5

QUALITY

Quality has been an important concern ever since firms began producing goods or delivering services and managers realized the importance of meeting standards. Quality has emerged as one of the key dimensions of customer value; however, customers define quality in various ways, partly dependent on whether the customers are internal or external to the firm. In general, quality may be defined as meeting or exceeding the requirements, needs, and expectations of the customer—whether or not those needs have been articulated.

QUALITY DEFINED

It is widely accepted that quality represents an important attribute underlying customer value. Quality is often a difficult attribute to assess, and many consumers, when asked to identify quality, are likely to respond, "I know it when I see it." Managers need to understand the elements of quality, as perceived by the user, to assess whether a product or service is of high quality.

Garvin (1988) identified eight dimensions of quality:

- *Performance:* measurable primary characteristics of a product or service
- *Features:* added characteristics that enhance the appeal of a product or service
- *Conformance:* meeting specifications or industry standards
- *Reliability:* consistency of performance over time
- *Durability:* useful life of a product or service
- *Serviceability:* resolution of problems and complaints
- *Aesthetics:* the sensory characteristics of a product or service
- *Perceived quality:* subjective assessment of quality based on cues related to the product

To design and deliver quality, a company's products need not be rated high on each dimension. Manufacturers of food products, such as Noram Foods, might focus heavily on conformance, reliability, and aesthetics. In contrast, a diesel engine manufacturer, such as LongXi Machinery Works, could emphasize performance (i.e., power) and features relative

to competitors. Thus, customers (and managers) must choose which dimensions of quality to emphasize, meaning that trade-offs between these dimensions might be necessary.

Not all of Garvin's (1988) eight dimensions of quality apply equally well to both goods and services. For services, which are often intangible in nature, it is also necessary to assess a number of process-based elements. Parasuraman, Zeithaml, and Berry (1988) posit five dimensions to service quality:

- *Reliability:* ability to perform the promised service dependably and accurately
- *Responsiveness:* willingness to help customers and provide prompt service
- *Assurance:* employees' knowledge, courtesy, and their ability to inspire trust and confidence
- *Empathy:* caring, individualized attention given to customers
- *Tangibles:* appearance of physical facilities, equipment, personnel, and written material

Assessing service quality, which is a critical task for managers and employees of Blue Mountain Resorts and Mutual Life of Canada, is primarily done through surveying customers on their expectations and perceptions of performance across various dimensions.

These definitions of quality have, as seen in the cases that follow, significant implications for the operational control and improvement of quality. Irrespective of how quality is defined in the manufacturing or service context, the strategic elements, practices, and tools necessary for the successful management of quality fall under the umbrella descriptor "total quality management."

Quality Delivered

Total quality management (TQM) requires the managing of the entire organization so that it excels in all dimensions of goods and services that are important to the customer. TQM represents a pragmatic and comprehensive system for managing quality. The "total" component of TQM emphasizes that performance excellence needs to exist throughout all the firm's operational activities: design, procurement, production, distribution, and service. Furthermore, involvement from all firm stakeholder—employees, suppliers, and customers—is critical to the TQM effort. Successful implementation of TQM transcends culture, as illustrated in the LongXi Machinery Works case, and requires customer focus, top management support, active involvement of all employees, continuous improvement and learning, business planning and performance measurement, management by fact, and collaborative relationships. Each of these contributes to the synergy required for effective TQM.

Many firms have achieved significant performance benefits—operationally, financially, or customer based—from implementing an effective TQM system. These benefits are the result of successfully deploying both the philosophical elements and generic tools of TQM. In the Noram Foods case, for example, you will have to address the philosophical implications to managing quality resulting from an analysis of statistical process control data.

Although quality may be an important priority for an organization's survival, it alone may not guarantee success. Indeed, managers recognize that there are both quantitative and qualitative costs for poor quality. Some of these quantitative and qualitative costs include scrap, rework, downtime, lost customers, and negative word of mouth. Implemented successfully, TQM provides managers with new strategic options. Given increased customer expectations

on quality, cost, delivery, and flexibility, companies are challenged to design, produce, and deliver products and services better, faster, and cheaper. TQM represents an integrated approach to addressing such challenges.

Furthermore, TQM's emphasis on continuous improvement affects the efficiency and effectiveness of many operational practices, including those related to process design and planning and control. For example, manufacturers implementing just-in-time production as part of a broader supply chain management system are required to first achieve stable and capable production processes. TQM can be effectively employed to achieve the required stability and capability through the continual focus on identifying and eliminating predictable variability that results in waste. Most organizations that have implemented quality management have quickly recognized the importance of continuous improvement and that the rate of improvement achieved is as important as the resulting performance improvements. For these reasons, the management of quality represents an important component for achieving world-class operations (see Figure 5.1).

The cases in this quality management module generally involve the definition, control, and improvement of quality, for products or processes, in both service and manufacturing organizations. The module includes discussions of the costs of poor quality, statistical quality control, benchmarking, standards such as ISO 9000, quality guarantees, and operational options for improving quality.

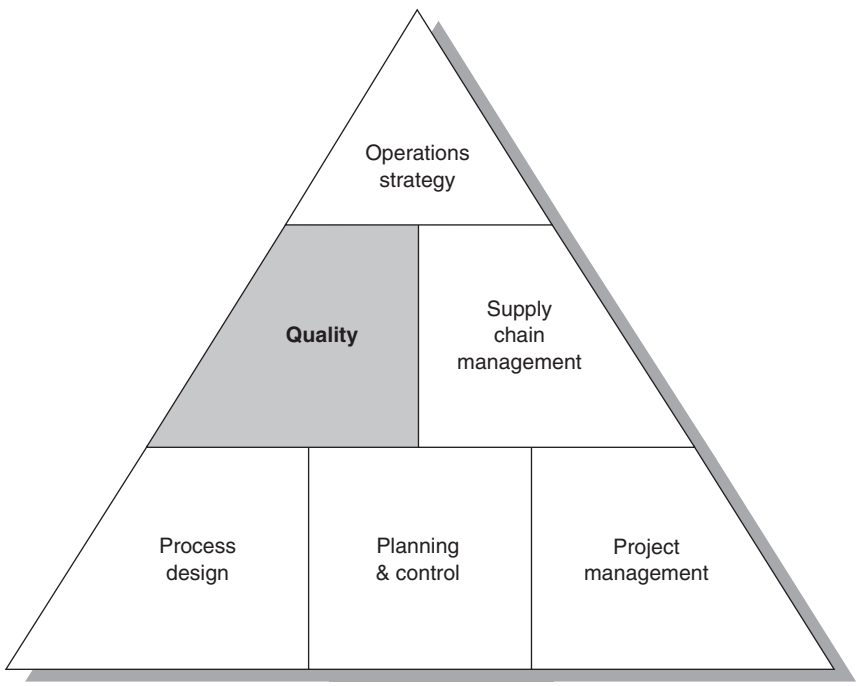

Figure 5.1 Quality Management

LONGXI MACHINERY WORKS—QUALITY IMPROVEMENT (A)

Zhang Lin, the assistant engineer in the Thermal Treatment Department of LongXi Machinery Works, a state-owned enterprise in China, has received approval for the formation of a new quality control group to reduce the high defect rate of a critical part. This high defect rate had significant implications for LongXi's future development because it caused costly production delays and engine failures at a time when many industry players were fighting for survival. Lin must decide who will be directly involved in the quality control group, which data must be collected and analyzed, what is the cause of the problem, and which actions should be taken. LongXi's total quality concept is presented within the context of a specific quality problem. (Note: This case is the first of a three-part series that applies the principles and tools of total quality management in a Chinese setting. This case can either be used independently or in combination with the (B) case, 9A98D002, and (C) case, 9A98D003.)

Learning objectives: compare and contrast TQM concepts, frameworks, and tools, especially in an international setting; assess quality systems; and apply quality tools and improvement cycle.

BLUE MOUNTAIN RESORTS: THE SERVICE QUALITY JOURNEY

Blue Mountain Resorts had been driving its business with a service quality program for several years, which the vice president of human resources, David Sinclair, was responsible for coordinating. With a new ski season under way and the critical Christmas season approaching, Sinclair wanted to continue progress of the program by introducing a new set of initiatives. He had recently gathered together a team of Blue Mountain Resort managers, from a variety of different areas in the company, to identify opportunities to improve service quality. The group provided three proposals that he felt warranted consideration. At the upcoming executive team meeting, Sinclair would be expected to set the priorities for the coming year and recommend what action, if any, should be taken for each. He had to decide which programs made the most sense for immediate action and which ones required additional study and analysis. Each of the proposals affected different parts of the organization, so Sinclair also needed to be concerned about who else in the company should be involved in further evaluation and implementation.

Learning objectives: differentiate product and service quality, illustrate quality management in services, and examine the role of internal and external customers.

NORAM FOODS

Noram Foods, a major producer of consumer food products known for its high-quality brands, had recently experienced a period of declining profits when the Canadian economy suffered under conditions of high unemployment, high interest rates, and high inflation. The president of Noram Foods has expressed the need to exploit revenue-increasing and cost-reduction opportunities wherever possible. Pat Marsden, the plant manager for Noram Foods, was considering the impact of changing Noram's policy on package weight, as the weight control issue represented a major opportunity for reevaluation and increased performance. Marsden had to decide whether to recommend to Noram executives that

company standards on package weight control be lowered to secure cost savings. Government regulations were more lenient than Noram's corporate standards, but a citation for weight violations might seriously affect its brand image with customers.

Learning objectives: understand statistical process control, contrast "voice of customer" and "voice of process" quality perspectives, and assess ethical trade-offs in operating decisions.

Hilcrest Auto

Mark Bailey, quality manager and business unit manager of the Small Parts Division of Hilcrest Auto, discovered that scrapped parts had been used in a shipment to a major customer. Although Hilcrest had experienced quality problems for some time, this shipment decision could have a potentially disastrous effect on the firm's future. Bailey must decide what action to take regarding the scrapped parts shipment and determine which among four options to choose to address quality issues. Each of these options would result in operational changes to the production facility for heating core tubing. However, some of the improvements required additional investments and expenditures. Bailey felt the need to ensure that strong quantitative support and a convincing qualitative rationale formed the basis for his decision.

Learning objectives: examine costs of quality, apply quality management tools for improvement, and implement quality-based changes in operational policies, procedures, and practices.

Mutual Life of Canada—The Group Client Service Guarantee (A)

Alex Brown, the senior vice president and head of Mutual Life's group division, was trying to decide whether to proceed with a plan to guarantee his division's services as a task force had recommended. If the division decided to proceed, he would have to decide whether to accept the task force's suggestions on the design of the guarantee and answer a number of questions that they have left unanswered. Brown was currently considering three distinct service guarantee options and was faced with an urgent decision as the task force would expect that any service guarantee be implemented quickly. (Note: A sequel to this case bearing the same title, case 9A94D017, describes the guarantee and an issue that has arisen.)

Learning objectives: design, assess, and implement service guarantees; understand operational and marketing implications for service quality; and evaluate informational requirements for quality management.

Management Questions Addressed in Quality Chapter

1. How is quality defined? What is the goal of total quality management (TQM)? Why is TQM important?
2. Who are the quality gurus? Compare and contrast the gurus in terms of how they defined quality and how quality was to be managed.

3. How does quality and the management of quality differ between manufacturing and service organizations?
4. What role should the customer play in the management of quality?
5. What tools and practices are commonly used in TQM? Describe the types of qualitative and quantitative tools and practices commonly employed in TQM and indicate under what circumstances they are likely to be effective or ineffective.
6. How should an organization's TQM efforts be assessed? What approaches are available for measuring quality?
7. What is required for successful TQM implementation? What are the challenges in implementing an effective TQM program?
8. Compare and contrast TQM with business process reengineering (BPR)? What is required for successful BPR?

REFERENCES

Garvin, D. A. (1988). *Managing quality: The strategic and competitive edge.* New York: Free Press.

Parasuraman, A., Zeithaml, V. Z., & Berry, L. L. (1988, Spring). SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality. *Journal of Retailing,* pp. 12–40.

LONGXI MACHINERY WORKS - QUALITY IMPROVEMENT (A)

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Tom Gleave

Rob Klassen

 Version: (A)1998–05–04

As the end of September 1996 neared, Mr. Shi, Manager of the Quality Management Department at LongXi Machinery Works (Longxi) in Zhangzhou, China, was reviewing an application for the formation of a new quality control (QC) group. Mr. Lin, an assistant engineer in the Thermal Treatment Department, was proposing that this group focus on growing quality concerns with the production of a critical part, called the duo-gear shaft (DGS).[1] This part was used in Longxi's multi-cylinder diesel engines to transfer power between gears. If a DGS did not meet minimum performance standards, it could crack, and then break, possibly resulting in complete seizure of the engine.

This was not the first time that quality concerns about this part had come to Shi's attention. He recalled recently receiving a report from the Inspection Department complaining about numerous quality problems originating in the Thermal Treatment Workshop. When similar problems had occurred several years ago, Longxi's engineers had been unable to determine the precise cause of the quality problems. At that time, after noticing a marked improvement in DGS quality following the rainy season, the

engineers simply attributed the problem to the changing temperature and humidity in the plant.

While the DGS part itself was relatively small and inexpensive (RMB 15),[2] continued quality problems would have significant implications for Longxi's future business. Longxi's multi-cylinder engines were used in the agricultural sector, and there had been a growing number of customer complaints about losses in production time resulting from engine breakdowns. Since the beginning of the year, there had been 14 incidents related to failure of this part. Because special equipment was needed to fix any failure, Longxi was forced to cover the costs of sending a mechanic to replace the part, or in cases of severe damage, of replacing the engine completely at a cost of RMB 4,000.

While the Inspection Department identified most defective parts before their final assembly into engines, the high defect rate, 44 per cent in September, had resulted in costly delays to engine production at a time when industry players were competing fiercely with each other. After reviewing and approving Lin's application, Shi commented:

> Unfortunately, the number of reliable suppliers who could produce this part is extremely limited, and those that could possibly help us are already over-stretching their production capacity. I believe that purchasing from these suppliers would further aggravate our quality problem. Thus, Longxi has no choice—we must find a way to improve quality in-house. If we are not successful, we run the risk of jeopardizing our long term strategy, which calls for expanding our product sales both at home and abroad.

China's Small Diesel Engine Industry

China's agricultural machinery sector, Longxi's primary market, had been experiencing profound change since 1978 when a series of economic reforms designed to boost China's overall farm output were introduced. The reforms provided farmers with incentives to exceed their traditional quotas and proved to be a considerable success as China's total agricultural output increased dramatically in the ensuing years. This led to increased buying power in the rural sector, resulting in a rising demand for low-cost, small to medium-sized diesel engines for use on small-scale agricultural units. Reform measures also had encouraged the development of larger cooperative farming efforts that benefit from greater economies of scale. Cooperative farms, in turn, translated into additional demand for larger model engines, thus encouraging manufacturers to offer a greater range of product options.

Sales of diesel-powered agricultural machinery and vehicles in China had grown by more than 10 per cent annually since 1985, and this growth rate was forecast to continue until at least the year 2000. This year, Longxi estimated that domestic manufacturers across this sector would combine to produce 1.91 million small tractors, 85,000 domestically produced medium to large tractors, 15,200 seeders and 23,600 threshers, along with a host of other agricultural machines, such as irrigation pumps and small transportation vehicles. Approximately 85 per cent of this equipment used single-cylinder diesel engines.

Four large manufacturers jointly accounted for approximately 45 per cent of China's production of single-cylinder engines. The remainder of the market was divided among several medium-sized (including Longxi) and numerous smaller firms. Over the past several years, industry consolidation and rationalization had reduced the number of medium-sized firms from the previous high of 30 to about 15. This trend was expected to continue over the next five years.

The principal strategy employed by most Chinese manufacturers was to compete on the basis of low cost production. For example, Chinese firms typically were able to produce engines at 25 per cent of the cost of their Japanese counterparts, who currently had the second largest single-cylinder diesel engine industry in the world. Recent investment had pushed the industry into a state of overcapacity for single-cylinder engines. Yet, many manufacturers continued to add capacity as they upgraded production technology to lower costs and improve quality. As a result, it was widely expected that a price war was imminent.

In contrast, the market for small multi-cylinder diesel engines was much more promising. Although sales levels were currently well below those of single-cylinder engines, customer demands for more power were being heard as efforts were made to further increase productivity in the agricultural sector. One factor was the formation of larger cooperative farms, with their drive for economies of scale. Another was the greater need for small transportation vehicles in the agricultural sector to move more products greater distances. Moreover, multi-cylinder engines also offered greater versatility, with a broader range of applications across both agricultural and other small machinery sectors. Because demand was growing faster than supply, manufacturers had been able to impose price increases on multi-cylinder engines.

COMPANY BACKGROUND

LongXi Machinery Works (Longxi) was a state-owned enterprise (SOE) located in Zhangzhou, Fujian, a southern coastal Chinese province situated across from Taiwan. The company was founded in 1957 as a result of the merger between a military machinery works from Sichuan province (in China's southwest interior) and an agricultural machinery plant owned by the city government of Zhangzhou.

Since its inception, Longxi had produced various single and multi-cylinder diesel engines primarily for the agricultural sector. These engines were typically used in the powertrains of four-wheel and three-wheel tractors, hand-held tractors, as well as related equipment such as tillers, seeders and threshers. They also were modified for use as irrigation pumps. These varying applications meant that the company serviced four primary customer groups: tractor manufacturers, ancillary equipment manufacturers, engine wholesalers and farmers who bought directly from the plant.

In the early years, Longxi produced only one model of single-cylinder, low-speed diesel engine. This model was primarily sold in the domestic market, although a small volume were exported to Africa, Latin America and Southeast Asia. In the 1970s, the plant shifted its focus toward the production of single-cylinder, high-speed engines which were sold both locally and in export markets. By the 1980s, the product line had further expanded to include several two- and three-cylinder models. It was during this period that Longxi began exporting its multi-cylinder products to the United States. In the last five years, the company had broadened its product line to include a series of four-cylinder, high-speed units.

At this time, Longxi's most popular multi-cylinder unit was the SL2100,[3] a two-cylinder model generating 28 horsepower (hp). Management felt that this particular engine was the key to future sales for several reasons. First, the primary market for these engines, 25–30 hp wheeled tractors, was expected to remain buoyant over the next several years. This engine also could be readily adapted for other agricultural equipment use, further increasing its market potential.

Second, the marketplace was increasingly viewing an older, multi-cylinder engine—model S295—as having insufficient power. The two-cylinder S295, produced by competitors, generated only 24 hp, was larger, and was of lower quality. This view was particularly prevalent in export markets like the U.S. Longxi's new model SL2100 recently had received favorable feedback from U.S. importers, and the company believed that there was strong potential for the SL2100 to replace the S295 throughout the industry.

Third, the SL2100 offered a wider range of uses outside the agricultural equipment sector than other single or two-cylinder models. For example, the SL2100 could be used in 0.8 ton and 1.5 ton front-end loaders, as well as 2.0 ton forklifts. This engine also could be easily adapted for electrical generators and small boat engines.

