthermore 'the primary responsibility for the operation of the mill will remain with operators and the primary responsibility for maintaining the mill will remain with trades persons and steam plant maintenance employees.'

The Company has indicated, through the current labour agreement, that it is intent on minimizing the work done by contractors and maximizing the work done by mill crews. This is stated: 'The joint committee will examine ways to enhance employment opportunities through new work arrangements, including reduced overtime.' The Labour Agreement also states, 'Flexibility will increase the productivity of current employees which will result in more capability to do work that is currently contracted...it will make sense to do more jobs with our crews.' This is emphasized in the letter on relief supervision, 'It is not the intent of the Company to increase the use of contractors through relief supervision.'

Further, the company has agreed to apply certain conditions with respect to contractors coming on-site to perform the work normally performed by employees 'The Contractor's straight time hourly rate of pay for a journeyman will not be less than the straight time hourly rate for the equivalent mill journeyman.' Page 126 of the labour agreement refers to payments made by the contractor to the Pulp and Paper Pension Plan: 'a) For contractors performing maintenance and repair work of a nature normally performed by employees in the bargaining unit – the equivalent contributions b) For contractors performing construction work – one-half the equivalent contributions.' Page 126 also refers to payments made to the Union Local 298: 'One percent (1%)

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39 2003 - 2008 Labour Agreement, Notes of Discussion on Flexibility, Sect. 1, 133
40 2003 - 2008 Labour Agreement, Letter Re: Relief Supervision, Sect. 3, 236
41 2003 - 2008 Labour Agreement, Letter from The President of Eurocan Pulp & Paper Co. Re: Commitment Regarding Contractors Coming Onto Mill Site, 125
of all wages earned calculated on the basis of straight time hours worked shall be remitted to the Local Union on a monthly basis.\textsuperscript{42}

The actual practice of contracting out involves consultation with a joint Union/Management group as covered on Page 44 of the 2003 - 2008 labour agreement, states ‘…a Joint Contracting Committee will be established and it will be used as a forum to discuss the company’s contracting decisions. In keeping with a joint commitment of the Company and the Union to provide as much maintenance and repair work as possible to the regular maintenance workforce, the Committee will also meet quarterly to make recommendations regarding the utilization of the mill maintenance workforce to minimize the use of contractors, both inside and out of the mill.’\textsuperscript{43} In practice this committee reviews contracting out decisions weekly, and, depending on the current workload and project urgency, the skill-set required, and use of specialized equipment, will decide whether to contract out or not. The committee makes the final decisions and displays the minutes on bulletin boards throughout the mill.

\textsuperscript{42} 2003 - 2008 Labour Agreement, Letter from The President of Eurocan Pulp & Paper Co. Re: Commitment Regarding Contractors Coming Onto Mill Site, 126
\textsuperscript{43} 2003 - 2008 Labour Agreement, Article XXV - Contracting., Section (a), 44
7  STRATEGIC ALTERNATIVES

The external analysis shows that Eurocan should compete based on cost and quality. The internal analysis shows that Eurocan is in a segment of the value chain that is not able to extract as much value as the other segments within West Fraser. The Company was also shown to have no single source of sustainable competitive advantage. It is time therefore to first ascertain the relative importance of the maintenance cost to the rest of the costs at Eurocan, and second the significance of using the maintenance department to lower unit costs in order to achieve a cost advantage. The present situation will be looked at along with the advantages of using in-house crews, contractors, and a combination of both. Finally this section will examine the industry experience with maintenance outsourcing.

7.1  The Importance of Maintenance from a Cost Perspective

When focusing on maintenance costs it is useful to look at maintenance in comparison to the total cost at Eurocan. Maintenance spending has averaged 16% of the total production costs from 2002 to 2004, where total production costs include all the costs of making paper. Another useful statistic is that maintenance is about 32% of the total controllable costs (Figure 7). To estimate controllable costs, one must look at each cost category and estimate the portion on which management can exert some level of control, for instance through price negotiation or careful, monitored use of a consumable.
The maintenance cost itself of 32% can be broken down into three components; departmental crews and their related overhead 9%, replacement parts and material 8%, and contractor services 13%, as in Figure 8. If maintenance costs could be lowered by 10%, this would reduce costs by about $4 million per year.

It is useful now to look at costs as unit costs or cost per tonne. Cost per tonne can be lowered either by reducing spending or by increasing the units or tonnes of production. Effective maintenance plays a large role in reducing machine downtime and therefore increasing machine productivity. Figure 9 shows that the larger linerboard machine has improved running time from...
72 to 85% over the last three and one half years, while Figure 10 shows that the sack paper machine has improved from 71 to 82%. The fall down from 1998 to 2001 for liner and 2000 to 2001 for sack was likely due, in part, to a 20% staff reduction in the fall of 1998 and a 10% reduction in the hourly workforce in 1999 (both predominantly through voluntary early retirement).