Management was confident that sales of this model would increase dramatically in 1997 to a projected total of 12,000 units. Company-wide, financial results for the year to date indicated that Longxi was on target to reach revenues of RMB

176 million in 1996, with an income of RMB 6.5 million in 1996. These figures were based on projected sales of 80,000 single-cylinder engines and 6,900 multi-cylinder engines in 1996.

Changchai: LongXi's Primary Competitor

Changchou Diesel Engine Works (Changchai) was the world's largest producer of single-cylinder diesel engines, a distinction it achieved in 1993, the same year its popular S195 model became ISO 9002 certified. The vast majority of its sales, 92 per cent, were destined for the domestic market, which was serviced through a network of 275 service centers located throughout 26 provinces. Changchai's engines also were increasingly being exported to the Southeast Asian countries of Indonesia, Vietnam and Thailand, where it was able to sell its products for a small premium. About 80 per cent of Changchai's sales were to tractor and agriculture equipment manufacturers, while distributors purchased the remainder.

The company had experienced significant growth in recent years. In 1995, the Changchai group of companies operated 33 separate engine production lines and had doubled its 1994 sales to reach RMB 2.16 billion. Profits jumped even more dramatically, more than four-fold, to RMB 208 million. Forecasted sales and profits for 1996 were RMB 3.0 billion and RMB 300 million, respectively.

This spectacular growth had been largely achieved through investing in a series of joint ventures. Since 1994, Changchai had acquired controlling interest in three small domestic diesel engine manufacturers which were incurring losses or operating at undercapacity. Changchai licensed its better known brand name to these companies in an effort to increase their sales. As a result, the company captured 23 per cent of the domestic market for single-cylinder engines in 1995 with sales of 1.2 million units, with output projected to rise to 1.8 million units in 1996. The corporate objective was to capture 30 per cent market share by 2000.

In contrast, Changchai sold only 3,000 multi-cylinder units in 1995, despite having capacity to produce 60,000 units. Current plans called for expanding R&D in this area and increasing the range of models offered. Management also had announced plans to double the capacity of their multi-cylinder production lines in the near future to meet anticipated market demand. Finally, two joint ventures with diesel engine component manufacturers had been established earlier in the year in a move to backward integrate and better control the supply of parts.

The capital necessary for all this expansion was raised through a series of share offerings, with the first, initial public offering occurring in 1994 for 20 million class 'A' shares on the Shenzhen Stock Exchange. Then, earlier this month, 100 million class 'B' shares, valued at US$ 90 million and accounting for about 30 per cent of the company's expanded capital base, were listed on the Shenzhen Stock Exchange. Immediately following this issue, Japan's Kubota Corporation, a high quality manufacturer of farming equipment, purchased US$ 25 million of the stock. This investment by Kubota was in anticipation of future cooperation between the two companies involving technology transfer and market access.

Changchai competed primarily on the basis of offering high quality products at prices similar to or less than most of their competitors, including Longxi. The firm's manufacturing strategy called for outsourcing all non-critical components while retaining control over the production of key items such as cylinder heads and engine blocks. By 1996, about 83 per cent of its component requirements were outsourced. New manufacturing technology was imported from Germany, U.S., Japan, Taiwan and France to improve quality and productivity.

Production Facilities at LongXi

Like many other SOEs in China, the "Works" was split into two distinct areas, one for living, the other for production. The living area contained

apartments for employees and their families, an employee club, entertainment center, hospital and canteen, all provided by Longxi. Employment had steadily declined from 2,300 at the beginning of this decade to the current level of approximately 1,880.

As employees entered the production area (Exhibit 1), they were greeted at the entrance by the company's two guiding slogans: "Love LongXi, Complete Contribution," and "Market, Management, Quality, Profit." Most of the facilities were built during the 1960s and 1970s, although several new engine assembly lines had been added more recently as the company had expanded its range of multi-cylinder products. Most recently, new technologies, such as group processing centers, had been acquired from Germany, Britain, Japan and Taiwan to help bolster both the company's component and machine manufacturing capabilities. These centers were capable of cutting, grinding and drilling engine parts and were especially valuable for rapidly developing and testing engine component prototypes. However, the operation of much of the older equipment still relied heavily on human judgment.

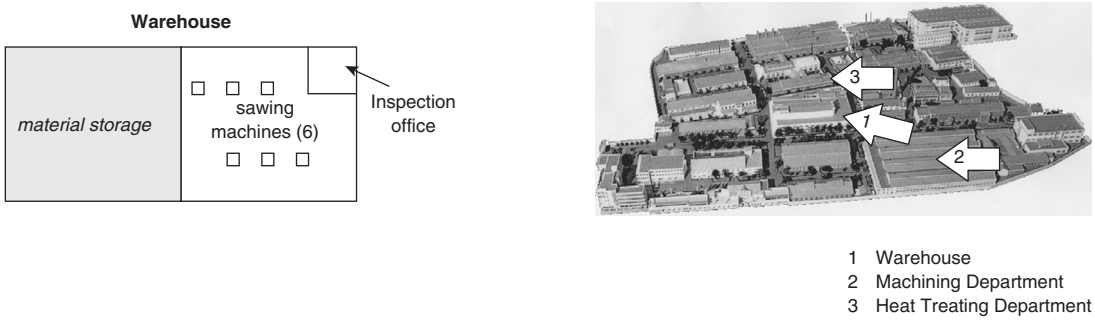


Exhibit 1 Plant Layout

Increased competition during the last decade had encouraged customers to demand greater value from engine producers, which in turn forced the industry to reduce production costs. In response, LongXi increasingly engaged in outsourcing or co-production of its engine components. By 1996, about 80 per cent of LongXi's engine components were manufactured externally. However, the company continued to maintain complete control over what it viewed as key components for its engines: cylinders, cylinder heads, and a number of component parts, including the DGS. Management had considered greater vertical integration, but one senior manager noted:

> We have discussed the possibility of vertically integrating with some of our domestic suppliers and buyers; however, our location remains a concern for them. There is only one railway line to Zhangzhou and it has proven to be severely inadequate and has caused us great difficulties in getting our products distributed and marketed.

The firm also had over 350 technical staff helping to manage its facilities, including 14 separate production lines. About 30 per cent of these employees had achieved the title of "Senior Engineer" from several different government ministries. This title was given to individuals with 15 or more years of technical work experience who had passed a rigorous examination set by the State.

Longxi's senior management team directed most of its efforts towards fulfilling the "Market, Management, Quality, Profit" credo. At the beginning of each year, the team established goals for marketing, production, profits and employee benefits. Action plans were also developed in the areas of technological improvement, quality improvement and new product introduction. The goals set by senior management required approval of the Employee Assembly (all the other permanent employees). These goals were translated into quotas which were distributed accordingly throughout the company. Every month, each department analyzed its actual versus planned performance. The senior management team reviewed the departmental results on a bi-annual basis, although issues concerning quality and production planning were discussed on a weekly basis.

The senior general manager at Longxi was Mr. Yang Bin Feng, the company's Managing Director. Mr. Yang began working at Longxi in 1981 after spending over 13 years in the defense and automobile manufacturing industries. In his early years with Longxi, Yang was a teacher in the company's training school before moving to the casting division where he was quickly promoted to Manager. Over the next ten years, he assumed increasing management responsibility for broader production and personnel concerns throughout the company. Finally, in 1991, he was promoted to the position of Managing Director.

As a managing director of a typical State-Owned Enterprise (SOE) in China, Mr. Yang thought that his role was different from his counterparts in the West.

> I have been looking for a point which balances the benefits to the country and the Works' own employees. I have to be an actor who is suitable for multiple roles. Devotion to both the country and company is very important for a managing director in China. To be frank, I do not think it would be difficult for me to get a comfortable, highly paid job in a foreign enterprise. I did not do so because I love the Works. I want to devote what I have to her. Our country is not rich; the spirit of devotion is the pillar for directors working in the state-owned enterprises in China.

Mr. Yang was currently active in the Communist Party of China and was the Vice President of the Fujian Entrepreneurs Association, the same body which had conferred upon him an award for entrepreneurial excellence. Unlike some other managing directors who had achieved similar success, he did not ask for a car from the Works for personal use.

When asked to assess Longxi's future, Yang stated:

> The challenge over the next few years will be upgrading our technology and quality processes. Unlike Changchai, our city government does not intend to let us go public, at least not at this time. This is because the Zhangzhou city government wishes that we maintain employment levels for

now. Instead, we may seek to obtain loans from banks for any investment or expansion project. Our borrowing will be in smaller increments over a longer period of time, rather than borrowing a large amount at any one time. By doing so, we will be able to repay our obligations. I expect that 70 per cent of this money will be used to improve our technological processes.

Development of Quality Management

Prior to 1978, the only formal mechanism for assessing quality at Longxi resided with the Inspection Department which examined components and engines after they were produced. This changed that summer, when managers at Longxi were invited to participate in a two-week Total Quality Management (TQM) training course given by China's Ministry of Machinery and Industry. During the previous spring, a senior director from the Ministry had spent three months in Japan learning the Japanese approach to TQM. Deeply impressed by his findings, the director persuaded the Ministry to sponsor a formalized TQM training program, to be taught by himself and given to selected state-owned enterprises (SOEs).

Longxi accepted the Ministry's invitation and sent its Managing Director, Inspection Department Manager and an Inspection Department engineer to attend the training course. Having been one of the first companies in China to receive TQM training, Longxi was mandated by the provincial government to provide similar training to other SOEs in Fujian province. The following year, Longxi established a Quality Management Department (QMD), which included three groups: Inspection, Measurement, and Management Groups. If defects were reported by the Inspection Group, the QMD was allowed to summon the heads of any other departments that it felt could assist in resolving the issue.

However, in 1981, Longxi's senior management concluded that QMD had weakened the inspection function. In practice, for the QMD to carry out its mandate to resolve quality issues, production lines often needed to be shut down. The QMD was reluctant to intervene in this way, and typically allowed operations to continue despite conditions of substandard quality. In response, senior management separated the Inspection Group from the QMD. A name change accompanied this restructuring: QMD became known as the Office of TQM.

During the 1980s, the Office of TQM gradually developed plant-wide quality control systems for many of the company's production activities. In August 1986, the provincial government formally recognized Longxi for its achievements in quality management by awarding it the certificate of "Provincial Excellence in TQM." Since then, the company had been consistently viewed as having one of the strongest quality management teams in Fujian.

By the end of the 1980s, senior management realized that the growing Office of TQM was overloaded with responsibilities, and separated the Office into two parts: the Quality Management Department (QMD) and the Enterprise Management Office (EMO).

In its newest incarnation, the four people assigned to the QMD became responsible for:

- planning and administering all of Longxi's quality management activities, as well as ensuring that all State and company regulations were being adhered to properly;
- ongoing development of the company's quality assurance system, including the design and implementation of quality improvements;
- organizing all of QC group activities; and
- training of employees in quality management concepts and techniques.

As part of quality improvement efforts, the quality reward system was changed so that employees were rewarded according to product quality in their department. Employees started with 100 quality points each month, which was equivalent to 40 per cent of their base salary. Formerly, the reward system had been based on plant-wide quality performance. Now, if quality levels fell below standards in their department, all employees in that department lost quality points, resulting in a lower quality bonus. The

number of points lost varied by the severity of the quality problem, although the number of points lost typically was quite small.

The "Method"

In 1994, Longxi put into place what later became viewed as one of the cornerstones of its overall approach to TQM: the development of an evolving manual entitled "Management Methods of Quality Improvement Activities," otherwise known as "The Method." The content of the "Method" was based on the structure of ISO 9000. Among the details included in the Method were guidelines governing the systematic change of working routines, rules for establishing quality improvement targets and implementation of brainstorming techniques. Instructions to govern activities such as harnessing employee enthusiasm for solving quality problems and incorporating customer's suggestions also were included.

In addition, the Method described the procedures for designing and using QC groups as a means for achieving quality improvements. Since that time, QC groups had become an increasingly popular means for resolving quality issues at Longxi. All QC group activities within the plant came under the direct responsibility of the QMD, including the registration of QC groups, verification of quality issues, establishment of rules governing group activities, provision of general guidance and inspection of group results.

The QMD also was responsible for recognizing the input of individual group members and communicating their contributions to others. For example, if a QC group developed a notable quality improvement, the QMD would ask the Employee Assembly to confer the title of "Excellent Employee" on their champions and display their pictures on the wall at the main entrance to the plant. These people received diplomas which were presented to them by the company's senior executives at the annual Employee Assembly. If the results of a group's activities were of great significance, the QMD would recommend that the QC group present their findings to the appropriate city, provincial or central government authorities.

In sum, management felt that this approach to quality had proven very successful. Throughout the 1990s the company received several awards from both the Provincial and State governments. These awards included the following:

- 1993 Provincial QC Excellence Award for stabilizing the engine painting process;
- 1994 Provincial QC Excellence Award for improved technology and new product;
- 1995 Ministry of Industry QC Excellence Award for improving the tidiness of single-cylinder engines; and
- 1996 Ministry of Industry QC Excellence Award for increasing first-test pass rates for running engines.

Notwithstanding these quality-related achievements, senior management realized that further efforts were needed before the company would become a true world-class competitor. While many employees understood the need for quality and how TQM could be applied to their working environments, many others did not. Technical support continued to be inadequate for many employees, particularly production line workers. For example, several workshops did not schedule technicians who were capable of providing support during the night shift. Furthermore, flaws in some operating procedures continued to contribute to the plant's quality troubles. All of this meant that further employee development, hands-on supervision and operating process refinements were required throughout many areas of the plant.

Views of TQM at LongXi

Since being promoted to Managing Director, Mr. Yang had received direct exposure to Western management ideas and approaches which were of potential benefit to the company. In 1992, he attended a four-week training course in New York which focused on the principles of general management. Later, in 1994, he and 200 other managers from mainland China attended

a general management training program in Hong Kong where he received instruction in marketing, finance and quality management.

In terms of his personal role in the development of TQM at Longxi, Yang offered the following:

> When it comes to TQM, I see myself as a strategic decision maker. It is my view that a good senior manager needs to be a good negotiator and an arbitrator. I do not have time to become involved in the smaller details of TQM, but I do wish to provide guidance and counselling when it is needed.

Other senior managers noted that Yang had adopted a more democratic approach than his predecessors, with responsibility being placed at lower levels in the firm and the use of teams for QC groups. As a result, more workers became directly involved in quality improvement efforts. These efforts bore fruit in 1995 as two single-cylinder models were among the first products to be awarded the designation of Prestigious Products in Fujian province.

Reflecting upon Longxi's past accomplishments, and the future role that quality improvements would play in achieving the firm's objectives, Yang stated:

> There are three achievements which have contributed to Longxi's record of quality improvement over the past 10 years for which we can be especially proud. The first is the company's quality methods manual [The Method]. This manual has become "the Bible" of quality management at Longxi. The second has to do with our training system. We have trained our workers to understand both the concepts of quality management, as well as the skills they need to do their jobs properly. The third achievement is that we have established an effective reward system which is based on a combination of spiritual and material rewards.

Prior to submitting his application for the DGS QC Group to Mr. Shi in the QMD, Mr. Lin Zhang had participated in one other QC group project. Lin had received his Bachelor's degree in Thermal Treatment from the University of Fuzhou in 1992, the same year he started his career at Longxi and joined the Communist Party. Work on this project, like other QC groups at Longxi, required the use of employees' spare time. In explaining his motivation for wanting to develop the DGS project group, Lin remarked:

> The primary reason that I wanted to participate in this QC group was not because of money. Instead, QC group projects give me a chance to apply what I learned in school. Other types of projects do not allow me to refresh my knowledge so thoroughly.
>
> Another reason is the knowledge I expect to receive from other people. Sometimes, when I have encountered problems in the past and have run out of possible solutions, I have taken the chance to ask other more experienced people for their ideas. Their insightful opinions have helped, and they have become big brothers to me. However, many of them have been promoted and given many administrative responsibilities, which I believe does not make full use of their technical expertise.

On the issue of top management involvement in TQM, Lin suggested that:

> Top management should be more involved in QC group activities. They should require reports from the plant's middle level management detailing QC group actions. This would ensure that the QC groups get more support. From my point of view, a plant is an army at peace time. It should have strict orders to keep production and other activities in order. Without strict control systems, we can expect problems to keep recurring.
>
> Recurring problems are related to our reward system. A good reward system should keep pace with our QC group activities. Sometimes a problem recurs simply because people made the same mistakes again. These people were not motivated enough to do a good job. So, as time passes, they go back to their old tricks. Technical personnel also need to be motivated. The reason why we have failed to solve some problems sooner is because technical personnel have failed to foresee the problem, or else they simply tried to avoid addressing the problem. These people need to be motivated to attend training seminars and work towards their potential.

ISO 9000 Certification

Unlike Changchai, Longxi had not yet received ISO 9000 certification for any of its products. However, the ISO process formed the basis for the Method. On achieving certification, Lin offered the following view:

> There are two reasons why I don't think that we need to have such a certificate at this point of time. First, it is costly. An ISO 9000 certificate requires renewal each year. This just tells me that they [ISO] want people to spend money repeatedly for the same thing. The second, and most important reason, is that ISO 9000 has lost its credibility with me. I know that there are some plants which have ISO 9000, yet their products have much lower quality than ours. How did they get the certificate?

> There are many quality control systems in the world these days. They are all very good. The key is not which system a plant has chosen to adopt, but whether it can produce quality products. Our products are superior to other plants in terms of quality. Our plant's environment and working stations are cleaner and our workers work harder, too. That is what matters.

Mr. Yang further elaborated,

> With respect to ISO 9000, we are actually practising it, but have not got the certificate yet. What is more, renewing this certification on an annual basis takes a significant amount of time and money. However, the certificate is becoming a powerful marketing weapon. With our expansion into the international market, we will seek to achieve certification by 1998 or 1999.

The Duo-Gear Shaft (DGS)

The duo-gear shaft (DGS) was one of the critical parts used in the production of two-cylinder diesel engines (Exhibit 2). This part was assembled into the Gear Housing Assembly (Exhibit 3), which coordinated the functions of other assemblies and transferred power from the engine to the drive train. Because quantities were considered small, Longxi had decided against purchasing sophisticated equipment which would have automated DGS production.

Production involved four basic sets of operations across three different departments: raw material preparation, followed by machining, heat treatment, and then, final machining (Exhibit 1). Based on demand forecasts, the Production Department initiated the production of DGS parts by scheduling the movement of raw steel rods from storage in the warehouse to sawing machines, located in the same building. Overhead cranes moved a maximum of three rods, each measuring 6m by 58mm, to one of several sawing machines that cut the rods into short, 46mm lengths. While six sawing machines were available, usually only a maximum of three were used simultaneously to prepare the raw material for this part.

Quality Inspection

Approximately 130 inspectors were responsible for scrutinizing quality throughout the Works. In raw material preparation, as with other production steps, an inspector periodically performed three types of Professional Inspections during the sawing operation: Initial Inspection; Patrol Inspection; and Completion Inspection. After the first unit of each batch (i.e., 125 parts at the sawing operation) was produced, the inspector would perform an Initial Inspection to confirm that the unit conformed to specifications. For cutting, the inspector would confirm that the shafts were made of the proper grade of steel, HB45, and the dimensions were correct. After granting approval, the inspector would give a plate of Initial Inspection to the sawing machine operator. Without this plate hanging at an operator's position, further production could not proceed.

During the remaining production of that batch, typically twice per shift, the inspector would return to conduct a Patrol Inspection to ensure that production was continuing according to specifications. Finally, when the batch of parts had moved through all the required operations in a department, such as Machining or Thermal Treatment Departments, described next, an inspector conducted a Completion

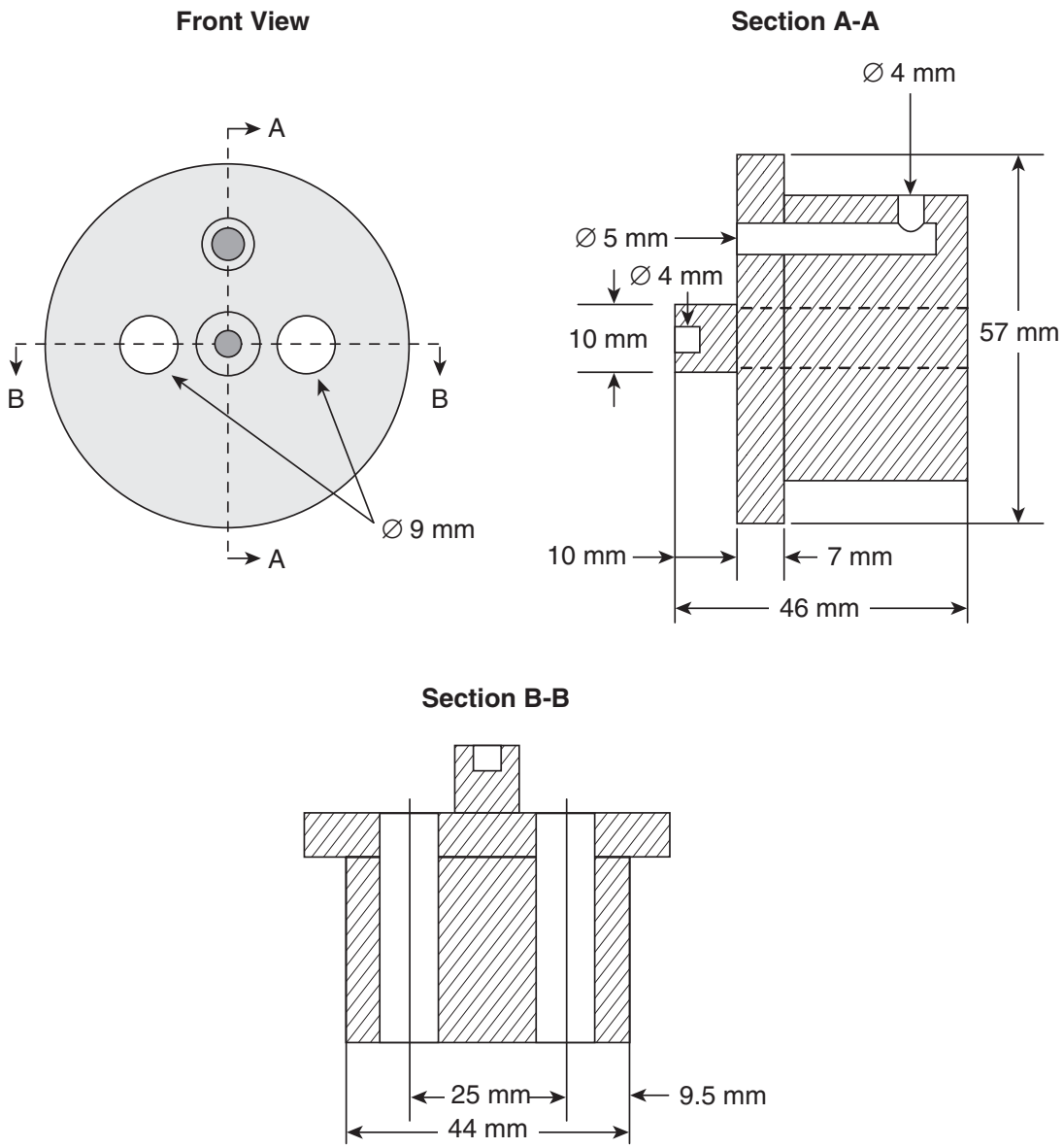
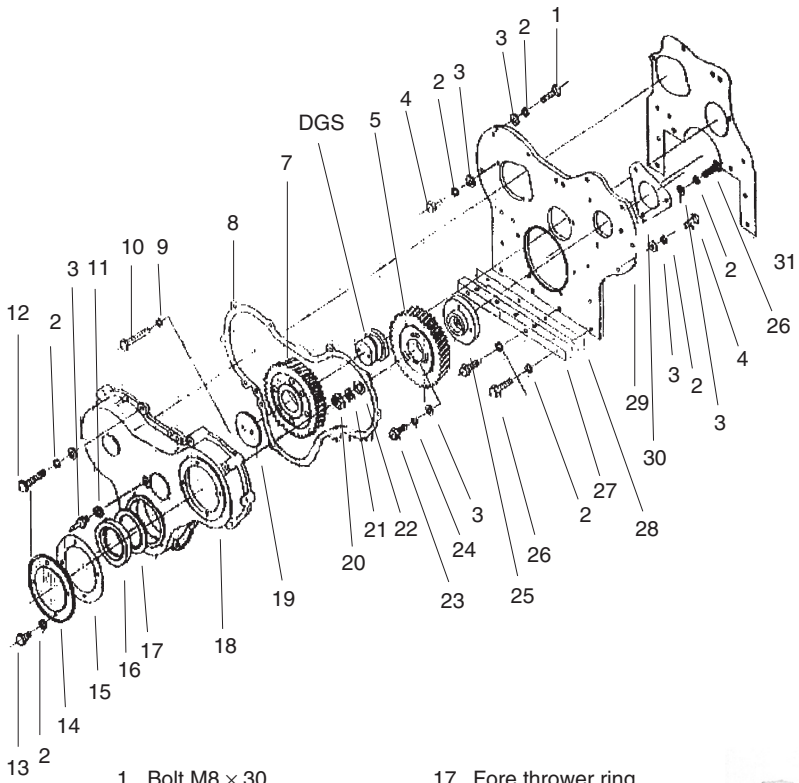


Exhibit 2 Duo Gear Shaft (DGS)

Inspection. This final inspection was necessary to authorize the release of the batch to the next department.

Workers also were responsible for ensuring high quality production. During the sawing operation, as with other operations, workers were told to inspect the quality of their own production, termed Self Inspection. In addition, workers examined the quality of parts received from upstream operations, called Mutual Inspection, to confirm that they continued to work on good parts. For raw material preparation, Mutual



1 Bolt M8 × 30
2 Spring washer 8
3 Washer 8
4 Bolt M8 × 22
5 Injection pump timing gear
6 Duo Gear Shaft (DGS)
7 Idle gear
8 Gear housing gasket
9 Idle gear bolt
10 Washer
11 Pointer
12 Bolt M8 × 55
13 Bolt M8 × 16
14 Front cover
15 Front cover gasket
16 Oil sealing GS60 × 80 × 12
17 Fore thrower ring
18 Timing gear housing
19 Idle gear retainer
20 Nut M12
21 Spring washer 12
22 Washer 12
23 Bolt M8 × 25
24 Spring washer 8
25 Connecting plate
26 Bolt M8 × 40
27 Sealing clamp
28 Sealing clamp gasket
29 Suspension plate
30 Injection pump gasket
31 Suspension plate gasket

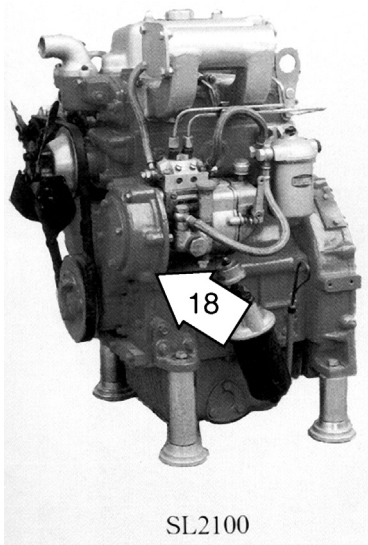


Exhibit 3 Sl2100 Diesel Engine and Gear Housing Assembly

Inspections relied on visually checking the parts. Finally, the worker was responsible for notifying the inspector to conduct other necessary inspections (such as Initial Inspection and Completion Inspection).

Machining Department

After the sawing operation for an entire batch of parts was completed, a person responsible for materials handling would load the parts onto a small cart for transit to the Machining Department, about 200m away (Exhibit 1). Upon arrival there, the raw parts were stacked beside one of three lathes and the operator for that lathe signed a material receipt. Each operator could produce up to 350 DGS parts per month, in addition to other production assignments, and only a single shift was currently scheduled.

The operation at the lathe involved cutting the steel rod into three different diameters along its cylindrical axis. As with sawing, inspectors performed an Initial Inspection after the first part was completed for each new batch. Later, an inspector would return for a Patrol Inspection, when a few parts would be inspected at random. Because this area of the plant was quite cramped and noisy with equipment and operators, each operator stacked completed parts on top of his tool box, which measured 80cm by 60cm by 120cm high.

Once this step of production was completed, the materials handler again moved the batch of DGS parts on a hand cart to the next operation, drilling. Here, two 9mm holes, parallel to the cylindrical axis were drilled completely through the part. In addition, several other holes were drilled partway into the part. Following drilling, the batch of parts was moved by the materials' handler to Final Inspection. If approved, the materials handler moved that batch of parts to the Thermal Treatment Department, about 250 meters away (Exhibit 1).

Thermal Treatment Department

Heat treatment was needed for many steel parts to develop the proper hardness after the cutting and drilling operations. In addition, an anti-rust coating was applied. Unlike the Machining Department, the Thermal Treatment Department had been built fairly recently, in the early 1980s. To reduce the presence of toxic fumes, which were generated as surface contaminants such as oil vaporize, fume hoods and exhaust fans had been installed. However, the fumes were not completely captured, and workers were urged to wear both mouth masks and gloves, although many refrained from doing so because the temperature inside the plant often exceeded 36C in summer.

Three workers were assigned to work on DGS parts during each of two daily shifts. Because of heat and fumes, they rotated among the different positions. The first operator used steel wire to string together four DGS parts through the 9mm holes. This worker would then place four of these strings (16 parts) using a 130cm steel hook into a well-shaped electrical furnace, called a Preheat Furnace. This furnace preheated the DGS parts to 200 to 300C for 10 minutes. The Preheat Furnace, which was not covered, was maintained at approximately 300C, and the worker was expected to use his judgment, based on visual cues and overall time, to determine when the parts were at the proper temperature.

When the parts finished preheating, the worker would use the steel hook to transfer the 16 parts to the larger Main Furnace. Like the Preheat Furnace, this furnace had a well-shaped interior measuring $30 \times 35 \times 35$cm deep and no cover. Because smoke was produced by residual traces of oil on the parts, a fume-hood had been installed above the furnace to exhaust the gases outside the building.

After placing the preheated DGS parts in the Main Furnace, the operator would push a button at a nearby station that started and controlled the heating cycle of the furnace. Engineering specified that the DGS parts be heated to 850C. Data on the heating times and cycles of the Main Furnace were automatically recorded on chart recorders, which were changed each shift. Current operating practice required that the operator hold the parts during the entire heating cycle.

Following the heating cycle, the worker removed the DGS parts from the Main Furnace and quenched them by plunging them into an

adjacent vat of water. The temperature rapidly dropped to 200 to 300C. This process was monitored visually and required careful experienced observation. If the DGS was removed from the water too soon, it became too soft; if it was removed too late, it became brittle.

The worker then used a steel hook to place the 16 parts into a heavy iron basket sitting nearby on the concrete floor. Within 10 minutes, an overhead crane transferred the iron basket into a larger Tempering Furnace for a further two-hour tempering process. The purpose of tempering was to stabilize the part's material structure and lower internal stresses, thereby reducing the chances of cracks and premature failure. This furnace, located 10 meters away, also was electrically controlled and had a cover to reduce energy losses. The crane would remove the cover, place the basket of parts inside, possibly remove another basket of parts from Tempering, and then replace the cover.

After removal from the Tempering Furnace, the overhead crane moved the basket of parts to a series of process vats. First, the parts were washed. Following washing, a worker removed the steel wires from the bundles of parts and an inspector tested the hardness of the steel of these parts. If approved, a worker placed the parts back into the basket and used a small electrical crane to dip the parts into a hot alkalized water cabin for three to 10 minutes. The alkali bath removed any remaining traces of contaminants from the surface of the parts.

Next, a hot acid bath, again for three to 10 minutes, prepared the parts for subsequent coating with a thin anti-oxidant to prevent rust. Then the basket was dipped into a hot, specially formulated anti-oxidant liquid for 35 to 45 minutes. After this, the parts were again washed in a water bath and coated with oil by dipping them in a nearby oil vat. Finally, the semi-finished parts were placed on a drying rack to await Completion Inspection. The hardness of each part was measured using a specifically designed instrument, while the thickness of the anti-rust layer was inspected visually. If approved, a materials handler stacked the parts for return to the Machining Department for a final grinding operation.

Return to Machining Department

After returning the parts to this department, the grinding machine operator signed for their receipt. Two shifts were used for grinding, usually with one operator per shift. One surface of each part was ground to ensure precise alignment of the DGS with the Idle Gear in the final assembly of the Gear Housing Assembly.

As before, Initial Inspections were performed after the first part was complete, with Patrol Inspections occurring in both shifts. Finally, the finished product was sent to the Machining Department's inspection station for the final Completion Inspection. Once approved, the DGS parts were forwarded to a finished products warehouse where an administrator stacked them and assistants would coat each DGS, one by one, with oil as further anti-rust treatment.

QC Group 96020

Following review by Mr. Shi of the application, Zhang Lin was elated to receive rapid approval to establish a new QC group, license number 96020. At the same time, Lin realized that much work needed to be done. Lin's previous QC group experience had taught him that an important first step for ensuring group effectiveness was selecting the right people to be involved in the process.

First, he solicited support from people working in the Metallurgical Division to have access to their experience. In particular, he believed that much of the DGS problem(s) was related to the metallurgical techniques being used in the plant. Lin approached and tried to recruit the best available people.

In addition, he followed the accepted Chinese practice that required subordinates to invite the manager of their respective department to become the head of the QC group. For example, while Mr. Chen, Manager of the Thermal Treatment Department, did not necessarily have the strongest background with respect to metallurgy, he was nevertheless invited to provide the leadership role to this group. Chen's role became one of

coordinating the activities of group members, as well as monitoring and communicating the progress of the process. In total, the QC group had six members, including Lin.

QC Member	*Title*	*TQC Training*	*Years at Longxi*
Chen K.F.	Manager, Thermal Treatment	60 hours	27
Lin Zhang	Assistant Engineer	60 hours	4
Chen X.N.	Line Worker	48 hours	18
Chen C.S.	Line Worker	48 hours	9
Chen Q.Y.	Assistant Engineer	60 hours	5
Chen P.Y.	Engineer	80 hours	28

All of the older members of QC Group 96020 had gained experience at Longxi by working in a variety of departments over the years. The two youngest employees, Lin and Q.Y. Chen, had worked exclusively for the thermal treatment department. They, along with P.Y. Chen, were the only members who possessed specialized, university-level training in thermal treatment.

As the group members prepared to tackle the project, P.Y. Chen stated:

> Our success will depend on whether or not we attack the correct problem. To do so, we need to be diligent and careful when collecting data. Honesty is also required when it comes time for drawing conclusions. If the problem is due to people not fulfilling their responsibilities, we need to point this out. We should not be afraid of embarrassing anyone.

This view matched that of Mr. Yang, Longxi's Managing Director, who was pushing people toward "Fact Management" rather than the traditional "Relationship Management," termed *guanxi,* where each individual tries to "save face."

The Next Steps

With the membership of the QC group established, the process of gathering and analyzing data could begin in earnest. Ultimately, Lin knew that this group needed to recommend credible improvements that would fix this recurring problem.

Notes

1. Also translated as idle gear shaft.
2. In 1996, the Renminbi (RMB) exchange rate was about US $1.00 = 8.30 RMB.
3. Chinese small diesel engine model numbers were consistent between firms. For example, 2100 designates a two-cylinder engine, with piston diameter of 100 mm. A single-cylinder engine with piston diameter of 95 mm is designated by 195.

Blue Mountain Resorts: The Service Quality Journey

Mark Sheppard

P. Fraser Johnson

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Dave Sinclair, vice-president of human resources at Blue Mountain Resort, was considering his options concerning the company's service quality program. It was Thursday December 2, 1999, and a light snow was falling outside. Since 1991, Blue Mountain Resorts had been driving its business with a service quality program, which he was responsible for coordinating. With the

1999–2000 ski season now underway and the critical Christmas period approaching, he wanted to continue progress of the program by introducing a new set of initiatives.

Dave had recently gathered together a team of 25 Blue Mountain Resort managers, from a variety of different areas in the company, to identify opportunities to improve service quality. They had provided Dave with a number of specific proposals that he felt warranted consideration. On the following Monday, Dave would be reviewing his plans for the service quality program at the executive team meeting. In preparation for the meeting, Dave wanted to evaluate the proposals and decide on a course of action.

The Canadian Ski and Snowboard Industry

There were a total of two million skiers and snowboarders in Canada in 1999. The total number of skier and snowboarder visits to Canadian resorts in the 1998–1999 season was 17.3 million, up 12 per cent from the previous season. British Columbia and Alberta captured approximately half of the market, with popular resorts in Whistler and Banff, followed by Quebec with approximately 30 per cent, and Ontario with most of the balance.

A number of factors influenced decisions regarding which resorts skiers visited, namely location, cost, quality of the runs, speed and capacity of lifts and amenities. Ticket prices could vary according to a number of factors, such as ski conditions, time of year, time of day and day of week.

Blue Mountain Resorts

The Greater Toronto Area (GTA) was home to an estimated 400,000 active skiers and snowboarders. Although Ontario had approximately 60 private and public resorts available for skiing and snowboarding, the Toronto market was served primarily by five public resorts: Blue Mountain, Talisman, Horseshoe Valley, Mount St. Louis/Moonstone, and Snow Valley.

Blue Mountain Resort (BMR), located 135 kilometres north of Toronto, was one of Ontario's most popular ski resorts, with 18 percent of the Ontario skier and snowboarder visits in 1998–1999. Situated near the town of Collingwood, BMR was founded in 1941 by the Czechoslovakian born Jozo Weider.