**Figure 9 Efficiency Improvements on Eurocan’s Paper Machine No. 1 (Liner)**

![Graph showing efficiency improvements on Eurocan’s Paper Machine No. 1 (Liner)](source: Figure by Author, data from Internal Eurocan Reports)

The improvement to the liner machine productivity on a per year basis has been 12.1%/4 years x 341,862 tonnes per year (2005 projected production) equals an increase of 10,300 tonnes per year. The current value of such an increase is 10,300 x $250/t (current sales less variable costs) equals $2.6 million per year, of which one half, or $1.3 million (assuming that maintenance is responsible for half of the improvement) is due to better and more preventative maintenance practices. The other causes are better operational procedures, capital improvements, and better process control. The improvement to the sack machine up-time over the same period was 11.6% or 11.6%/4 years x 121,661 tonnes per year equals 3528 tonnes per year or 3528...
tonnes x $240/t equals $.8 million per year, of which, say, half or $.4 million is due to improvements in maintenance. The total yearly improvement would be at least $3.4 million per year for both machines together, with possibly 50% or $1.7 million per year due to improved maintenance practices.

Figure 10 Efficiency Improvements on Eurocan’s Paper Machine No. 2 (Kraft Paper)

Source: Figure by Author, data from Internal Eurocan Reports

Since the benchmark targets for up-time are 90% for liner and 86% for sack, there is room for another two years of improvement. If one were to look at the difference in profitability when running at the target level of 90% efficiency on the liner machine and 86% on the sack machine, compared to 72% and 71% in 2001, one would get a number of 6 years x $3.4 million per year or $20 million. This is a conservative number since it is based on 2005 sales prices, which are depressed. This is the difference in yearly profitability due to increased machine up-
time from 2001 to 2007 projected. In addition the paper machines run faster to utilize increased pulp (also due to more up-time and greater efficiencies).

The difference in mill production due to improved maintenance could be some portion of $20 million per year (conservatively calculated), while the savings in reducing spending on the maintenance department or in spending in a more controlled way is estimated at $4 million per year. It therefore makes sense to improve the maintenance practices, whether done internally or by contractor.

If any change were to be imposed it would be beneficial to maintain stability of personnel in the maintenance area in order to assure the continued efficient operation of the mill. According to Dave King, Mill Manager, the successful contracting out of the maintenance department of Kinleith Mill of Carter Holt Harvey to ABB Maintenance Services Ltd. involved the rehiring of 60% of the original Kinleith workforce.44

7.2 Status Quo

The Company has the option of leaving the maintenance contracting-out practice as it is today. The advantage of this approach is that there is no change to deal with. Eurocan personnel can continue to focus their efforts on improving reliability, speed and quality through improved operational and maintenance practices, as well as on allocating capital improvement spending on projects that give the highest returns. The strategy of continuing to use the in-house crews does not preclude Eurocan from making the maintenance department more efficient.

7.3 Advantages of Using In-house Maintenance Crews

One of the advantages of in-house crews is that they are available in case of equipment failure. Most of the maintenance workers work eight hour days from Monday to Friday. Tour workers are scheduled around the clock in 12 hour shifts. Serious mechanical difficulties require that workers be called in after regular hours on an overtime basis. A full-time contractor based on the mill site would have the same advantage.

When using internal crews, there is one set of supervisors. No doubling up of supervision is necessary, as is the case where there are internal and contract crews. If one were to outsource the maintenance crew there would still be a need to do safety audits. There would also be a need to review the materials that the contract crews use. Decisions such as when to replace worn equipment, or whether to replace an item with a new part or a rebuilt part, or who to buy the parts from, need to be reviewed by the company.

Outside workers need to be trained on the plant's unique safety procedures, standards, or regulations. Safety training cannot be avoided and will increase the transaction costs of using outside maintenance contractors.

It could be argued that safety is better with an internal crew. A contract crew may work faster, and have more motivation to work faster, but the crew may sacrifice some safety in order to do so. This is most true when the maintenance job takes down the operation creating a significant loss in production, then everyone feels the pressure to work fast and repair the equipment quickly.

There is more coordination required when using contract maintenance crews and in-house production crews than when using all in-house crews. With all in-house crews there is not the same need for coordination.46

46 Fischbach C5
Eurocan has some site-specific complex tasks that require specific training. According to Bill Maggard, a capacity assurance consultant with the Masonite division of International Paper, ‘That is a special kind of training and that kind of work, if you have a lot of it in your plant, is best performed by your own local employees’.\textsuperscript{47}

### 7.4 Advantages of Using Contract Maintenance Crews

Contract maintenance crews can be used to overcome a skilled labour shortage. There appears to be a shortage of skilled labour approaching in B.C. in the next 10 years due to an aging workforce (the average age of Eurocan maintenance employees is 48 years). In addition there is a constant push to install more process control in order to optimize processes. This increased use of process electronics in manufacturing\textsuperscript{48} pushes the need for more skilled maintenance workers. The maintenance workers need to maintain the electronics and computerization in addition to the machinery.

The use of contract crews can reduce costs. Darrell Bovee, business development manager, plant Services Group of Raytheon Engineers says ‘Contracted services, including periodic competitive bidding, certainly help keep direct maintenance costs under downward pressure. Creating these pressures in a more traditional mill maintenance workforce situation is difficult.’ This is an important point, but only applies to that portion of maintenance that is being contracted out. Another point that Bovee makes: ‘For many facilities the average age of the workforce is fairly high and everyone is working for top pay with excellent benefits. There is a real case to be made for contracting on a strictly cost basis.’ Gary Jones, senior vice-president at BE & K in Birmingham, Ala. disagrees in part, saying ‘There is little room to reduce the $/hr cost


because of the upward pressure on wage rates in our industry. Our gains come through productivity improvements.\textsuperscript{49} This is a very good point. There are two ways to decrease the unit cost of an input. One is to reduce the price of the input and the other is to increase the productivity of the input.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{age_distribution.png}
\caption{Age Distribution of Eurocan Maintenance Department}
\end{figure}

\textit{Source: Figure by Author, data from Eurocan Internal Reports}

Eurocan has a maintenance work crew (Figure 11) with an average age of 48 (most workers are in the 45 to 59 year range), and an average loaded cost per hour of $52.40 in 2004 at 16\% overtime. An older crew with more years of service is entitled to more vacation and more vacation pay as in Table 5.