BMR had expanded and modernized as the sport gained popularity. In the 1980s, the company added a year round four star resort hotel and conference centre, a condominium development and the Monterra Golf course.

By 1999 BMR was a four season resort. However, winter sports, skiing and snowboarding, were still its dominant activities, accounting for approximately 65 per cent of total revenues. The ski hill offered 251 acres of ski-able terrain with a vertical drop of 721 feet and an additional 50 acres was available for future trail development. BMR had fifteen lifts to service the area and the longest run was four thousand feet, approximately 1.2 kilometres. The terrain broke down to 17 per cent beginner, 42 per cent intermediate, and 41 per cent advanced. Special facilities, to accommodate snowboarders, had been introduced, keeping up with the trends in the industry. For night skiing, BMR had 11 trails on 88 acres under lights. In general, Blue Mountain was regarded as having a good variety of skiing and snowboarding facilities, which tended to attract large crowds. Exhibit 1 provides a map of BMR.

In the 1998–1999 season, BMR hosted 415,920 skier visits, the second highest in the company's history. During the previous three years attendance in skier visits at BMR had been 358,000 in 1997–1998, 368,000 in 1996–1997, and 416,000 in 1995–1996. Approximately 60 per cent of the skiers at Blue Mountain came from the GTA, while the balance came from other parts of Ontario and United States. BMR's average lift ticket price was approximately $24 and the expected average total revenue per person per visit for the coming season was approximately $40, which included revenue generated by the other operations on site.

Blue Mountain offered over 15 different ski and snowboard package options, but the three

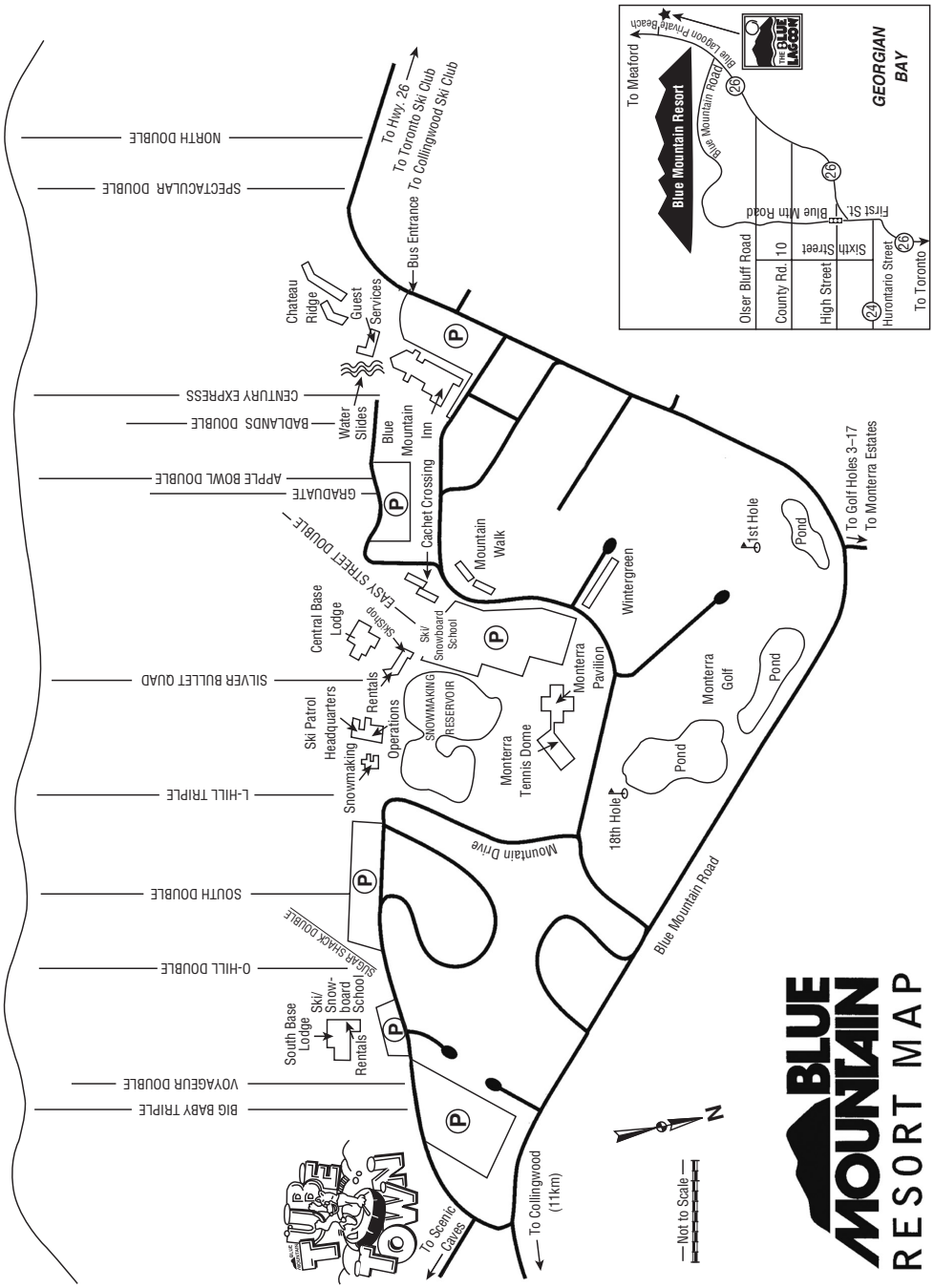


Exhibit 1 Map of Blue Mountain Resorts

most popular price packages—the weekend individual or "walk-ups," midweek individual and the full season pass—made up 54 per cent of lift ticket sales. Group tickets made up 12 per cent of ticket sales. Destination ticket holders comprised of the three day package ski ticket, and the one week pass made up one per cent of sales. BMR catered to a wide range of skiers—20 per cent were beginner to novice, 40 per cent were intermediate, and the balance were advanced to expert. The company estimated that intermediate level skiers and snowboarders typically came to the resort an average of 4.1 times per year, while advanced and expert level customers came an average of 6.7 and 9.4 times per year respectively.

Intrawest Investment in BMR

In 1999 Blue Mountain Resorts was the largest family operated ski resort in Canada. Gordon Canning, president and chief executive officer of BMR, was the son-in-law of the founder, Jozo Weider. Gordon joined the company in 1971, and became president in 1978. On January 14th, 1999, BMR announced that it would sell a 50 per cent interest in the company to Intrawest Corporation. Intrawest, headquartered in Vancouver, British Columbia, was a leading developer and operator of village centered resorts across North America. The company owned ten properties, including Whistler/Blackcomb, North America's most popular mountain resort.

In conjunction with its investment in BMR, Intrawest also purchased 16 acres of developable real estate lands at the base of the BMR resort, with plans for a village development. This expansion would include approximately 1,000 condo-hotel units, 200 townhouse units and 100,000 square feet of commercial space. Intrawest announced plans to develop a four season pedestrian village, complete with quality restaurants, shopping and nightlife similar to Intrawest's village at Tremblant. Gordon Canning commented on the Intrawest investment in BMR:

> Our business plan called for continued capital investments to maintain our growth. We are no longer just a ski hill—Blue Mountain is a four season resort with golfing, waterslides, tennis, beach and meeting facilities. We felt that to capitalize on the opportunities we needed a strategic partner that could help provide financing and management expertise. Overall, we expect a $585 million investment to develop an authentic Victorian style Ontario village at the Blue Mountain. This will include walkways and parklands to enhance the four season aspect of the resort throughout the village.

A primary attraction of BMR to Intrawest was the existence of an experienced management team. Consequently, Gordon Canning and his management team remained in place following the Intrawest investment. Exhibit 2 provides a corporate organization chart.

BMR Operations

BMR operations included facilities and guest services, the ski hill, golf course and summer recreation facilities. BMR employed a year round staff of 200, and hired an additional 750 winter seasonal employees and 250 summer seasonal employees. Dave Sinclair, commented on the managing staff:

> Despite the growth in our summer business, our operations are still quite seasonal. We hire a lot of seasonal employees who require orientation and training. With an annual payroll of over $10 million, our staff costs are a large part of our expense. However, we still have to be respectful of our employee needs and carefully plan staffing levels and remain flexible where possible if the weather doesn't cooperate.

Facilities and Guest Services

For many customers initial contact with BMR came through its call center. Dave Sinclair described the call center operations:

> We have 16 people working in the call center during peak periods, with 10 people at any one time. In terms of average calls per day, they handle

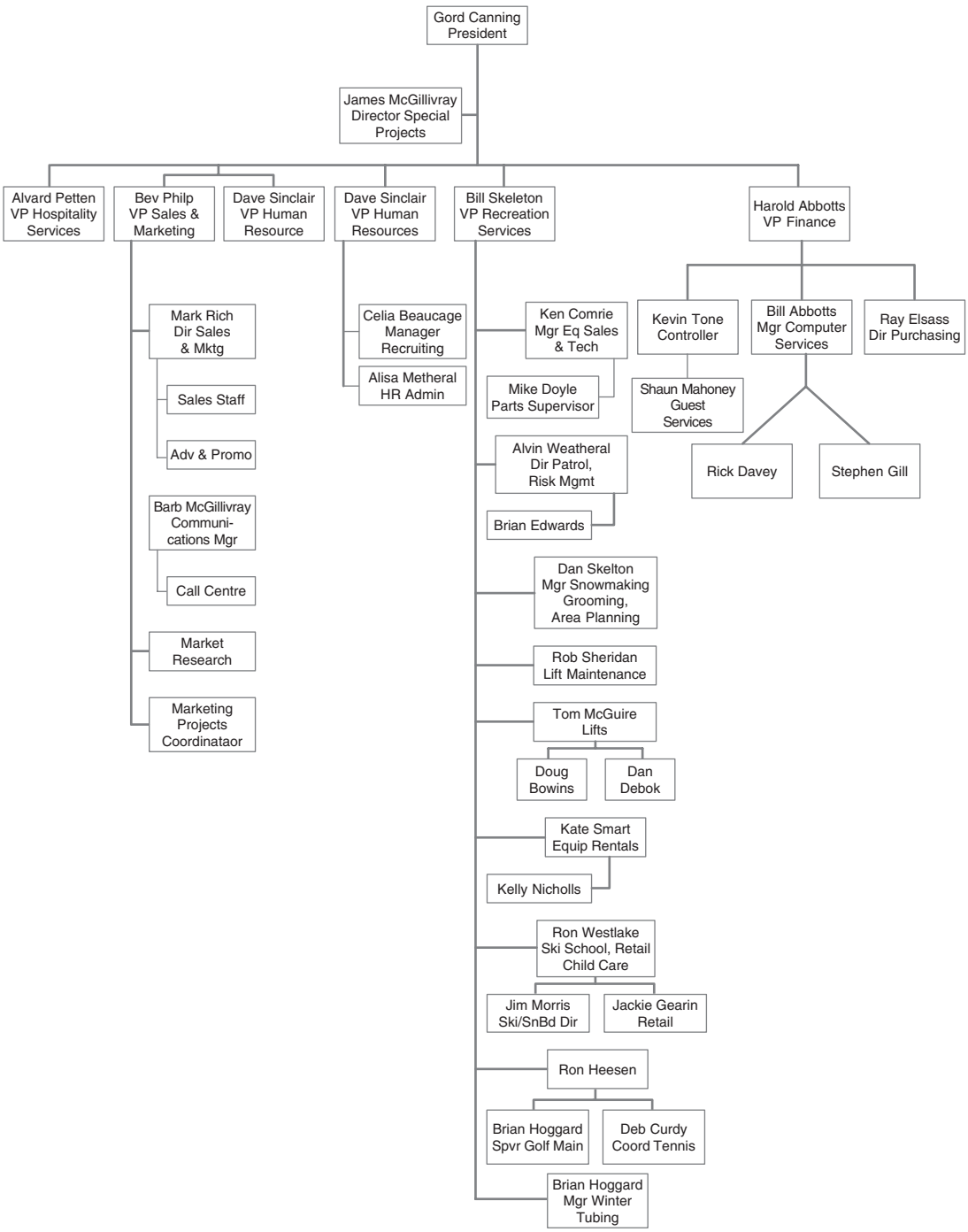


Exhibit 2 BMR Organizational Chart

anywhere from a high in January and February of 950, to a low in April of 230. Our professionally trained call center operators can answer questions about the resort, reserve accommodations, give directions, book golf tee times, and sell a variety of programs available at the resort.

There were eight different food service facilities at the resort that included a wide range of restaurants, from food court style cafeteria to fine dining. BMR conference facilities had capacity to handle conferences and large meetings for a total of up to 5,600 people, and in 1998–1999 Blue Mountain hosted 19,000 people in 350 different conferences and large meetings. Although these facilities operated year round, the peak period was between September/October and May/June.

Winter guests at BMR could shop at the three retail stores located on the resort. The retail shops were located at the two Base Lodge locations and hotel. The main lodge held a shop that offered a full line of ski fashions, accessories, and logo items. The South Base Lodge carried a smaller selection of fashions.

A daycare facility was open daily from 9:00 to 4:30 during the ski season, and could accommodate children from 15 months to five years of age. Weekend programs were available for children from ages six to 12 on weekends and holidays. In addition, BMR operated an eight week Tiny Tykes program at the South Base Lodge.

Ski rental and repair shops were in two locations. The Central Base lodge had 1,000 pairs of skis and 250 snowboards available for rental, while there were an additional 600 pairs of skis were available for rent at the South Base lodge. These shops also handled repairs for customers.

Finally, BMR also offered a number of other miscellaneous services to its guests, such as a chalet rental location service to provide assistance finding seasonal accommodation.

Ski Hill Operations

Hill grooming and snowmaking played an important part in BMR's operations. Dave Sinclair explained:

> We estimate that our ski hill has the capacity to handle 7,500 skiers comfortably during any particular day, while night skiing handles an additional 3,000. Since we can't control the weather, hill grooming and snowmaking help us get maximum utilization of the hill. Each night the trails are groomed with special machines with hydraulic attachments. We have about 12 people working in snowmaking, and another eight in the hill grooming operations.

BMR offered a wide variety of services to skiers and snowboarders. Among the most important was the ski school, located at the Central and South Base Lodges. It employed 180 ski and snowboarding professionals, which made it one of the largest ski and snowboarding schools in the country.

A number of systems were in place to help skiers. Electronic message centers that were located at all chair lifts displayed which lifts were operating and the current waiting time at each. Fourteen mountain guide volunteers were available to greet bus groups, answer questions and give guidance on the slopes and in the base lodges. There were 15 full time and 15 part time ski patrollers plus an additional 75 volunteers who promoted safe skiing and snowboarding, and provided first aid assistance. There were also 10 staff dedicated to the Badlands Terrain Park, and another 25 staff assigned to the snow tube area.

Golf Course and Summer Recreation Facilities

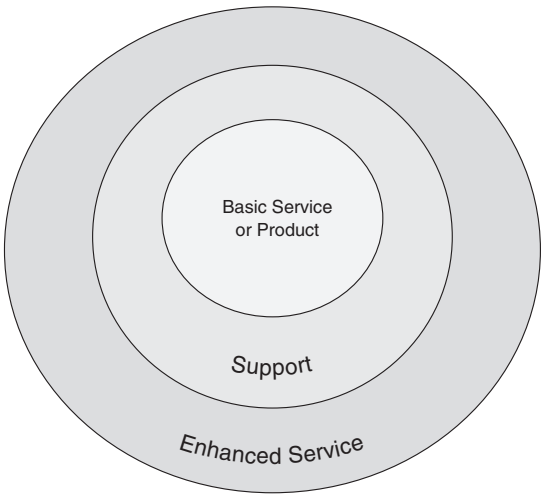
BMR had been moving steadily into a four season resort since 1977 when the Great Slide Ride was built for summer sledding down the mountain. By 1999 BMR had 225 part time seasonal staff working in its summer recreation facilities, which included the Monterra Golf Course, tennis, outdoor pools and water park complex. The Monterra Pavilion, opened in 1990, was the focal point of BMR's summer recreation activities. It included the Monterra Bar and Grill, pro shop, condominium check-in center, conference facilities, and outdoor pool and whirlpool.

BMR Service Quality Program

In spring 1991 David Sinclair was hired as BMR's first director of human resources. Dave had extensive experience as a human resource manager in a large consumer products company, and he commented on the situation in 1991 when he joined BMR:

> Blue Mountain enjoyed very good times during the 1980s. However, the focus had been revenue growth and facility expansion. Although the company had been profitable, it began to develop a reputation for long line-ups and poor service. Blue Mountain competed based on our location, expecting skiers to show up every season.
>
> Gordon Canning decided to survey the employees in 1990, and the results indicated problems with morale. Consequently, a consulting company was hired to conduct a series of seminars that focused on communication, team performance, and improving supervision techniques. The issues that came up during the course of the meetings indicated employee concerns about a number issues ranging from working conditions to frustration concerning service quality levels.
>
> When I arrived, one of the first requests that I made was for a management training program aimed at improving service at the resort. From my perspective, a major problem was one of poor service that was affecting employee morale and job performance—it costs us five times as much to attract a new customer as it does to retain an existing one. However, it was evident that our service quality problems were not going to be an easy fix—it would involve a complicated process and a long-term commitment from senior management.
>
> I then began looking into organizations that might be able to help us and eventually contacted a consultant at a firm called Achieve International, who agreed to help us. We started the process with an executive retreat, which included the six people who made up the senior management team: Gordon Canning, president; Harold Abbotts, vice-president of finance; Beverly Philp, vice-president of marketing; Bill Skelton vice-president of recreation services; Dale McNichol vice-president of accommodations, food and beverage; and myself. Throughout the two day workshop we considered the future vision of the company, focusing on our vision for the organization and values that we considered critical for creating a supportive corporate culture. The people from Achieve International provided some very persuasive data concerning the advantages of service oriented culture and the potential benefits to the company, its employees and our customers. At the end of the two day session they left us at a decision point. We considered the individual and corporate costs to beginning a service quality journey. As the change was perceived to be significant, it was, for some, not an easy decision.
>
> We reconvened to decide what, if anything, we should do next. At that point we made the commitment to develop a service quality philosophy, and we adopted Achieve International's book, *Firing on All Cylinders,* as our service quality bible. We also developed a vision statement—"To be the best resort in Canada at exceeding customer expectations"; a value statement—"caring, trusting and committed"; and a method—the three rings of perceived quality: basic service or product, support, and enhanced service (see Exhibit 3). We subscribe to the same basic vision, values and method today in spirit, although the words have changed slightly in order to be consistent with our new partner, Intrawest.
>
> Part of the commitment involved designating a service quality coordinator, a role that became part of my job description. I was to spend half my time on human resource activities and the other half as the service quality coordinator. As part of my new responsibilities, I went on a one-week training retreat to learn Achieve International's quality philosophy. Interestingly, I found that that all other firms represented were in manufacturing industries. It was during this training that I developed a rough draft for a two year plan, which identified our priorities, methods and goals. This plan was based on Achieve International's implementation framework (Exhibit 4).

At the start of the service quality program Gordon Canning made the following comments regarding the opportunities of improved service quality for BMR and its employees:



Basic Service: Skiing/snowboarding, golf, tennis, summer attractions, conferences, food & beverage.

Support: Call centre, housekeeping, front desk, accounting, human resources, maintenance, lifts.

Enhanced: Anything a service provider does for a guest or anything provided by the company that is unexpected or considered over and above.

Exhibit 3 The Three Rings of Service

Source: Achieve Group Inc.

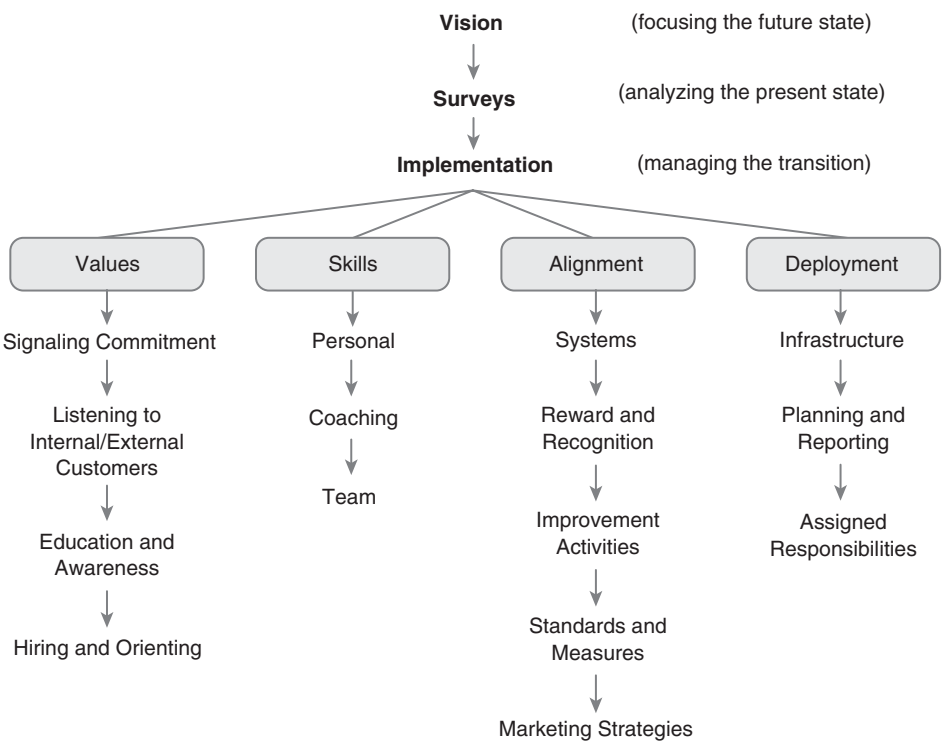


Exhibit 4 Achieve International Framework

Source: Achieve International

> The world is experiencing a service revolution. An organization must continuously improve just to keep up with the competition. Our challenge is to be better than others at exceeding customer expectations. Today the most important capital investment we can make is in our people. It is essential that Blue Mountain Resorts provide a level of service which sets it apart. This may be the most important thing the resort will do in the nineties—a decade when companies will rise, or fall, on their level of customer service.[1]

Early Service Quality Initiatives

The service quality program was introduced in the fall of 1991, in time for the 1991–1992 ski season. The program resulted in several changes at the company. Management felt that they had been too focused on external services, and that the term "customer" needed to be redefined. Consequently, as part of the service quality vision statement, customers were defined as internal and external, in order to recognize the importance of satisfying the needs of internal stakeholders.

Although BMR had been collecting customer data for several years, the new service quality program forced management to act on the information. Dave Sinclair explained:

> We needed a place to start so we used the benchmarking question on our customer survey—"How does Blue Mountain's service compare to other Canadian resorts?" Customers were given three alternatives: better, same or worse. We focused attention on the 'better' category and set targets to steadily improve our rating. If we hit our targets, then employees received an incentive bonus that represent about $50 for a seasonal employee and $200 for a full-time staff member. In 1991–1992 19.6 per cent of our customers classified us as better, in 1992–1993 our rating increased to 30 per cent and it reached 41 per cent in the 1993–1994 season. Meantime, customers that classified us as worse than other Canadian resorts fell from 16.5 per cent to three per cent over the same period.
>
> Initially we were looking for exposure with our employees and simple method of communicating performance. Eventually we reached a ceiling with respect to our ratings and by about 1996 we changed our approach. In the early years, however, it worked well for us.

In 1993 BMR changed its hiring practice with the objective of matching job demands with employee capabilities. A more structured interview process was developed and front line staff were invited to participate in some hiring activities. This was intended to build better teams in allowing those participating to decide on their future team members.

Finally, the management team prepared annual service quality reports. BMR published 10,000 reports each year to communicate to both the employees and to stakeholders what Blue Mountain's commitment to service quality entailed. The reports showcased improvement initiatives and recognized the many successful service quality initiatives coordinated by the employees.

The Move to Enhanced Service

The results of the first year of service-quality program encouraged management to consider how they could move quickly to enhanced service, the outer ring in the model (see Exhibit 3). Dave commented on the strategy adopted for the 1993–1994 season:

> We felt that we weren't doing enough to "wow" the customer—that service quality meant impressing the customer by exceeding their expectations. We began to focus on enhanced service and ignored the fundamental aspects of good operations necessary for high levels of quality service.
>
> Let me give you an example. At the Christmas holiday season we staffed up to put people on the hill to handle complaints and to answer questions from guests. We also put people on the hill to provide services to our guests that they might not expect—we had staff on the hill handing out hors d'oeuvres on silver platters and others were handing out hot chocolate drinks.

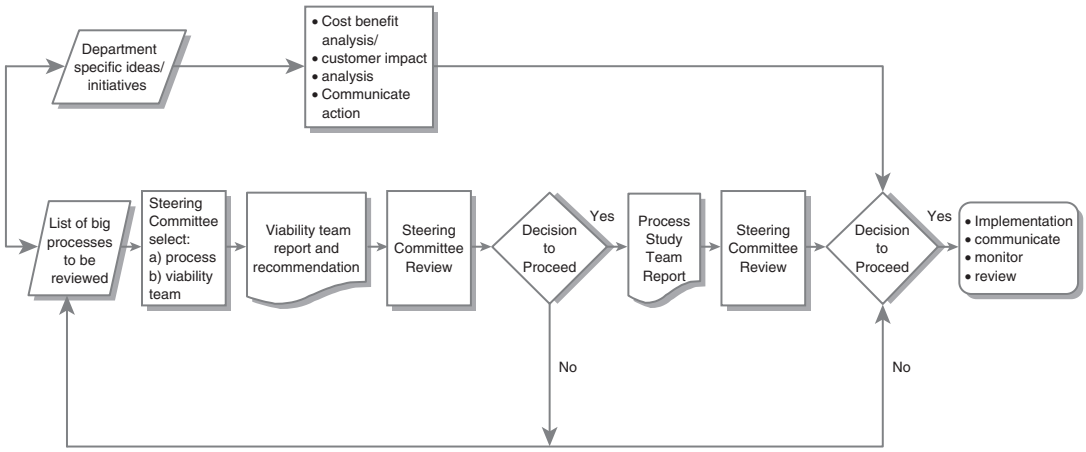


Exhibit 5 The Project Review Process

This was all nice except we still weren't able to manage the basic levels of service that our customers were expecting. For example, we estimate that we lost over 1,000 calls in our call center in March that year and customers unfamiliar with our location had difficulties finding our resort because of poor signage. We were trying to achieve high levels of service without adequate processes and systems.

The result was a difficult season, from a financial perspective, as our labor costs shot up. This was an important lesson, and it made us reconsider our concept of service quality and reevaluate our approach.

Process Teams

Concerned that service improvement efforts had ignored many of the fundamental aspects of process management and control, Dave Sinclair turned to Achieve International for assistance. Dave commented on what happened:

> They helped us learn how process management techniques commonly used in the manufacturing sector could be applied to our service business. As a result, we shifted our approach to continuous improvement, supported by cross-functional teams using data analysis and planning techniques. Our process improvement teams identified failure points in our processes, looking for the root causes of the problem, then making recommendations for corrective action. We called these productivity initiatives and developed a formal process for each team to follow.

A number of process teams were organized in the 1994–1995 season, in areas such as the call center, check-in, purchasing and signage. The teams had cross-functional representation and spent about four hours per week on the project. Each team used a standard process as identified in Exhibit 5. Each team used a number of different problem solving and analysis techniques, such as Pareto charts, brainstorming and process flow mapping. Dave Sinclair described the results of one productivity initiative, the call center:

> We used to treat the call center as an order desk, but in 1994, as part of our service quality program, conducted a study of call center activities. The end result was an initial investment of $100,000 for infrastructure followed by another $575,000 in new technology in December 1997 for a new telecommunications platform, in addition to a new management approach at the center. We provided formal training programs for our call center staff,

> set performance targets and started using the call center to help manage revenues. For example, on the performance measurement side, we aim for 80 per cent of our calls to be answered within 20 seconds, and we monitor the rate that calls are abandoned. We are now using yield management techniques in the call center to offer variable pricing structures for bookings in an effort to better manage revenues, and the call center is set up for one-stop shopping. They handle anything from bookings for accommodations, to tee off times, to BBQ rentals.

A move was also made to improve communications between management and staff. Employees were invited to join Gordon Canning over lunch. This provided an opportunity for Gordon and the staff to discuss a wide range of issues in an informal setting.

Finally, in the 1994–1995 season the company decided to abandon its incentive program based on percentage of customers classifying Blue Mountain's service as better than other Canadian resorts. By the summer of 1994 its rating had hit 50 per cent, and management felt that it would be difficult to consistently achieve a better rating. Consequently, a new measure was established—the percentage of customers that ranked staff friendliness as a 10 on a ten-point scale. In 1994–1995, 17.2 per cent of customers gave BMR staff ratings of 10 on the staff friendliness question. The company set targets to increase their rating in this area, starting with an objective of 18 per cent for the 1995–1996 season. Management expected to steadily increase the targets each year, and had set an objective of 24 per cent for the 1998–1999 season.

THE SWOP PROGRAM

"SWOP" was the strengths, weaknesses, opportunities and proposals program that Dave Sinclair had initiated several months prior to continue the improvement of customer service. In June 1999, Dave had organized five teams of five BMR managers and staff from different functional areas. Each team was asked to identify specific areas where they felt an opportunity existed for BMR to improve its service quality and to submit a one- or two-page SWOP proposal describing the issues to be resolved and to provide specific recommendations. A total of twenty-five separate proposals were submitted from the five teams.

Once the reports were completed, several were presented to the executive management team and acted on immediately and others were discounted as not being feasible. However, Dave identified three proposals that he felt required careful consideration: customer flow, speed of service and information technology. Dave selected these proposals because he believed that they offered significant opportunities to improve service quality at BMR.

1. Customer Flow

Problems familiarizing guests with the resort area and its services had become increasingly difficult as BMR expanded. This had in turn created problems particularly for first time guests, who sometimes became frustrated because they were unable to find a particular service or because they had been misdirected to the wrong line. Deb Lynch, manager of the Monterra Bar and Grill, described the problem:

> Having people find the resort easily isn't the only customer logistics issue. Obviously our regular customers are familiar with our services and they know the best way to navigate through the resort. However, customers less familiar with Blue Mountain need help understanding everything from where to park to where they can find the ski and snowboard rentals. Guests have a lot of specific questions as well, such as: Are there lockers? Is the terrain right for my ability? Is there childcare? Can I get my skis repaired? Where will I meet my tour bus?
>
> One big problem is parking. Apparently many of our guests aren't familiar with the parking areas because we have to tow cars from restricted areas, which causes obvious problems.

Another problem is that sometimes people are sent from one line to another and then to a third. For example, a guest might start at the south base lodge information desk where they are directed to administrative guest services and then get redirected to hotel front desk activities. Also, sometimes guests looking for rentals are sent from administration to the rentals desk at Central Base Lodge, only to discover that they are out of stock.

As the resort has expanded, problems associated with customer flow have become more pronounced. Obviously Intrawest plans to grow our facilities, so if anything this problem is going to get worse.

Right now we have approximately 14 mountain guides on the hills to answer questions. However, these people are only able to address the needs of guests after they are out on the mountain. The SWOP team felt that we should get to our customers earlier and identified a number of possible solutions. We could hire three attendants at a cost of approximately $9.50 per hour to work in the parking lot to address customer questions and coordinate parking.[2] However, they also identified a number of other alternatives including using an internal website, call center, hotel condo TV channel, walk-up information booths, drive-through information booths, a FM radio station or computer terminal kiosks.

2. Speed of Service

The second major recommendation was to improve speed of customer service. Weekends and holidays could cause problems at the resort as the number of guests approached the resort's capacity. The result was long line-ups, which guests equated as poor service. The SWOP team saw this as an area of frustration for the staff and an opportunity to improve customer service and made six recommendations that they felt would improve speed of service:

- Better forecasting in order to predict changes in business activity;
- Improved communication between departments;
- Provide fast and accurate information to staff;
- Train staff to be more flexible to adopt new approaches to their work;
- Adopt self-service information technology applications for guests;
- Schedule staffing levels based on a scientific examination of staff capacity to process customers.

Although BMR had made substantial improvements over recent years to shorten customer waiting times, Dave Sinclair agreed that speed of service represented a potential area for improvement and made the following observations:

BMR guests are increasingly concerned with the speed of service, especially as families make up a large portion of the target market. There are a great number of line-ups that guests work though for services and products. These range from wait time on the phone to get information, to waiting in line to check into their room, to waiting in line to pick-up equipment—all before they even get on the hill. We feel that the acceptable time for the lift line is ten minutes. If we consider the times that guests spend in consecutive queues for complementary services, then we are exceeding this limit by a great deal.

Recently we had one of our most successful weekends in history. A storm system dumped fresh snow on Friday night and Saturday opened up with beautiful sunshine. We had stuff happening on the hill, including three major suppliers doing demonstrations. Additionally, it was the American Presidents' Day long weekend—they love our dollar. So we had a big turnout. The place was jumping, but it was to the point where we were overwhelmed. The parking lot was jammed; there were crowds at the lifts, at the cafeterias, at the bars, at the rentals. On the one hand everyone seemed willing to pay the price, but we exceeded our comfortable carrying capacity. We knew we'd not met expectations of some guests.

3. Information System

BMR's information system consisted of several independent databases and operating

systems. For example, vendor information, invoices and other purchasing data, tee time info, and conference center guest history were in the AS/400 system. Payroll, hotel guest history, ski and snowboard revenue, and call center data was held on the Novell system. Finally, rental revenue, golf and tennis memberships, ticketing sales, skier visits and other retail information were on stand-alone systems. Dave Sinclair described how the SWOP team saw the problem:

> Our information system had grown up with the company. We added capacity and features as we needed new capabilities. However, we never worried about system integration. The team felt that staff needed the capability to access information on a common system. For example, the call center could benefit from customer purchase history when processing information requests or booking a reservation. Staff at the information desk would benefit from tracking ski and snowboard rental bookings so to understand if equipment is available when responding to guest inquiries. An online information system would allow managers to make appropriate changes one time and provide access to all staff as needed—from telephone sales reps, front desk clerks, and conference sales and service personnel. Right now all of our information is on hard copies, so staff sometimes have to sift through different binders to find what they need. Unfortunately the information is sometimes inaccurate or badly outdated. With an on-line information system it could be checked for accuracy and update on a regular basis.
>
> I can see where such a system could be very expensive. Installing a PC on each call center desk, for example, would cost approximately $50,000. We would also have substantial costs for setting up the intranet system and database, not to mention the costs of installing the infrastructure and cabling.
>
> The team proposed that we should hire a graduate level co-op student on site for approximately five months to help us get our information systems organized. They expected that such a person might cost $600 to $800 per week, and he or she could investigate and document the databases and our current reporting requirements, and identify a long-term plan and budget. For example, evaluate the appropriateness of our Crystal Reports program over the long term and evaluate the viability of establishing an Intranet system.

CURRENT SITUATION

As Dave considered the three proposals before him, he knew that he would be asked for his recommendations on Monday. Although each had its merits, he recognized that Gordon Canning would expect him to set priorities for the coming year and recommend what action, if any, should be taken for each. Dave felt that he had to decide which programs made the most sense for immediate action and which ones required additional study and analysis. If there were a need for additional information, Dave needed to identify what information was still required and how long it would take to get it. Furthermore, each of the proposals affected different parts of the organization, and Dave needed to be concerned about who else in the company should be involved in both further evaluation and implementation. Finally, Dave also recognized that he had to consider the investment that Intrawest would make in the resort and how his recommendations might fit with the aggressive expansion plans for Blue Mountain.

NOTES

1. Source: Ontario Skills Development Office, 1993 promotional publication.

2. Labour cost based on $8.00 per hour plus 18 per cent for benefits

NORAM FOODS

M. R. Leenders

John Walsh

based on research by Professors Forsyth and Wood

 Version: (A) 2003–07–15

Pat Marsden, plant manager for Noram Foods (Noram) of Toronto, Ontario, was considering the impact of changing Noram's policy on package weight. Pat knew this was a matter of overall concern for the corporation. Before raising the possibility of a change in policy with the company's executive committee, Pat wished to have a clearer picture of the options available and the implications of any change in policy. Pat was particularly concerned about the capability of the plant to hold tolerances on weights.

COMPANY BACKGROUND

Noram Foods was a major producer of a variety of consumer food products, including baby foods, cereals, and a variety of canned products. Noram Canada was part of Noram International which had plants in 12 different countries. The head office of Noram International was located in New York. Head office control was primarily financial, as part of Noram's success was based on giving its international units a large amount of local autonomy. Moreover, food tended to be subject to specific and different legislation in each country in which Noram produced its products. Noram Foods had existed in Canada for over 80 years and its brands were extensively advertised. Even though management had frequently been pressured to do custom packaging or produce "no-name" products, it had steadfastly refused to get involved in either. Management believed that exclusive concentration on the production of high-quality branded products was in the corporation's best interest.

Noram Foods in Canada had an enviable record of sound financial performance. Recently, however, the president had called for special vigilance by all managers to look for opportunities to increase revenues or reduce costs. Pat Marsden believed the weight control issue represented a major opportunity for re-evaluation and increased performance.

Policy on Weight Control

Pat's concern was with the company's current policy on weight control, which read:

> At least 95 per cent of all packaged net weights shipped will be above the stated net weight.