\textsuperscript{49} Finchem 72
Table 5 Vacation Entitlement at Eurocan

<table>
<thead>
<tr>
<th>Year</th>
<th>% of Pay</th>
<th>Time Off (weeks/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>4.5</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>6.5</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>8.5</td>
<td>4</td>
</tr>
<tr>
<td>14</td>
<td>10.5</td>
<td>5</td>
</tr>
<tr>
<td>23</td>
<td>12.5</td>
<td>6</td>
</tr>
<tr>
<td>29</td>
<td>14.5</td>
<td>7</td>
</tr>
</tbody>
</table>

Source: Table by Author, data from 2003 - 2008 Labour Agreement

The vacation pay and the need to bring employees in to work on overtime for vacation coverage increases maintenance cost as the workforce ages. The switch to a contract crew would likely reduce the average years of service and reduce the maintenance cost, at least for some years.

Maintenance material costs can also be reduced through outsourcing. According to Maggard, 'People do not seem to realize that half their maintenance costs are materials. They may...not properly staff and manage their parts or materials and quality assurance issues. That is something that can be contracted effectively.' At Eurocan the stores department is managed internally, along with a computer stores system. Both appear reasonably effective. Eurocan would be cautious in outsourcing such a critical area. If the mill suffers downtime due to equipment failure, and a spare part is not available, the mill would incur significant losses while transporting a replacement part from a distant location. There is no sister mill that is situated in the Northwest to borrow parts from on an emergency basis.

Maggard says "My rule of thumb is to not outsource the core competencies needed to maintain the manufacturing processes. My experience is that there are some activities companies try to do that they don’t manage well; stores, building facilities, and some advanced analytical

50 Finchem 72
technologies, that are more economically done by a contractor.’ He suggests that for technologies such as thermography and vibration analysis, training and maintaining highly skilled in-house expertise may not be cost-effective because there is too little work to be done.

With contract crews there is no need to keep workers busy year-round. The contractor can adjust the size of the crew to fit the project.\textsuperscript{51} This can be done by moving crews to other operations or by hiring them on a more temporary basis.

Contractors can supply their own tools.\textsuperscript{52} This can be useful in specialty jobs, such as high-pressure cleaning, painting parking lines and paving.

The company does not have to supply fringe benefits directly when contracting.\textsuperscript{53} The supply of employee benefits may not be a core competence of Eurocan, and it may be more efficient for a contractor to handle. Eurocan would still pay the benefit cost, including administration of the benefits, indirectly.

Maggard says that ‘There are a few companies that are very good at building process reliability into their capital projects. But in today’s world of minimum effective design and zero-based projects, very few companies are actually doing it...with today’s widespread use of contracted engineering services and their focus on competitive bidding and scoping, good life-cycle cost and reliability practices are seldom included in project designs’.\textsuperscript{54}

One advantage of having a full-time maintenance contractor may be the formal establishment between the two parties providing for customer training, certification programs, and experience exchange sessions. Where maintenance programs are performed in-house, training levels are established as in the labour agreement which only sets minimum levels.

\textsuperscript{51} Fischbach C4
\textsuperscript{52} Fischbach C5
\textsuperscript{53} Fischbach C5
\textsuperscript{54} Finchem 75
Another advantage is that the maintenance contractor can provide the capital for process improvements, to be charged back through monthly payments.\textsuperscript{55} This makes sense when the payback on a project is less than, say, two years, and the primary company does not have capital funding available.

7.5 Advantages of Combining Contract with In-house Maintenance Crews

Basically the combination of contract crews with in-house crews has most of the advantages of contracting out.

Eurocan takes advantage of some of the benefits of contract crews already. Eurocan uses about 700 workers hired in contractor crews (as well as 90 extra trades employees and 120 hole watch workers in addition to the regular crew of 140) for the maintenance work during a typical annual maintenance shutdown. The shutdown lasts approximately 12 days at a loss of production costing about $6 million. The company can do more work in a shorter time frame by utilizing large contract crews and minimizing the loss of production.

The Company does specialized work or work requiring specialized equipment with contractor assistance. This includes high-pressure water cleaning, paving, crane lifting, recovering paper machine rolls and rewinding electric motors.

Eurocan puts some of the work out to bid, in an effort to minimize cost. This is true of capital construction, high-pressure cleaning, and large shutdown projects.

\textsuperscript{55} Eric J. Hager, “Outsourcing partnerships for utility operations and maintenance” \textit{Plant Engineering} Vol. 58 Issue 9 (2004): 64
The company can pay a contractor to do work that the union has no desire to have its workers do. This work could be uncomfortable or dangerous, for example cleaning vessels prior to the actual rebuilding work.

In the future Eurocan can help overcome a skilled labour shortage by hiring contractors that have the tradesmen available. Contractors could have staff available in the event of a skilled-worker shortage because they can shift their workers around different worksites to put the highest skilled workers in the sites requiring high levels of expertise. Also, according to Bill Maggard, a capacity assurance consultant with the Masonite division of International Paper, workers frequently leave the mill workforce to work for a contractor, in order to take advantage of a contractor's incentive program.\(^{56}\) Eurocan currently has an apprenticeship program of 10 apprentices, in an effort to maintain a skilled in-house workforce.

There may be an opportunity in contracting out some of the maintenance functions that are currently covered by in-house crews. This could include the maintenance of new capital equipment that the manufacturer would have a strong desire to keep reliable. It could also offer a test area to see if a major contractor could do a more effective or efficient job.

### 7.6 Industry Experience with Maintenance Outsourcing

Managers rate maintenance as the second most effective function to outsource, next to transportation, according to a 2002 Industry Week Census of Manufacturers.\(^{57}\) The Eurocan experience supports this opinion, as shown in Table 6.

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\(^{56}\) Finchem 75

\(^{57}\) Blankemeyer 136
Table 6 Comparison of Outsourcing (or Potential Outsourcing) Services at Eurocan

<table>
<thead>
<tr>
<th>Type of Service or Potential Service</th>
<th>% of Total Outsourcing of Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transportation Services</td>
<td>52%</td>
</tr>
<tr>
<td>Contract Maintenance &amp; In-House Labour</td>
<td>45%</td>
</tr>
<tr>
<td>Contract Engineering (maintenance only)</td>
<td>1%</td>
</tr>
<tr>
<td>Consulting Other</td>
<td>2%</td>
</tr>
</tbody>
</table>

*Source: Table by Author, Data from Internal Eurocan Reports*

'Companies typically use contractors for low-skilled manual work like cleaning and painting. Companies also use contractors to supply skill sets out of their range.'\(^{58}\) This is true at Eurocan, where contractors provide high-pressure cleaning with specialized equipment. Electric motors are sent out for rewinding and paper machine rolls are sent out for repair and recovering.

Some companies trying to outsource all maintenance have had negative experiences. For instance a textile company found that the relationship was abused. Many demands were made of the contractor, who brought in the help and increased costs beyond the budget.\(^{59}\) Richard Jones of MCP Management Consultants says that it is essential to develop the proper contract or relationship with the contractor. He says that some of the maintenance strategy and decision-making must be shifted to the maintenance contractor. The contractor must be part of the asset-improvement team. Communication is needed with operators to transfer preventative techniques and to set effective schedules. The contract is important. It needs an honest examination of the current situation, what the goals are, and how this relates to the contract. Roger Mason of Flexsys Rubber Chemicals states that the contract needs to be a source of stimulus and initiative.\(^{60}\)

Production and maintenance schedules are now being coordinated. We will increasingly deal with electronic components and systems as machinery becomes self-analyzing, self-adjusting, and self-

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\(^{58}\) Annie Gregory, "Build a Partnership that Works" *Works Management* 58 Issue 12 (2005): 17

\(^{59}\) Gregory 16

\(^{60}\) Gregory 18
correcting. This will increase the complexity of equipment and systems and increase the need for more specialized knowledge.\textsuperscript{61}

Some companies reversed the outsourcing of the whole maintenance department. Fiat tried it for 10 years, and then bought back the division that did maintenance. Fiat was losing money, felt its control was slipping, and was not getting value from its network of supplier and service companies.\textsuperscript{62}

Another more local pulp and paper example is the experience of Norske Skog Canada Ltd. (Norske). Norske entered into an agreement with ASEA Brown Boveri Inc (ABB) in late 1999 to create a joint venture, Allwin Technical Services Inc. (Allwin). The joint venture looked after the maintenance at Norske’s three BC pulp mills located at Campbell River, Crofton, and Mackenzie.\textsuperscript{63} This was a unique attempt to contract out the maintenance service function to a worldwide experienced company, while retaining a level of ownership and management control. 380 employees were transferred from Norske and ABB to Allwin on March 1, 2000.\textsuperscript{64} A performance-based agreement was set up using key-performance indicators and a steering committee to enable Allwin to earn extra income and be penalized.\textsuperscript{65}

There were some problems due to the original structure. Allwin was not contracted to perform paper mill maintenance, even though two of the three plants had paper mills. This would lead to two maintenance service groups at these two sites.\textsuperscript{66} The other problem was that the employees of Norske were transferred to Allwin yet still subject to collective agreements negotiated between Norske and its trade unions. This resulted in a ruling by the BCLRB on Dec 17, 2001 which said that ‘Norske and Allwin constituted one employer for the purposes of the labour code’. However ‘the declaration cannot override the individual right of employees to

\textsuperscript{61} Richard L. Dunn, “10 Trends that will Change your Job” Plant Engineering 58 Issue 1 (2004): 39
\textsuperscript{62} Luca Ciferri, “Fiat Auto Reverses its Outsourcing Strategy” Automotive News 78 Issue 6079 (2004): 24N
\textsuperscript{63} British Columbia Labour Relations Board BCLRB No. B469/2001 (2001): 1
\textsuperscript{64} “FCCL and ABB join forces to create pulp mill maintenance partnership” ABB website (2000): 1
\textsuperscript{65} British Columbia Labour Relations Board BCLRB No. B469/2001 (2001): 5
\textsuperscript{66} British Columbia Labour Relations Board BCLRB No. B469/2001 (2001): 4
decide whether they wish to work for the single employer. The scope of the declaration and other remedial issues are referred back to the parties for resolution.\textsuperscript{67} Although Allwin was still registered as an active company as of July 25, 2005\textsuperscript{68}, it was no longer managing the maintenance function by December of 2002.\textsuperscript{69}

\begin{flushright}
\textsuperscript{67} British Columbia Labour Relations Board BCLRB No. B469/2001 (2001): 9 \\
\textsuperscript{68} Extraprovincial Company Summary for Allwin Technical Services Inc., BC Minister of Finance, search date July 26, 2005 \\
\textsuperscript{69} Scott Doherty, "Recording Secretary's Views", \textit{The Broke Beater – News for CEP 1123 Members} Dec 2002 Issue (2002): 2
\end{flushright}
8 EVALUATION OF STRATEGIC ALTERNATIVES