Pat believed this policy could result in too high a proportion of overweight packages at substantial cost to Noram, and had therefore requested a meeting with Noram's packaging engineer, Joe Turner. Joe was the recognized expert in the company on statistical quality control, and filling and weighing equipment. In discussing the current policy with Joe, Pat said:

> I know that Noram has had this policy for many years and that during this period Noram has never been cited for putting out underweight products. A lot of things have happened over the years, however. For example, today's weighing technology is a heck of a lot better than it used to be. I think we could save a bundle if we took a more realistic look at our policy. The last time I brought this issue up at an executive meeting was about 10 years ago. At that time, the vice president of marketing was completely opposed to any changes. I can still remember how upset she was. She said:

> The consequences of underweight product reaching the public could be disastrous for this company. We have a fantastic reputation to protect and I don't want to run any risk that we will lose something that took decades to build and on which we have spent tens of millions of advertising and promotion dollars. If you're proposing that we start playing statistical games with the government and the consumer, I don't want any part of it.

Pat continued:

> Nevertheless, especially in today's economic climate, we would be remiss if we didn't at least look at any major opportunity at cost reduction. Before I propose anything to the executive committee, however, I want to be sure I'm on safe ground. I want to be absolutely sure, for example, that I do not propose anything we're not capable of doing in this plant.

Joe Turner replied:

> Pat, I think I know what you're saying, but it is more than just a matter of statistics and technology in filling and weighing. From time to time, I've had discussions with our marketing people about this whole area. They keep insisting that if we ever get caught with underweight packages, it will be seen by consumers as just as serious as a citation of unsanitary conditions. It is a topic where a lot of corporate psychology is involved. We see ourselves as real corporate winners in the food field. Our current policies on sanitation, weight control, package design, and a host of other areas all reflect that winning attitude. In that kind of environment, how much of a risk should this company take? Also, as you can well appreciate, our wide product diversity makes it difficult to apply the same weight policy to everything we do. Even now, on some products, we have substantially less than five per cent of our packages underweight, just to make sure we run no chance of running below the government permitted tolerances.

Both Joe and Pat agreed that raising the issue of weight control without getting down to specifics was going to be meaningless. They, therefore, agreed to concentrate on a specific product line, pre-cooked baby cereals, to see what options might be available and what impact any change in policy might possibly have. Pat and Joe decided they would go and have a good look at the pre-cooked baby cereal package line.

Filling Operations

Weight and Volume Standards

Noram used a variety of filling equipment in its plant. For some less popular products, or products with unusual physical characteristics, some older equipment was used. Almost all of the larger-volume product lines were produced on sophisticated modern, high-speed filling equipment that was developed especially for the types of products Noram manufactured. An interesting design trade-off on filling equipment involved speed of fill versus tolerance holding ability on weight or volume. Obviously, a greater filling speed resulted in a higher capacity of the equipment and a lower labor cost per unit produced. On the other hand, a lower filling speed afforded better weight and volume control, resulting in a package weight and volume closer to specifications. Overweight packages resulted in higher material costs for Noram, but underweight packages might result in adverse consumer reactions or government citation.

For many products, Noram not only had weight standards, but also volume standards. "Settling" of product in a package after filling was always a concern, as Noram managers believed consumers might be upset if on opening a box or bag they found a substantial empty space at the top of the package. Special vibrators were attached to the filling equipment to encourage settling before packaging closure. Particle size and weight also affected filling rates and weight and volume control. For example, a granola-type cereal, with particles ranging in weight from one-half gram to seven grams and particle size up to about a cubic centimetre, was much more difficult to control than pre-cooked baby rice cereal in which unit size and weight were small and uniform.

Operation for Pre-Cooked Baby Cereals

For pre-cooked baby cereals, the filling operation was performed on a double line consisting of nine pieces of equipment (see Exhibit 1). The parallel lines were designed to optimize staffing, since one operator could attend to two pieces of equipment at the same time. The first unit in each

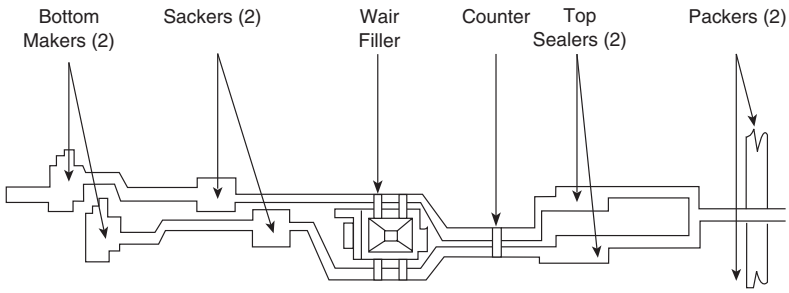


Exhibit 1 The Pre-Cooked Baby Cereal Line

line, a bottom maker, formed the pre-made carton and sealed the carton bottom. The sacker, second in line, formed the wax-paper liner and inserted it into the carton, completing the package. From the sacker, the carton was moved to the Wair filler, which measured out by weight the cereal content and inserted it into the waiting carton. From the filler, the carton was moved to the top sealer for final closure, and then to the packer.

The crew consisted of five operators. One tended the bottom makers and sackers, making sure that each unit was kept supplied with raw materials like flat cartons and wax paper. The second operator looked after the Wair filler, while the third operator packed the completed cartons into cases at the end of the line. Another operator, trained in line machine operation and minor maintenance, was responsible for effective operation of the whole line. The fifth acted as a spare operator who could temporarily relieve any of the other operators and also assist in maintenance. The top sealer glue supply tended to be touchy and had to be watched carefully. A considerable amount of the spare operator's time was spent on the two top sealers. This operator also rotated with the other line personnel. The work arrangement allowed for job rotation each half hour.

The Wair Filler Operation

The net weight filler consisted of four separately-operated filler heads fed from a food bin located on the floor above the filler room. The capacity of the Wair filler was placed at about 100 cartons of 454-gram pre-cooked baby cereal per minute by the machine's manufacturer. This amounted to a filling speed of about 25 cartons per filling head per minute. The capacity of the other machines on the lines was in balance with the filler capacity. Actual experience with the equipment showed that daily effective capacity ran at about 85 per cent for the seven and a half hour shift the equipment operated.

The Wair filler operator was primarily concerned with package weight control. This job consisted of taking full cartons from each head (four cartons from one of the four heads every 10 minutes), pouring their contents into a plastic container, and weighing the cereal to determine the actual net weight. The operator recorded the weight for each head on a control chart ($\bar{x}$ and R chart) and noted its position between the control limits. If the point fell outside of the specified limits, the operator adjusted the questionable filler head. If the filler had continued out of control after the adjustment, the operator summoned the operator in charge of the line who decided on further action.

Typically, the machine was allowed to continue if the condition was one of overweight. However, an underweight situation was cause for the operation to be stopped.

During the normal course of the line operation, the filler machine operator had control over the in-feed of cereal weight (variable high-low adjustment), food agitators (to maintain cereal consistency, prevent lumping and make room in the carton for the required net weight), vibrators (to make the food settle in the carton), and the stop-start controls for the line. Each of the four

heads on the Wair operated independently of the others and could be adjusted without affecting the operation of the other heads. By operating the Wair with a split heads setup, at least part of the line could continue to operate at all times except under severe breakdown conditions.

Efficiency

When Joe and Pat observed the filling operation, they noted everything was running smoothly. The line was running pre-cooked baby cereal and seemed to be meeting its daily production goal of about 38,000 cartons. Since the rice cereal was the most popular of the pre-cooked baby cereals, and since the 454-gram size was the most popular package weight, approximately 60 days a year were scheduled for this package size and cereal alone. The remainder of the year, the machine produced a variety of package sizes in rice, soya, barley, oats, and mixed pre-cooked baby cereals. Pat believed that the cost of 454 grams of pre-cooked baby cereal was about one dollar. This was a fully allocated cost, including an appropriate share of overhead in the various processing departments prior to filling, as well as a share of general plant overhead.

The equipment in the baby cereal area was about three years old and had operated well since its original installation. When Pat asked Joe what new technology was coming along on the horizon, to replace it, Joe replied:

> As you know, Pat, the technology in measuring and weighing and packing equipment is changing all the time. They are always trying to increase speed and accuracy. However, the costs are going up substantially as well. I'm not aware of anything at the moment that would make it worthwhile for us to pull out this line now and substitute it with something better. It may well be that in another year or so, somebody may have some new equipment that's attractive enough for us to take a good look at. Frankly, compared to some of the older equipment in other parts of our plant, the performance of these two lines and this particular filler is quite astounding. We really have no problem staying within a plus or minus one per cent range on weight control in this department, which, considering the speeds we're running at, is outstanding performance.

Joe moved to the Wair filler and asked the operator to show Pat the weight control charts. Pat noted that the equipment was consistently running within the control limits specified. (See Exhibit 2 for a typical Wair filler plot.) Joe also selected at random one of the sheets summarizing the previous day's operations (see Exhibit 3). It summarized both the day's performance for one of the filling heads, as well as the month's to date statistics for the same head. Pat asked Joe to make a copy of this and also to bring the latest government regulations on weight control. The government had issued regulations on acceptable tolerances, and Pat wanted to be absolutely sure that they had the latest information available on consumer packaged goods.

LEGISLATION

Joe returned to Pat's office later in the day. He brought with him, not only a copy of the Wair filler chart that Pat had requested, but also copies of the consumer packaging and labelling act and various amendments and information brochures provided by the Department of Consumer and Corporate Affairs of Canada. Joe said:

> Pat, I've gone through all of this government material. As you can appreciate, the primary reason for its existence is to protect the consumer from misrepresentation by the manufacturer of consumer packaged products. I have underlined here a few specific points which deal with the net weight issue you're trying to raise.
>
> *7(3): where a declaration of net quantity shows the purported net quantity of the pre-packaged product to which it is applied, that declaration shall be deemed not to be a false or misleading representation of the net quantity if the pre-packaged product is, subject to the prescribed tolerance, not less than the declared net quantity of the pre-packaged product and the declaration otherwise meets the requirements of this Act and the regulations.*
>
> Tolerances
>
> 39. (1) For the purposes of Schedule 1, "catch weight product" means a product that because of its nature cannot normally be portioned to a predetermined quantity and is, as a result, usually sold in packages of varying quantity.

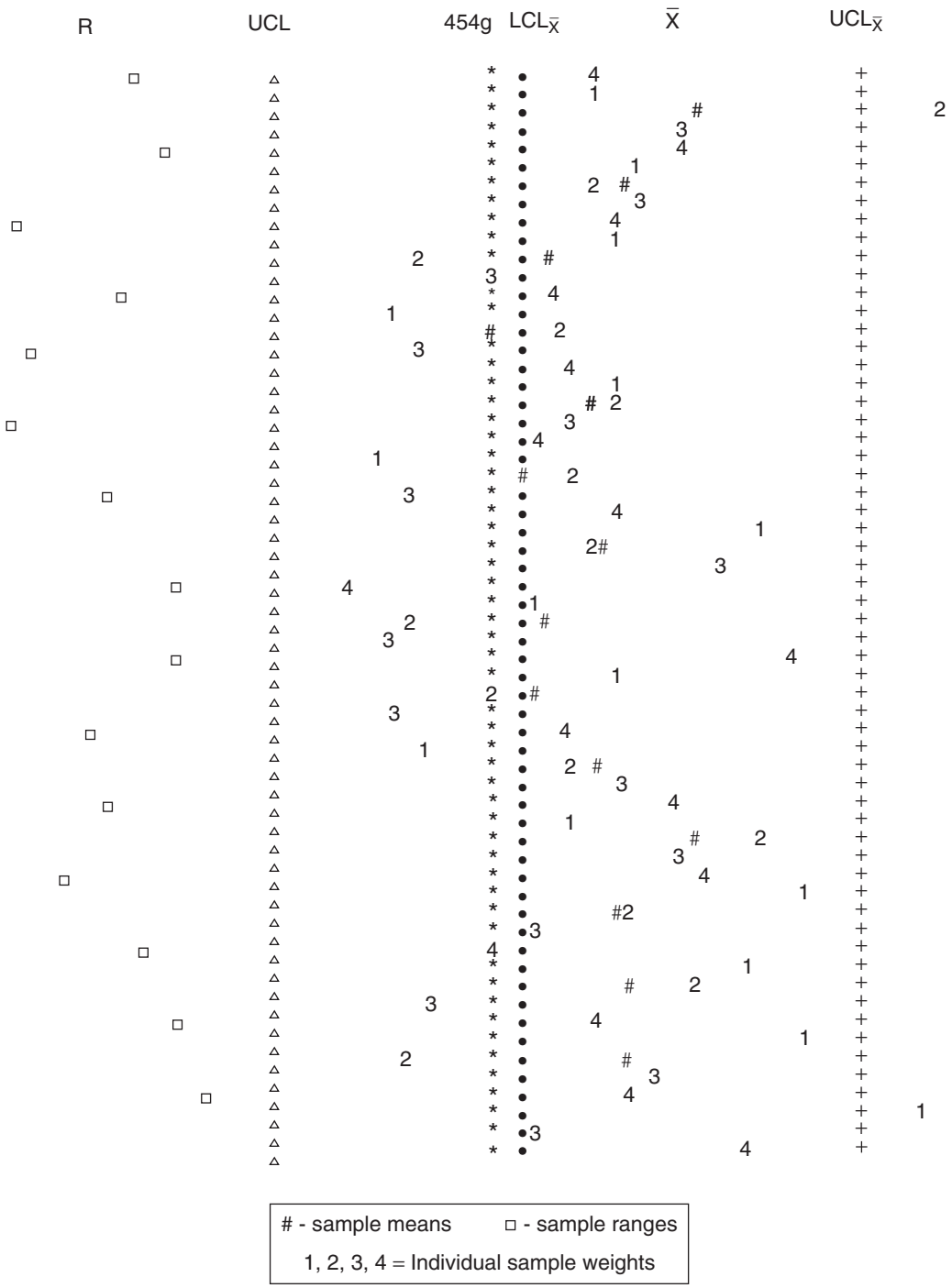


Exhibit 2 Wair Filler Plot, Head No. 3

Product	Pre-Cooked Baby Food
Package Weight	454 g
Head	#3
Capability	1.65 g

	Month to date	*Day*
Mean weight ($\bar{x}$)	456.609	457.064
Mean range (R)	3.124	3.876
$UCL_R = D_4R$	7.129	8.845
$LCL_R = D_3R$	0	0
Std. Dev. = $S = R/D_2$	1.517	1.882
5% Control = 1.645S	2.496	3.097
A_2R	2.277	2.826
$UCL_{\bar{x}} = x + A_2R$	458.886	459.890
$LCL_{\bar{x}} = x - A_2R$	454.332	454.238
Sample size	630	45
Adjusted sample size	622	45
# Light	119	8
Total lightweight	257.516	20.520
% Light	4.783%	4.444%
Total overweight	6,749.944	572.040
Mean overweight	2.713	3.178
Mean % overweight	0.598%	0.700%
Percentage variability	8.046%	–14.089%

A NOTE ON CONTROL CHART CALCULATIONS

Date, Product, Package Weight, Head

Each day summary tables of operations for the Wair Filler were prepared. On any given day there might be several summaries for each head as package weights or products changed. This summary refers to the previous day's run of 454-gram Pre-Cooked Baby Cereal through #3 head.

Capability

This is the standard deviation determined by Noram management which under the filling conditions relevant to this product, speed, particle size, Wair manufacturer specifications, etc., should be achieved in meeting the company policy that: "95 per cent of all packaged net weights shipped will be above the stated net weight."

Mean Range

The average of the ranges in the samples taken for the period is called the mean range.

Std. Dev.

This is the sample standard deviation. Theoretically, it is calculated as the square root of the sum of the squared deviations of n observations from the mean divided by n-1. The bigger the standard deviation, the more "spread out" the distribution about the mean.

Exhibit 3 Wair Filler Operating Results *(Continued)*

$$S = \sqrt{\frac{\sum(Y - \bar{y})}{n - 1}}$$

In Noram's case, S is calculated from the mean range instead of from the individual observations. Dividing the Mean Range by the factor D_2 (from Table A at the end of this Exhibit) provides a very close approximation of the population standard deviation. Table A shows D_2, to be 2.059 for subgroups of four, so for the month to date:

$$\text{Std. Dev.} = S = R/D_2 = 3.124/2.059 = 1.517$$

UCL_R

The upper control limit on the range is calculated as D_4 times the mean range. D_4 equals 2.282 for a sample of n = 4 (see Table A). For the month to date:

$$UCL_R = D_4R = 2.282 \times 3.124 = 7.129$$

LCL_R

The lower control limit on the range is calculated as $D_3 \times$ mean range. Since D_3 is equal to zero for a sample of four, the lower control limit on the range is also zero.

Operators use the upper and lower control limits on the range to monitor the filling operation.

5% Control

This setting ensures that 95 per cent of the packages are filled with 454 grams or more.

To assure ourselves that 95 per cent of the observations will exceed a certain mean value, we first note that 50 per cent will be at or above the mean. Thus, we need only determine the number of standard deviations below the mean that are needed to account for the remaining 95 per cent minus 50 per cent = 45 per cent of the observations. Do this by locating 0.4500 in the body of Table B and read off 1.645. For the month to date:

$$\text{5\% Control} = 1.645 \times 1.517 = 2.496$$

A_2R

The 3-sigma control limits on the mean are based on A_2R. For samples of four packages Table A shows that A_2 is 0.729. For the month to date:

$$A_2R = 0.729 \times 3.124 = 2.277$$

$UCL_{\bar{x}}$

The upper control limit on the mean is calculated as mean weight plus A_2R. For the month to date:

$$UCL_{\bar{x}} = 456.609 + 2.277 = 458.886$$

$LCL_{\bar{x}}$

The lower control limit on the mean is calculated as mean weight minus A_2R. For the month to date:

$$LCL_{\bar{x}} = 456.609 - 2.277 = 454.322$$

Sample Size

This is the unadjusted size. Each sample consists of four packages. Thus, the 630 samples reported for the month to date represent 2,520 individual packages.

Exhibit 3 Wair Filler Operating Results *(Continued)*

Adjusted Sample Size

The adjusted sample discards "wild" samples. We can think of two kinds of "causes" for package weight variation. There are statistical variations which we can regard as normal fluctuations around a mean and which arise from acceptable operating characteristics of the equipment, and there are assignable variations where the variation from target is a result of some malfunction. If a blockage occurs, for example, and produces a half-filled package in a sample, this would be termed "wild" by Noram and the sample would be discarded for computational purposes. The reasoning here is that Noram wishes to track statistical variation and not malfunctions. In the event of a wild sample being detected, operators would remove affected packages. A total of eight such samples were omitted from the adjusted sample for the month to date. The 622 samples reported for the month to date represent 2,488 packages.

 # Light

This is the number of packages in the samples under the net weight of 454 grams. For example, if, in one of the samples of four packages, one of the packages was less than 454 grams, this would count as one light package. For the month to date 119 such packages have been recorded.

Total Light Weight

This is the amount in grams of underweight in the light packages. For example, if a light package has been detected in a sample, weighing in at 451 grams, this would be recorded as three grams of light weight. The total light weight associated with the 119 light packages for the month to date is 257.516 grams.

% Light

This is the percentage of packages in the adjusted sample under the net weight. It is calculated as # light divided by the number of packages in the adjusted sample size and expressed as a percentage. Thus, for the month to date:

$$\% \text{ Light} = 119/2{,}488 = 4.783\%$$

Total Overweight

This is the total weight in grams in excess of the net weight requirements. Each package that weighed in excess of 454 grams would contribute to the total overweight.