In order for the Company to achieve profitability it must compete based on cost and quality. Eurocan does not have a single source of sustainable competitive advantage and therefore must compete by reducing all costs over which the Company has control. The maintenance expense is about 16% of the total costs at Eurocan, and maintenance closely affects reliability, which is even more significant than the direct maintenance cost. The Company therefore needs to make a decision as to the long-term level of outsourcing of the maintenance department. There are four levels possible; increasing the level of in-house work; the status quo; the migration of some of the current in-house work to contract; and the contracting of the entire maintenance department.

Factors affecting the long-term strategy will be presented in this section for consideration in the recommendations and conclusions section. That will be followed by a discussion on the current maintenance department and the use of teams for improving productivity or efficiency, followed by a discussion on contracting out successfully, given that some level of out-sourcing is necessary in both the short-term and the long run. Finally a best-practices guide will be developed for the short-term operation of the business.

8.1 Community Impact

Eurocan has the option of increasing or decreasing the amount of work done by contractors. Replacing all the Company's maintenance workers with a contract crew would lower the number of workers and the cost, if the contract crew were more effective than the in-house crew. This would have a negative effect on the community of Kitimat as workers leave to seek
employment elsewhere. Kitimat is already facing an aging population as well as declining employment in the local Alcan Inc. smelter, and the possible closure of the Methanex Corporation methanol plant. As most workers retire they tend to move from Kitimat to warmer destinations. Also the town of Terrace is becoming the service center for the Terrace-Kitimat area. This has been accelerated with the start-up of a Walmart store in Terrace in 2003. The downsizing of a mill in the Kitimat area would have an immediate effect on reducing the local population.

8.1.1 Transience

Maggard says that ‘...you have no loyalty in a contracted workforce. In a small town where there is almost no competing industry, whether the maintenance workforce is employed directly or contracted may have little effect on transience’.70 However, in Kitimat the Alcan Aluminum Company has a large smelter and also employs a maintenance department. That employer, as well as maintenance contractors in the area, may be attractive alternatives to the contracted maintenance employee. The mill owner would need to rely on the contractor to build and maintain employee loyalty. The contractor often has an advantage here with more flexibility in their hiring and compensation programs.71

8.2 Labour Relations

There could be a long-term negative impact in employee relations if Eurocan were to increase the amount of work done by contractors. The 1997-2003 labour agreement that incorporated flexible trade practices appeared to cause a spirit of discontent. From 1997 to 2003 there were more than 100 grievances as well as a four month strike in 2003. The strike appeared to be motivated not by the company wage package offered, but by discontent over the previous agreement that incorporated trades flexibility as well as anger over losing the many grievances

70 Finchem 75
71 Finchem 75
regarding the implementation of that previous agreement. In the end the union local 298 agreed to the original offer that was accepted throughout BC by other locals.

If the Company were to contract out work that is currently performed in-house, there would almost certainly be labour discontent. The Company would have to make the changes through contract negotiations. The negotiations would quite likely precipitate another costly strike. A one month strike would cost the Company approximately $5 million directly. A one-year strike would cost $60 million directly, not including a significant loss in revenue for the sawmills that supply the raw material to Eurocan. Even if outsourcing results in a 10% reduction of maintenance cost, yielding about $4 million per year in savings, the payback period for a one year strike would be much more than 12 years. At Eurocan, capital projects with more than a two-year payback period are seldom approved unless they have a safety or environmental benefit. All the actions of the Company indicate that it is currently trying to do more work in-house; therefore it would be seen as though the company had misled the union if the Company were to move in the opposite direction.

Any change to a new structure is risky and would likely degrade employee motivation and loyalty. Changes should be accommodated in open discussion with the union locals. The union goal is long-term membership retention or enhancement. They need a long-term profitable mill operation to achieve this. The company goal is for a more efficient maintenance department that reduces the overall maintenance cost. The company should not be concerned with whether internal manning is reduced or not, if the overall cost is reduced. The larger cost saving is to be achieved through greater mill productivity while a smaller yet still significant cost savings (Section 7.1) is to be achieved by workers working in a more motivated fashion. Working together with the union executives to achieve consensus should bring the union, and therefore many of the employees, on-side with any changes. Change could be implemented with a pilot group to lessen the overall impact and to overcome employee and management fears. The
Human Resources department would need to be involved in a leadership role in the implementation of any new structure, whether to a contractor or by the existing department.

The Company has had recent success (2004) with the creation of several cross-functional teams. These have included a team to select projects and control project spending, a reliability team, and a pollution-control team. The reliability team has a mixture of staff and hourly employees while the other two are staff only. A similar team will soon be created to deal with the area of contracting-out of services, maintenance, and construction. This team should look at the possibility of bringing in representatives from the union and the hourly maintenance workforce and yard crew. There is a very real opportunity of bringing in other points of view at an early stage. This process could prove to be a key element in achieving cooperation of departmental structural change. Cooperation by the union and therefore employees is crucial not only in implementing change successfully now, but also in order to enhance future employee cooperation and build stronger job motivation.

When beginning the talks with the union the context needs to be created. Purpose, scope, and whether a facilitator is to be used should be decided in advance.

The Company would benefit from creative solutions that are tailor-made by the parties affected, as opposed to the implementation of programs that have been developed in different countries with different cultures, working conditions, and employee expectations. The study of team programs by staff and union representatives, before embarking on a new program, would be beneficial.

To achieve maximum productivity, Eurocan needs an environment where there is open dialogue between management and the union locals. Eurocan is already well on the way with its attitude of building a positive relationship.
8.3 Structural Changes to the Current Maintenance Department

According to Bill Maggard, for a continuous manufacturing process, the owner needs to have the capabilities to maximize the productivity of the assets. He urges caution about relying on a contractor to take care of this. Maggard says that maintaining process equipment had better be one of a mill's core competencies. He states 'Mills need that knowledge and skill within their own organization, as well as the loyalty of their people.' There is a need for at least some portion of the present internal maintenance crew. With that in mind there is also a need for continuous improvement in the productivity of the maintenance department. The use of teams may provide a solution.

Eurocan is already well on the way to developing an improved internal maintenance department from the top-down structure developed in the early days of Eurocan, 35 years ago. In 1997 Eurocan moved from a trades-based structure to an area-based structure. This made a decentralized department where workers tend to stay in one area of the mill and become more learned on that area-equipment. Also around 1997 Eurocan started, perhaps unintentionally, towards the development of teams. A small group of maintenance workers now focuses on the finishing line, a potential assembly line bottleneck. They provide more focused maintenance with the goal of reducing downtime caused by the paper mill finishing line. In 2000 the Company started a project crew with the idea of mixing skills to accommodate project work that would otherwise be contracted out. In 2004 the Reliability Team started up. As discussed in Section 6.1, this is a mix of hourly and staff workers, with a goal of improving machine reliability in the long-term.

Teams can be an effective way of increasing quality and productivity. A study of General Motor's Saturn Corporation and Chrysler's Jefferson North plant yielded some interesting

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72 Finchem 72 - 73
observations. The study found that the way teams are set up and the relationship among the workers, union, and management are the central factors in determining worker productivity. In both these operations productivity and quality improved under team structures and the workers rated the plants as good places to work compared to the plants before the change in structure.\(^{73}\)

Workers liked the increase in autonomy, which translated into participation in shop-floor decisions and less managerial interference.\(^{74}\) Teams carried out many managerial functions, and the teams selected workers to look after a given function. Saturn replaced the first-line supervisor with one operations module advisor and a union counterpart per 100 to 150 workers.\(^{75}\) Jefferson North replaced the title and role of supervisor with that of facilitator. Both plants had weekly team meetings for problem-solving and team communication.\(^{76}\) Most workers felt the increased responsibility was about right, and most felt that their team leaders were more like team members. While workers enjoyed not having supervisors watching them, some felt the peer pressure of dealing with all the other members. Most workers enjoyed the increased freedom along with responsibility. The facilitator was without disciplinary powers. Managers could not impose decisions, but had to bargain instead. Workers set up their work areas to work more efficiently instead of harder, and strive for a sustainable work pace. The plants still had, however, excessive overtime after the change to teams.\(^{77}\)

The union executives were of mixed opinions. They noted that the majority of workers liked the sense of job security and that employees could make more money. The union at Saturn did not like it that the teams handled the problems, enabling only five union officers to handle grievances among 7,000 employees. The workers did not like conflicts between management and

\(^{73}\) Harley Shaiken, Steven Lopez, and Isaac Mankita, “Two routes to team production: Saturn and Chrysler compared” *Industrial Relations* 36 Issue 1 (1997): 18 - 19

\(^{74}\) Shaiken 19

\(^{75}\) Shaiken 27 - 28

\(^{76}\) Shaiken 19

\(^{77}\) Shaiken 34 - 40
union being handled between the two operations module advisors behind closed doors and then
handed down as a solution. They felt that a more open dispute would show that the union was
earning their dues in representing them and not just siding with management. The union at
Jefferson North also perceived that some of the workers felt that the union was part of
management.78

Other examples attesting to the tremendous effectiveness of teams in increasing
productivity are Honeywell’s defence avionics plant and Whole Foods Markets.79

Apart from the experiences of these American plants, there are some additional
observations about teams that should be discussed here. Kratenbach and Smith, 1993, found that
teams differ from work-groups in that they have a set of common values, require a common
commitment, and require both individual and mutual accountability. While management is
required to clarify the challenge, the team must have flexibility in deciding how and when it will
be undertaken. The best teams require time to shape a purpose that binds them. Kratenbach and
Smith say that the team option should be considered where the cost and value of the company’s
products are directly determined.80

There are many advantages to using teams. Team members get to pool their ideas and
therefore come up with creative solutions. This is important when troubleshooting and repairing
complex equipment. Some teams are self-managed, eliminating some overhead.81 But the greatest
benefit is the increased productivity through a sense of achievement of a team goal, as can be
attested by all the people who participate in amateur sports teams and are motivated to sacrifice
time and money and risk personal injury for a moment of team achievement with his or her team

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78 Shaiken 41 - 43
79 Jeffrey Pfeffer, and John F Veiga, “Putting people first for organizational success” The Academy of
Management Executive 13 Issue 2 (1999): 4
80 Jon R. Katzenbach and Douglas K. Smith, “The Discipline of Teams” Harvard Business Review March-
April reprint 93207 (1993): 112 - 117
81 Pfeffer and Veiga 5
members. 'When correctly used for appropriate goals, and with the full and knowing participation of the members, teams are likely to increase both productivity and satisfaction.'