Mean Overweight

This is the total overweight divided by the number of packages in the adjusted sample size. Noram does not deduct the number of light packages from the adjusted sample size in computing mean overweight. Thus, for the month to date:

$$\text{Mean Overweight} = 6{,}749.944/2{,}488 = 2.713\text{g}$$

Mean % Overweight

This is the mean overweight divided by the package weight and expressed as a percentage. Thus, for the month to date:

$$\text{Mean \% Overweight} = 2.713/454 = 0.598\%$$

Percentage Variability

This can be interpreted as a measure of Wair Filler performance against "standard." It is calculated as capability minus std. dev. and expressed as a percentage of capability. A positive figure indicates performance better than standard, while a negative result suggests worse. Thus, for the month to date:

$$\text{Percentage Variability} = (1.650 - 1.517)/1.650 = 8.061\%$$

Exhibit 3 Wair Filler Operating Results *(Continued)*

Table A: Factors For Determining The 3-Sigma Control Limits For $\bar{X}$ and R Charts

Number of observations in subgroup	*Factor for X Chart*	*Factors for R Chart*		
n	A_2	*Std. Dev.* D_2	*LCLR* D_3	*UCLR* D_4
2	1.880	1.128	0	3.267
3	1.023	1.693	0	2.575
4	0.729	2.059	0	2.282
5	0.577	2.326	0	2.115
6	0.483	2.534	0	2.004
7	0.419	2.704	0.076	1.924
8	0.373	2.847	0.136	1.864
9	0.337	2.970	0.184	1.816
10	0.308	3.078	0.223	1.777

Exhibit 3 Wair Filler Operating Results *(Continued)*

Source: Adapted from J. R. Evans and W. M. Lindsay, The Management and Control of Quality, Second Edition. West, 1993. Appendix B, page 661.

(2) Subject to subsection (3), the amount set out in column II of an item of the appropriate Part of Schedule I is the tolerance prescribed for the purposes of subsection 7(3) of the Act for the net quantity set out in column 1 of that item.

(3) Where the net quantity of a prepackaged product referred to in Part I, II, III, IV, V, or VI of Schedule I is declared by weight or volume and that net quantity is not set out in column I of that Part, the tolerance prescribed for the purposes of subsection 7(3) of the Act for that net quantity is an amount based upon linear interpolation between the appropriate tolerances[1] appearing in column II of that Part.

Inspection

40. (1) Where an inspector wishes to inspect any lot, shipment, proposed shipment or identifiable quantity of prepackaged products all purporting to contain the same net quantity or product (hereinafter referred to as a "lot") to determine whether the lot meets the requirements of the Act and these Regulations respecting the declaration of net quantity and where, in his opinion, it is impractical or undesirable to inspect all the separate prepackaged products in the lot, he may inspect the lot by selecting and examining a sample of the lot.

THE DECISION

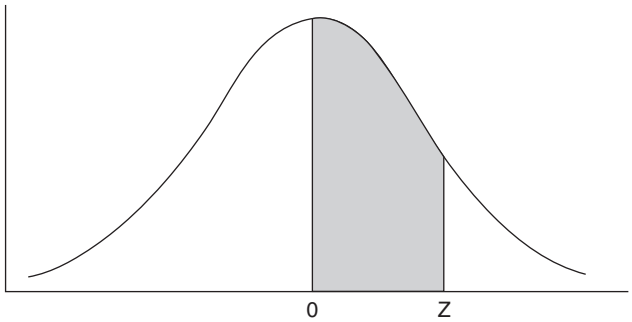
Pat thanked Joe for his work and concluded:

> Joe, why don't both of us think this whole situation out for a week or so and then get together on it again. I want to be thoroughly familiar with this whole situation before I look at any options or propose any changes. I like the idea of concentrating first at the pre-cooked cereal line, because it is a steady seller and it is an area we appear to have under reasonable control. I know we can't stop there, but it is a good place to start.

NOTE

1. Excerpt from Consumer Packaging and Labelling Act, Consumer Packaging and Labelling Regulations amendment, P.C. 1975–479 4 March 1975, See Exhibit 4 for Schedule 1.

Table B: Areas Under The Normal Curve



z	*0.00*	*0.01*	*0.02*	*0.03*	*0.04*	*0.05*	*0.06*	*0.07*	*0.08*	*0.09*
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0753
0.2	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
0.4	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879
0.5	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.2224
0.6	0.2257	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2517	0.2549
0.7	0.2580	0.2611	0.2642	0.2673	0.2704	0.2734	0.2764	0.2794	0.2823	0.2852
0.8	0.2881	0.2910	0.2939	0.2967	0.2995	0.3023	0.3051	0.3078	0.3106	0.3133
0.9	0.3159	0.3186	0.3212	0.3238	0.3264	0.3289	0.3315	0.3340	0.3365	0.3389
1.0	0.3413	0.3438	0.3461	0.3485	0.3508	0.3531	0.3554	0.3577	0.3599	0.3621
1.1	0.3643	0.3665	0.3686	0.3708	0.3729	0.3749	0.3770	0.3790	0.3810	0.3830
1.2	0.3849	0.3869	0.3888	0.3907	0.3925	0.3944	0.3962	0.3980	0.3997	0.4015
1.3	0.4032	0.4049	0.4066	0.4082	0.4099	0.4115	0.4131	0.4147	0.4162	0.4177
1.4	0.4192	0.4207	0.4222	0.4236	0.4251	0.4265	0.4279	0.4292	0.4306	0.4319
1.5	0.4332	0.4345	0.4357	0.4370	0.4382	0.4394	0.4406	0.4418	0.4429	0.4441
1.6	0.4452	0.4463	0.4474	0.4484	0.4495	0.4505	0.4515	0.4525	0.4535	0.4545
1.7	0.4554	0.4564	0.4573	0.4582	0.4591	0.4599	0.4608	0.4616	0.4625	0.4633
1.8	0.4641	0.4649	0.4656	0.4664	0.4671	0.4678	0.4686	0.4693	0.4699	0.4706
1.9	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744	0.4750	0.4756	0.4761	0.4767
2.0	0.4772	0.4778	0.4783	0.4788	0.4793	0.4798	0.4803	0.4808	0.4812	0.4817
2.1	0.4821	0.4826	0.4830	0.4834	0.4838	0.4842	0.4846	0.4850	0.4854	0.4857
2.2	0.4861	0.4864	0.4868	0.4871	0.4875	0.4878	0.4881	0.4884	0.4887	0.4890
2.3	0.4893	0.4896	0.4898	0.4901	0.4904	0.4906	0.4909	0.4911	0.4913	0.4916
2.4	0.4918	0.4920	0.4922	0.4925	0.4927	0.4929	0.4931	0.4932	0.4934	0.4936
2.5	0.4938	0.4940	0.4941	0.4943	0.4945	0.4946	0.4948	0.4949	0.4951	0.4952
2.6	0.4953	0.4955	0.4956	0.4957	0.4959	0.4960	0.4961	0.4962	0.4963	0.4964
2.7	0.4965	0.4966	0.4967	0.4968	0.4969	0.4970	0.4971	0.4972	0.4973	0.4974
2.8	0.4974	0.4975	0.4976	0.4977	0.4977	0.4978	0.4979	0.4979	0.4980	0.4981
2.9	0.4981	0.4982	0.4982	0.4983	0.4984	0.4984	0.4985	0.4985	0.4986	0.4986
3.0	0.4987	0.4987	0.4987	0.498	0.4988	0.4989	0.4989	0.4989	0.4990	0.4990

Exhibit 3 Wair Filler Operating Results

Source: **Op cit** Appendix A, page 660.

Item	*Column I Declared Weight*	*Column II Tolerances*
1	1 g*	0.16 g
2	1.5 g	0.20 g
3	2 g	0.25 g
4	3 g	0.32 g
5	4 g	0.38 g
6	5 g	0.44 g
7	6 g	0.50 g
8	8 g	0.59 g
9	10 g	0.68 g
10	15 g	0.88 g
11	20 g	1.05 g
12	30 g	1.36 g
13	40 g	1.63 g
14	50 g	1.87 g
15	60 g	2.1 g
16	80 g	2.5 g
17	100 g	2.9 g
18	150 g	3.8 g
19	200 g	4.5 g
20	300 g	5.8 g
21	400 g	7.0 g
22	500 g	8.0 g
23	600 g	9.0 g
24	800 g	11.0 g
25	1 kg**	12.5 g
26	1.5 kg	16.0 g
27	2 kg	19.4 g
28	3 kg	25.0 g
29	4 kg	30.0 g
30	5 kg	34.0 g
31	6 kg	39.0 g
32	8 kg	46.0 g
33	10 kg	53.0 g
34	15 kg	68.0 g
35	20 kg	80.0 g
36	over 20 kg	0.4% of declared weight

Exhibit 4 Declaration of Net Quantity by Metric Units of Weight on Products other than Catch Weight Products

* g = grams

** kg = kilograms

(1) Excerpt from *Consumer Packaging and Labelling Act,* Consumer Packaging and Labelling Regulations Amendment, Schedule 1, Part III, P.C. 1975-479, 4 March 1975.

HILCREST AUTO

Carlie Bell

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 Version: (B) 2003–09–09

Late one afternoon in March 2000, Mark Bailey returned from an emergency out-of-town meeting to discover that scrapped parts had been used in a shipment to one of Hilcrest Auto's major customers. Although the company had been experiencing quality problems for some time, this shipment decision could have disastrous effects on the future of the firm. Bailey, quality manager and business unit manager of the Small Parts Division of Hilcrest Auto (Hilcrest), had to decide what action, if any, he should take regarding the scrapped parts shipment. As well, he would have to determine which of four options to choose to address the quality issues as soon as possible: buying a second bending machine, adding a third shift, continuing as is with more overtime production, and/or requesting a change to the contract to allow more variance in the specifications of the part.

THE AUTOMOTIVE INDUSTRY IN NORTH AMERICA

The automotive supply industry consisted of companies competing for contracts to produce parts for automobile assemblers dominated by Ford, GM and Daimler-Chrysler, known as the "big three" automotive assembly companies, and/or the Tier One and Tier Two[1] manufacturers of automotive parts in North America. In 1999, GM held 33.26 per cent of the North American automobile market, Ford had captured 26.38 per cent, and Daimler-Chrysler held 18.67 per cent.

North American automobile sales recorded a banner year in 1999, and PriceWaterhouse-Cooper's AUTOFACTS had forecast that North American car and truck production would rise from 53.18 million cars and trucks produced in 1999 to 54.06 million produced in 2000. Although North America would continue to be the largest production region with a 30.55 per cent share of global production in 2000, this figure would represent a drop of 1.12 percentage points from 1999 as foreign manufacturers (Mazda, Honda, Volkswagen) increased their global market share.[2]

The Office for the Study of Automotive Transportation at the University of Michigan forecasted that while the amount of product design and engineering occurring in North America by international automakers would increase from 15 per cent in 1999 to 30 per cent by 2009,[3] domestic manufacturers would source an increasing percentage of parts from outside North America. Therefore, as the global industry continued to experience growth, North American parts manufacturers were under intense pressure to remain competitive by improving quality and at the same time by decreasing costs.

The industry experienced some seasonality in response to plant shutdowns, often occurring in December, July and August. The number of competitors in the industry had decreased since Hilcrest first entered the market, and those that remained were dependent upon winning contracts to supply the "big three" to ensure continued success. To win a contract, suppliers submitted a bid and attempted to prove themselves more reliable, more capable, and more cost effective than other bidders. It was an intense process, and the "big three" had the power to demand additional cost-cutting measures and service requirements that would affect the profitability of the smaller suppliers. Additionally, the "big three" demanded loyalty from their suppliers. As a result, GM,

Ford and Daimler-Chrysler often received unique parts and had total control over their suppliers, such that it was impossible for a supplier to sell to the other members of the "big three."

Hilcrest Auto Company Background

Michael Hill opened Hilcrest Auto in the early seventies in Hamilton, Ontario, an industrial city located at the western end of Lake Ontario, along the Niagara Escarpment. Hilcrest produced steel tubing components that were used in the assembly of numerous automotive units. Hill chose this location because of its proximity to major transportation routes between other manufacturing cities in Ontario and the United States. This site ensured that Hilcrest had easy access to the steel required to produce steel tubing and to the shipping routes to its customers, many of whom were located within the southwestern Ontario region. By 1998, the majority of Hamilton's population of approximately 500,000 was employed in heavy industries such as iron, steel, and machinery.

The business grew slowly but steadily over the years and Hill passed the business to his son, Dennis, in the late 1980s. Dennis had earned an engineering degree at The University of Western Ontario and a master's degree in business (MBA) from the Richard Ivey School of Business. Carl Wilson, Hill's son-in-law, was offered the role of vice-president and material control manager for Hilcrest. Carl had no formal business education, but was excited to be offered a role in the family business, and accepted the role enthusiastically. Under Dennis and Carl's leadership, Hilcrest earned its QS9000[4] certification, and by March 2000, Hilcrest's annual sales topped $30,000,000 and the company employed over 160 non-unionized employees.

Mark Bailey and the Small Parts Division of Hilcrest Auto

Upon graduating with a B.Sc. in mechanical engineering from The University of Western Ontario and later obtaining an MBA degree, Bailey worked as a quality control manager for several firms before joining Hilcrest in 1998. As the quality manager and business unit manager of the Small Parts Division of Hilcrest, Bailey was responsible for the manufacture of tubing used in the production of heater cores for vehicles.[5] All vehicles with heating systems needed heater cores, and many companies competed to supply the market with the tubing for these heater core units. Hilcrest won a three-year contract to supply a major Tier One company with the tubing, at $1.05 per heater core tube, in 1999. Weekly demand by the major Tier One customer ranged from 17,000 to 20,000 units, and forecasted demand for the year 2001 was expected to increase to 35,000 units per week. The quality problems Hilcrest had been experiencing were threatening Hilcrest's contract with this customer, who demanded that the tubing be "free, perfect, and yesterday."

Tubing Production

The heater core tubing production process was not complex. One operator (who earned $12 per hour for 50 weeks each year) was needed to ensure that the process ran smoothly. Pre-cut steel tubing, supplied by a United States supplier at a cost of $0.93 per piece, was manually loaded into a pressing machine that rounded both ends of the tube in about seven seconds. The operator then unloaded the rounded tubes into bins. Since the pressing machine was also used to produce another unrelated part, 30,000 units of rounded tubes were kept in inventory at all times. Once a bin was full of rounded tubes, the operator loaded the bin into a custom-designed bending machine where the tubing was bent into a zigzag shape to fit into the heater core. This step took 13 seconds per tube. The bent tubing was then washed for about one minute in batches of about 1,000 pieces to remove any oil or grime that had contaminated the tube. Finally, the heater core tube was ready for shipping to the customer.

The production process normally operated two eight-hour shifts each day, five days a week,

and produced between 1,000 and 2,000 finished heater core tubes per shift. Lately, the production of 1,300 units on a shift was considered "a good day." When production fell behind demand, Hilcrest used voluntary overtime to increase output. Workers were paid time-and-a-half on Saturday and double-time on Sunday, with Sunday shifts difficult to staff. Overtime shifts were often unproductive because if the operator experienced trouble with the machinery or was concerned about the quality of parts, no support personnel was available to assist the unskilled operator, and production was usually halted as a result.

Machine Problems

The bending machine was a chief concern within the process. The bender was required to operate continuously in order to meet demand, leaving no time for scheduled preventive maintenance. Maintenance could not be performed during the night because no supervisory or maintenance staff were available. As a result, equipment failures requiring maintenance would cause an unscheduled downtime of up to three or four shifts. To avoid this unscheduled downtime, the machine required a proper overhaul that could take up to a week and had to be done offsite. This overhaul had not been performed, however, because the machine could not produce enough inventory to meet the contractual obligations while the overhaul was being performed.

In addition, because of the lack of maintenance, the bending machine often slightly squeezed the rounded ends of the tubes as it bent the tubing. Hilcrest performed only infrequent checks on this particular feature, but were aware that the ends of the tubing did not meet the exact specifications of the contract because of this machine error. Bailey believed this slight distortion of the tubing ends in no way affected the safety or function of either the tubing or the completed heater cores; however, the fact remained that the shipped parts to the customer were not always "up to spec."

The Returned Shipment

Hilcrest had sent this Tier One customer slightly "out-of-round" tubing for quite some time, but recently this customer had performed a quality check on 8,000 heater core tubes received and phoned Bailey to inform him that the tubing did not meet specifications and, therefore, would be returned. Bailey authorized the return of the shipment, and desperately began to try to sort out the in-house situation to ensure that the next shipment met contract specifications.

Inconveniently, Bailey was forced to attend another major company emergency out of town. Upon his return a few days later, Bailey was horrified to discover that the returned parts were no longer in the holding area. In response to Bailey's inquiry, Carl Wilson stated that due to the plant's inability to hastily produce 8,000 perfect units, and because the customer had never noticed the distortion before, he had instructed the shipping department to re-package the returned order and re-send it to the customer.

Since the customer had already received the "new" shipment, had obviously not inspected the units, and was using the parts in the assembly of the heater core units, Bailey was unsure what to do. He was certain that informing the customer of the error now would be costly to Hilcrest because once the tubing had been installed into the heater cores, the entire heater core unit would have to be scrapped if any component was deemed to be defective. In addition to the replacement tubing costs, Hilcrest would have to pay the Tier One customer $60 per heater core (as written in the contract). Bailey did not know if he could save Hilcrest's relationship with this customer if he did report the "error" to the customer.

Changing the Process

Given this most recent event, Bailey was more determined than ever to fix the capacity and quality issues within the heater core tubing department. He was considering several options. It appeared that the purchase of a second bending

machine would successfully address the volume constraint and improve the quality of the finished product. However, the custom-designed bending machine would cost $70,000 and, combined with the old machine, the new duo-machine process would require another operator. The addition of a second bending machine would not affect any of the other stations on the line. Bailey knew he would have to justify these expenses to Dennis and Carl. Further, since the new bender would take up to four months to arrive, Bailey was going to have to make some interim changes to production quality and output.

To improve in-house quality immediately, Bailey could add two more steps to the production process. After the tubing was bent, it could pass through a re-work station where the distorted ends of the tubing would be re-shaped into proper rounds in less than seven seconds per tube. Once re-shaped, the tubes would pass through a 100 per cent gauge inspection station where the ends of the tubes would be automatically measured to ensure they had been re-worked to the required specifications. The gauge inspection would take virtually no time at all. This new process would result in the rejection of five per cent of the finished tubes, which would be totally scrapped. Because the current single operator would be unable to keep up with the new process, an additional (full-time) employee would have to be hired to ensure that production was not hindered further. Bailey would need to assess whether these new steps should be continued after the new bender arrived.