The Company needs to continue to actively look for areas in which to develop teams.

As the Company reduces overall maintenance costs through a more efficient maintenance department the in-house maintenance workers can, with their extra time, take over work that is currently contracted out, a practice already under way. The Company has started on this road by setting aside $150,000 of the 2005 Capital Fund for buying specialized equipment and reducing contractor work. This will enable internal crews to take on some of the specialized work that is currently done by contractor crews. In the future this work could include fabrication and machining, high-pressure cleaning, and scaffolding. Some of this work would be done by labourers in the yard crew as opposed to tradesmen. As the internal crew becomes more efficient, they can also reduce overtime (Figure 12) thorough more prevention maintenance, instead of facing workforce reductions.

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82 "Teams & Morale" Article for Undergraduate Admissions (1996): 1
83 Internal Eurocan Document
8.4 Contracting Out Successfully

Richard Jones of MCP Management Consultants says that it is essential to develop the proper contract or relationship with the contractor. He says you must transfer some of the maintenance strategy and decision-making. The contractor must be part of the asset-improvement team. Communication is needed with operators to transfer preventative techniques and to set effective schedules. The contract is important and needs an honest examination of the current situation, what the goals are, and how this relates to the contract. Roger Mason of Flexsys Rubber Chemicals said the contract needs to be a source of stimulus and initiative.

Darrell Bovee, business development manager - Plant Services Group of Raytheon Engineers in Birmingham, says that if a mill sets up a contract that includes incentives to encourage reliability, that is what the owner will likely get: if incentives are to minimize

Source: Figure by Author, data from Eurocan Internal Reports
maintenance costs, then that is what the owner will likely get. Jones further says that there has to be an integrated relationship with the mill’s operations. Maggard says that the organization must be careful to build a partnership with the contracting firm. He says ‘Criteria for availability, reliability, and downtime must be built into the contractor’s reward system….You will have duplicate managers, one working for the contractor and one working for the mill owner.’ 85

The success of outsourcing maintenance may depend on the nature of the relationship between the contractor and the mill. Metso Paper performs maintenance for the Metsa-Botnia Rauma pulp mill in Finland. Their maintenance agreement has built in bonuses for both pre-arranged maintenance targets and production tonnes. The contracts last for two to three years. In the case of Metso, they are also the main machinery supplier. In this situation the equipment provider has perhaps the best knowledge to perform maintenance and can provide more direct feedback on improving the design of machinery in order to increase reliability and make maintenance easier and faster. 86

For the present uses of contractor services, Eurocan can continue to use Purchase Orders or Contracts. In the future, should Eurocan decide to contract out any segment of its maintenance department, it should have a contract with built-in management incentives.

8.5 The Experience at Kinleith

The Carter Holt Harvey pulp and paper mill (Kinleith) at Tokoroa, New Zealand, found itself struggling to survive in 2002. After a period of legal actions and union consultations, ABB Maintenance Services Ltd. (ABB) was signed on to provide all maintenance services and mange all stores-related material. All maintenance workers were laid off and paid a severance package.

85 Finchem 73
ABB rehired 60% of the terminated workers and added some of their own workers and staff. The employees rehired at ABB make less overtime but can earn bonuses, and can look ahead to more career choices.

The five-year agreement relies on key performance indicators to penalize ABB for poor performance (share risks), and reward for good performance (share rewards).

The mill reduced employee costs by 22% and increased productivity by 8% over two years. Carter Holt Harvey was so impressed that they planned to make the same arrangement at their Tasman mill in 2004, and allow ABB to leverage resources and capabilities across the two mills.87

It is thought that a similar action at the Eurocan mill would produce a lengthy labour disruption (given its recent history) as well as have less significant benefits. The Kinleith mill appeared to be further behind than Eurocan in 2002. For instance, with the ABB contract, eight hour shifts were replaced with 12 hour shifts. Eurocan has had 12 hour shifts for at least 15 years. Also downtime was no longer taken over the Christmas holidays in 2002 at the Kinleith operation. Eurocan negotiated out Christmas downtime in about 1997. The seven unions were reduced to three at Kinleith, whereas Eurocan has only ever had two union locals. A computerized maintenance management system (CMMS) replaced a more general enterprise resource planning system that was ineffective, while Eurocan has been using CMMS for at least 20 years.

The experience at Kinleith has to be viewed with caution, partly because the cost of contracting out the maintenance department at Eurocan could be much higher, and partly because

87 King 30 – 34
Eurocan has already achieved some of the productivity gains that Kinleith achieved through contracting with ABB, and therefore the net benefits could be much less.

8.6 Best Practices Guide

Table 7 Best Practices Guide to Contracting Out Maintenance Services

<table>
<thead>
<tr>
<th>Contractual obligation</th>
<th>Contractor</th>
<th>In-House</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack availability of in-house crews</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Lack in-house skills</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Lack in-house equipment</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Maintain expertise</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Need a quality job</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Crew is available on short notice</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Ease of organizing to the Company</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Want downward pressure on costs</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Support long-term relationship</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Need the contractor to provide the capital (turnkey project)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Need a machinery provider to warrant reliability</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

Source: Table by Author

The 2003-2008 labour agreement has to be followed (covered in Section 6.2). The agreement prohibits outside workers from being used as shift coverage. If the agreement is not followed, then costly grievances and poor morale leading to poor worker productivity are the result. Any negative disruption is also a distraction in the workplace and leads to a loss in productivity.

When the in-house crews are busy, and the work to be done cannot wait, then that is work that can be contracted out.

Where the Eurocan workforce does not have the skills in doing a particular repair job, then that work can be put to a contractor. That type of work can be reviewed and switched to in-house crews in the future after adequate training. Similarly, work that requires specialized equipment can be contracted out. If it is thought that there is enough work to justify purchase of
the specialized equipment, then Eurocan can transfer that work to in-house crews at some point in the future.

The Company crews should perform jobs often enough to maintain expertise. If a job is consistently contracted out to contractors not available locally, then the Company is exposed to a threat of lengthy downtime in the event of an equipment failure. The company can rotate the work to Company crews periodically to maintain worker expertise, or keep spare equipment on-hand.

Quality work can be performed by either contractor or in-house crews, but in-house crews tend to perform better quality work on average. Eurocan employees take ownership of the job. They know that if the repair does not last then they will have to repair it again. When faced with more than one job the best result often comes from putting the in-house crews on the more exacting work.

When workers are needed on short notice it is common sense to use the workers on-site. If the repair work is critical and it disrupts other valuable maintenance work by calling in crews on overtime it may be justifiable to contract the repair job out.

There may be a tendency by supervisors to call in contract crews because of ease of management. If it is less expensive to call in and organize the internal crew, then this should be done rather than defaulting to the convenient route.

The Company may wish to contract out a job, if it is thought to be beyond the capacity of company crews and taking too long. On the other hand, it may be useful to have the company crews perform a job that has traditionally gone to contract, if it is thought that the contractor is too expensive and the Company crews can perform the work required.
The company may wish to give more work to the in-house crew or a contractor in order to support a long-term relationship. In this case it may be more expensive in the short-term but keep a mutually-beneficial relationship intact for the long-term. For instance a contractor may be willing to keep equipment and manpower based in Kitimat if a certain amount of work were guaranteed.

Eurocan does not typically ask a contractor to provide the capital for a turnkey project and then charge it back through monthly payments because all capital projects need Board of Director approval and come out of a set capital budget, regardless of any financing or rent-to-buy scheme. However, this could be a reasonable option for some companies that are cash-flow restricted, particularly where the payback period of the project is projected to be less than the term of payments.

It may be beneficial to have the installer or builder of a new, technologically-advanced project maintain the equipment or provide consulting expertise for a period of time as part of the project cost. That way there would be an incentive for reliability to be built into the project, as well as ease of maintenance. The labour agreement at Eurocan does not allow the contractor to provide maintenance that traditionally has gone to union workers unless there is a capacity issue (Section 6.2), but does allow the contractor to provide a trainer or consulting expert to work with the Company crews.
9 RECOMMENDATIONS

In the long-run Eurocan must continue to improve its maintenance function in order to compete. Increases in mill reliability yield the greatest return, followed by decreasing the service cost of maintenance. This paper recommends that this decrease in service cost is achieved through the continual attention to, and improvement of, the maintenance department. As improvements in efficiency are reached, the maintenance department needs to aggressively take on work that is currently contracted out, or to increase preventative maintenance work. These should be targeted as goals and considered accomplishments when achieved without hiring more workers.

Outsourcing of the entire maintenance group should only be considered as a last resort should the improvements to reliability and cost control fail to continue.

The use of teams within the maintenance department should be explored by a cross-functional group in order to achieve better communication, performance, and job satisfaction. Careful structural change is needed to foster teamwork, not just the creation of workgroups or work areas. The use of teams could allow team members to take on administrative duties thereby lowering administrative costs.

In both the short-term and long-term, contractors should continue to be used to supplement the in-house crews, as suggested in the best-practices table in Section 8.6.
10 CONCLUSION

Firms in the linerboard and sack paper industry tend to compete predominantly on cost, with quality as a secondary factor. Eurocan has no source of sustainable competitive advantage and therefore needs to compete on cost as well as quality. The maintenance function's affect on reliability, and on the service cost of maintenance, is significant in terms of cost control and deserves strategic as well as operational analysis.

Mill reliability is continuously improving towards benchmark targets indicating continual significant improvement of the overall maintenance function at Eurocan. The trend towards more out-sourcing is not recommended due to the risks inherent in poor labour relations with only moderate gains in productivity and unit cost to be achieved. The maintenance department cost could, however, be improved upon through the careful implementation of teams resulting in increased effectiveness. The increased effectiveness would allow for more maintenance services to be done in-house as teams lower the volume of outstanding work and therefore reduce cost. The practice of performing more work in-house would be viewed in a positive light by the union locals and therefore improve union-management relations. The practice of increasing employee productivity through employee involvement and maintaining the in-house maintenance function would be a good fit with the low-cost philosophy of Eurocan Pulp and Paper Co. and its parent company, West Fraser Mills, Ltd.
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