Bailey also considered approaching the engineers of the final customer—one of the three major automakers—to re-evaluate and re-test the heater core units with the intent to approve a contractual print change allowing Hilcrest a wider range of acceptable variance in the shape of the round tube ends. It was the Big Three automakers that ultimately dictated the specifications for the heater core units. Bailey was concerned, however, that this request would negatively impact Hilcrest's reputation and hinder potential future contracts with other Tier One companies, especially since Hilcrest had won this contract by stating it could produce the necessary quality and quantity of parts.

To increase output, Bailey was considering either the implementation of a mandatory overtime policy or the addition of a new third shift. He was concerned about the effect mandatory overtime might have on employee morale and productivity, but it could be a more cost-effective way to produce tubing than adding another full-time shift. If a third shift were added, in addition to hiring new tubing operators, maintenance and other support personnel would have to be available to assist the operators and to ensure that the additional shift was equally productive.

Decision

Bailey knew he had little time to make some major decisions. He questioned how he could justify the purchase of a new bending machine to management. He wondered how to most effectively and efficiently improve the quality and output of the heater core tubing operation while waiting for the new machine's arrival. Should any short-term changes made to the production process be continued once the new bender was operational? Right now, he had to decide what to do about the "out-of-round" parts re-sent to the customer.

Bailey believed that making long-term changes to improve quality and output was the right move for Hilcrest; it was a good step toward growth and would help the company remain competitive within this industry. However, he also knew that he would have to present a strong case to Dennis Hill and Carl Wilson when seeking approval for additional investments and expenditures. Bailey wanted to ensure that he had both strong quantitative support and a convincing qualitative rationale to make the necessary changes to the heater core tubing production facility.

Notes

1. Tier One suppliers manufacture most of their products and ship them to automotive assembly plants. Tier Two suppliers, in turn supply Tier One companies

with some of the parts required (parts the Tier One companies either do not want to or are unable to manufacture) in the finished goods shipped to the automotive assembly plants.

2. Automotive market information: Dale Jewett, Automotive Industries: Industry Statistics, January, 2000. http://www.findarticles.com/cf_atinds/m3012/1_180/59035633/pl/article.jhtml (August 16, 2001).

3. University of Michigan News and Information Services, Auto Industry Will Be Challenged by Technology, Regulations and Global Competition" April 3, 2000. http://www.umich.edu/~newsinfo/Releases/2000/Apr00/r040300a.html (August 16, 2001).

4. QS9000 is the set of fundamental quality requirements established primarily by Chrysler, Ford and General Motors to reduce the confusion and cost that came from having different quality standards which suppliers had to meet. Derived from ISO9001, the international standards for manufacturing quality, QS9000 includes requirements and measurables specific to the automotive industry.

5. The heater core is a smaller version of the radiator that is used to keep your toes warm when it's cold outside. It is mounted under the dashboard. Some of the hot coolant is routed through this little radiator, by more hoses. A small electric fan is also mounted there especially for the purpose of directing the heat inside the car. The principle is exactly the same as the one used in the radiator for your engine, except that the heat is released inside the car instead of outside. (Source: India MART Network, http://www/auto/indiamart.com/auto-part/autopart-html, May 31, 2001.)

MUTUAL LIFE OF CANADA—THE GROUP CLIENT SERVICE GUARANTEE (A)

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In August 1992, Alex Brown, senior vice-president of Mutual Life of Canada's Group Division, was preparing for the meeting of the Group Division Quality Council the next day. One item on the agenda was the decision on the group client service guarantee. For four months the Service Guarantee Working Group, reporting to Mr. Brown, had been investigating the possibility of the division guaranteeing some of its services. The working group had now prepared its final report which, although recommending that the division proceed with a service guarantee, raised a number of questions and left a major design decision unanswered. Mr. Brown now had to decide if he should endorse the group's recommendations. Mr. Brown believed that no Canadian insurance company had yet issued a service guarantee, although he thought that one company in the United States had. Although the opportunity looked attractive, he knew that the stakes were high.

THE MUTUAL GROUP

The Mutual Group, one of Canada's largest insurers (over $20 billion in total assets under administration), was the marketing name of a financial services organization led by Mutual Life Assurance Company of Canada (Mutual Life). The company's headquarters were in Waterloo, Ontario, approximately 100 kilometres west of Toronto. It operated from offices and agencies across Canada and the northern United States. The Mutual Group, which began in 1868 with the incorporation of Canada's first mutual life insurance company (The Ontario Mutual Life Assurance Company), comprised a number

of financial services companies offering a wide range of insurance, employee group benefit, investment, and trust company products and services. Exhibit 1 lists the companies of The Mutual Group, all of which were subsidiaries of Mutual Life. In addition, Mutual Life had four divisions (Individual, Group, Investment, and Corporate), each headed by a senior or executive vice-president.

Because Mutual Life was a mutual organization, clients buying participating life insurance became owners of the firm, entitling them to vote

1. The Mutual Life Assurance Company of Canada (Mutual Life of Canada). Products and services include life and health insurance, annuities, registered retirement income funds (RRIFs), registered retirement savings plans (RRSPs), life income funds (LIFs), pensions, commercial mortgages, real estate financing, and corporate lending offered to both individuals and groups.
2. Mutual Diversico Limited. Administrator of The Mutual Group of Funds (mutual funds); responsible for processing of purchase, redemption and exchange orders, distributions, and service to unit holders.
3. Mutual Investco Inc. Distributes and markets The Mutual Group of Funds (mutual funds); registered with the 12 Securities Administrators (regulatory authorities) across Canada; Investco agents are all dual-licensed as life insurance agents of Mutual Life of Canada.
4. Mutual Asset Management Ltd. Once regulatory approval is granted, Mutual Asset Management Ltd. will manage Mutual Life of Canada's stock and marketable bond portfolios and provide investment management services for The Mutual Group of Funds.
5. R.D.C. Property Services Limited. Manages revenue-producing real estate properties.
6. Mississauga Executive Enterprises Limited. Fifty owned by Mutual Life of Canada; real estate development.
7. Mu-Cana Investment Counselling Ltd. Investment management services for pension funds and other taxable and non-taxable assets, for Canadian corporations, unions, universities, foundations, and individuals.
8. Mu-Cana Data Services Ltd. Microfiche services for Mutual Life of Canada and client companies in the Kitchener-Waterloo area.
9. The Mutual Trust Company. Federally chartered trust company located in Toronto; gathers deposits through the marketing network of Mutual Life of Canada; invests primarily in residential mortgages.
10. Mutual Securities Inc. Member of the Investment Dealers of Canada; carries on investment banking activities principally related to mortgages and real estate offerings.
11. The Mutual Group (U.S.), Inc. An operating company responsible for strategic planning and investment management.
12. TMG Life Insurance Company

    The Mutual Group (U.S.)/Employee Benefits. Based in Brookfield, Wisconsin; serves the small group marketplace with health, life, short- and long-term disability, stop loss and dental insurance; and offers flexible benefits and managed care health services.

    The Mutual Group (U.S.)/Personal Financial Services. Based in Fargo, North Dakota; specializes in the sale of individual life insurance and annuities.

Exhibit 1 The Composition of the Mutual Group

Source: Mutual Life of Canada Annual Report.

at the annual meeting and also to share in the firm's financial success. Although mutual companies were not obliged to pay dividends which reflected this ownership, in 1990 Mutual Life broke with tradition, becoming the first mutual insurance company to pay participating policy holders an ownership dividend (it totalled $30 million). Historically, such companies had applied earned surpluses as "participating dividends" to reduce future premiums. Mutual Life was committed to both participating dividends as well as triennial ownership dividends.

MUTUAL LIFE OF CANADA—GROUP DIVISION

Mutual Life's Group Division, headed by Alex Brown, had several departments led by vice-presidents. It specialized in employee group benefit programs such as life, health, rehabilitation, and pension products. Exhibit 2 gives some data comparing the 1991 performance of 20 of Canada's leading group insurers. Overall, Mutual Life had the fourth largest group premium income. An industry publication claimed that the industry was very competitive.[1] The largest companies were growing at a rate above the industry average; in 1991 the five largest firms had increased their collective market share by 2.4 per cent over 1990. The Group Division was finding 1992 to be particularly challenging from a bottom-line perspective.

The division served approximately 1.35 million Canadians in 9,600 groups, many of which had been Mutual Life clients for decades. Groups with life and health plans represented 56 per cent of the total; groups with pension plans represented the remaining 44 per cent. The division segmented groups as small (up to 50 lives insured), medium (50 to 500 lives), or large (over 500 lives). Like its competitors, the division offered its largest clients many special services including assignment of group policyholder service officers to manage the relationship. Unlike smaller insurance companies which tended to specialize by benefit and group size, the division offered a broad range of products to a full spectrum of groups.

The division's mission was to be a leader in the group life, health, and pension markets in terms of its products, the quality of service it provided, and the degree of innovation it brought to the marketplace. The division prided itself on being in touch with clients and their needs. It believed that it was the only company in the industry that routinely measured speed of settlement and payment accuracy. Mutual Life client surveys showed that the division was number one in the eyes of customers. Audits showed that it was considerably better than the 99 per cent industry standard for accuracy. The division had a high degree of confidence in its ability to deliver.

The division offered benefit programs in two categories: life and health benefits and pension plans. Exhibit 3 gives some details of typical coverage. Annually, the division estimated its costs for the next year in three categories: claims (using, for example, actuarial tables), services claimed (using, for example, semiprivate hospital room rates, dental fee guides), and administration (e.g., for processing claims, premiums, accepting contributions, generating tax and employee statements, investing deposits, and handling enquiries). Employers typically paid life and health fees; employers or employees usually paid pension fees, either directly or as adjusted investment returns on contributions.

Many groups designed their own plans, typically with the help of an advisor: the group decided what coverage it wanted and then sought bids and possibly presentations from potential insurers. Exhibit 4 shows a typical request from a benefits consultant for a sales presentation; on July 31, the client awarded Mutual Life this contract, worth $6 million per year. Although price was the dominant criterion in choosing an insurer, others were also important: the structure of costs, the continued financial viability of the organization, their systems capabilities, special value-added services (such as individualized statements and special seminars), interpersonal relationships, etc. Insurers based their proposals on their estimates of initial and on-going costs.

Company	Group Life Premiums		Group Pension		Administrative Services Only		Group Health Premiums		Total Business		Market Share
			Premium Cash Flow	Pension Assets							
Confederation Life	$143	(10.4%)	$561	$5,440	$434	(18.1%)	$315	(2.9%)	$1,452	(27.7%)	11.0%
Great West Life	146	(0.1%)	324	3,479	455	(17.2%)	501	(3.6%)	1,448	(4.5%)	11.0%
Sun Life	201	(11.2%)	597	3,453	190	(18.4%)	422	(6.8%)	1,418	(12.1%)	10.8%
Mutual Life	79	(–5.1%)	470	3,948	252	(52.0%)	262	(1.5%)	1,076	(9.8%)	8.2%
Canada Life	144	(–11.6%)	343	5,299	119	(31.8%)	208	(26.5%)	814	(5.1%)	6.2%
London Life	90	(3.2%)	254	1,973	100	(18.2%)	312	(1.4%)	756	(10.6%)	5.7%
Standard Life	23	(4.1%)	464	3,227	21	(35.6%)	87	(47.6%)	596	(37.7%)	4.6%
Metropolitan Life	93	(5.4%)	103	1,147	174	(11.3%)	142	(-11.4%)	513	(-16.7%)	3.9%
Aetna Canada	56	(0.6%)	116	717	177	(18.6%)	124	(-7.1%)	473	(4.1%)	3.6%
Manulife Financial	31	(–3.4%)	248	2,583			170	(3.2%)	453	(10.2%)	3.4%
North American Life	65	(17.0%)	194	1,395			150	(30.2%)	412	(28.8%)	3.1%
Prudential Insurance	56	(10.0%)	60	109	98	(8.2%)	169	(28.0%)	390	(35.9%)	3.0%
Ontario Blue Cross					135	(-12.5%)	225	(9.2%)	360	(-0.1%)	2.7%
Crown Life	37	(–5.0%)	101	847	25	(-38.4%)	112	(-1.7%)	274	(-10.1%)	2.1%
Maritime Life	29	(5.1%)	73	336	75	(12.7%)	96	(-0.4%)	273	(3.5%)	2.1%
Industrial Alliance Life	22	(9.3%)	185	1,247					268	(27.5%)	2.0%
Laurentian/Imperial	38	(52.6%)	115	1,083			106	(15.7%)	268	(-6.1%)	2.0%
SSQ D'Assurance	30	(–1.6%)	24	173	32	(5.3%)	180	(11.7%)	266	(19.8%)	2.0%
Prudential Assurance			228	1,661					228	(37.6%)	1.7%
Green Shield					158	(10.4%)			201	(13.0%)	1.5%
Sample Totals	**$1,283**	**(3.8%)**	**$4,460**	**$38,117**	**$2,445**	**(16.3%)**	**$3,581**	**(7.0%)**	**$11,939**	**(11.2%)**	**(90.6%)**
Industry Totals[2]	**$1,427**	**(6.9%)**	**$4,621**	**$39,340**	**$2,661**	**(14.5%)**	**$4,312**	**(7.2%)**	**$13,178**	**(6.3%)**	**(100.0%)**

Exhibit 2 Data on Canada's Top 20 Group Insurers (for the year ending December 31, 1991)[1]

Source: Benefits Canada, July-August, 1992, pp. 32–35.

1. Financial numbers are in millions of dollars; numbers in parentheses are the percentage increases from 1990; blanks indicate unavailable information.

2. Numbers do not add to the totals shown because of data from other coverage categories not included in the table and 23 smaller firms in the survey.

Group Life and Health Programs	
Life	typically a multiple of salary (e.g., two years)
Accidental death	lump sums paid in the event of accidental death; reduced amounts and dismemberment for dismemberment
Extended health	includes items such as drug reimbursement, vision, hospital (e.g., upgrade to semi-private), supplementary care (e.g., wheelchairs, nursing care)
Dental	includes semi-annual check-up and cleaning, non-orthodontic dental treatment
Short-term disability	salary coverage for periods up to 17 weeks
Long-term disability	salary coverage for periods exceeding 17 weeks
Group Pension Plans	
Registered Retirement Savings Plans (RRSP)	
Registered Pension Plans (RPP)	
Deferred Profit Sharing Plans (DPSP)	

Exhibit 3 Typical Types of Group Coverage

Source: Company files.

July 10, 1992

Based on our analysis of the proposals submitted to the client on its Canadian Group Benefit Program and the findings and recommendations presented to the client's Canadian companies, we are pleased to advise that three companies have been selected to participate in finalist presentations. The client's Human Resource Council will receive presentations as identified below. A representative of our company will attend to facilitate the discussions.

Date, Place, and Time

The presentations will be held on July 29, 1992 at the company's offices. Directions from Toronto are attached. The presentations will be 1½ hours each, including 30 to 45 minutes for questions and discussion. The times have been scheduled as follows, as previously confirmed by telephone.

Competitor A	9:00 a.m.
Mutual Life	10:30 a.m.
Competitor B	1:30 p.m.

Insurance Company Representatives

It is expected that each competing insurer will have a presentation team of four representatives which may be comprised as follows:

1. The Ontario group representative who will be directly responsible for the client's Ontario-based companies and have on-going responsibility for the overall account;
2. The Quebec group representative who will be directly responsible for the client's Quebec-based companies;
3. A disability claims specialist or manager who can describe the facilities, philosophies, techniques, procedures, and special advantages or skills which your company applies in the successful management of disability claims and rehabilitation efforts;
4. One or two other representative(s) chosen at your discretion, who you believe would best round out your presentation team. However, the client has requested that all those in attendance have an on-going role in servicing or managing the client's account, and thus be accessible to the client's companies in the future.

Exhibit 4 A Benefits Consultant's Recent Request for a Competitive Sales Presentation[1] *(Continued)*

In advance of the meeting, please supply a list, identifying the individuals who will represent your company, including their job titles and roles. Also, please request any audio-visual equipment you require for your presentation, in writing, no later than July 20, 1992.

Presentation Format and Priorities

As mentioned, the presentations will be 1½ hours long. Your formal presentation should allow time for an informal discussion and/or question period of 30 to 45 minutes. To assist you in preparing your presentation, the client has identified the following priorities and areas of particular interest that you should address in the course of your overall presentation:

Disability Claims Management Facilities, including:

- a profile of the resource group that makes up your disability management team and an outline of your claims management process and techniques;
- the measure of success achieved by your company through rehabilitation efforts, expressed in terms of the cost/benefit ratio of rehabilitation expenses versus claims/reserve reductions;
- a brief (*quantitative*) account of a recent disability management success story;
- highlights of any other special attributes of your company's philosophies and claims control approach, which you believe contribute to the success of your disability management efforts.

Customer Service Support Systems, including:

- *on-line transfer of data* for eligibility purposes;
- *electronic claims validation* (EDI), including any special features or safeguards of "automated drug card" programs;
- direct (*electronic*) *deposit of claims* payments to employees' bank accounts, including eligibility of benefits arrangements.

Employer/Employee Claims Inquiry Programs, including:

- *on-line claims inquiry* programs;
- *telephone inquiry systems,* including voice interactive programs, 800 numbers, extended service hours, etc.

Plan Administration Issues, including:

- a detailed description of your capability and systems support of flexible spending accounts, including your handling of resulting tax reporting requirements (*identify existing flexible spending accounts under your administration*);
- financial concessions accruing to the client if your company fails to meet performance standards for claims turn around, documentation delivery and financial reporting, as outlined in the specifications;
- advanced statistical claims reporting that facilitates more effective claims analysis and financial forecasting, specifically addressing:
  - drug analysis by therapeutic grouping
  - brand-name versus generic drug identification
  - availability of claims data in electronic format, which can be manipulated to obtain custom reports, i.e., question and answer format

Value-Added Client Services, including:

- *customer driven value-added services*, introduced in response to client requests;
- *pro-actively created value-added services*, developed as a result of internal company initiatives.

In describing your commitment to value-added services, rank your organization in terms of its response to new or emerging benefit developments, issues, and products and provide copies of plan sponsor directed information material such as newsletters, etc., and provide sample copies.

Exhibit 4 A Benefits Consultant's Recent Request for a Competitive Sales Presentation[1]

Source: Company files.

1. The actual letter identified the client, Mutual Life's two competitors, and the benefits consultant. It also included complete directions on how to get to the client's office.

Because of the uniqueness of each plan and the complexity of the decision-making process, it was difficult to compare insurers. Groups almost always used the services of brokers or specialist benefits consultants. Although contracts were usually for one year, insurers expected them to be renewed; indeed, because of a contract's initial costs, insurers often would not see profits for several years. The insurer reset rates and contract terms annually on the basis of experience. The group might decide to take the business to the market to test the viability of the new terms.

The typical process worked as follows. A member of a group plan received dental service and subsequently paid the dentist. The plan member and the dentist completed a form which the plan member then sent to Mutual Life, possibly after the group administrator had checked it. Mutual Life checked to make sure that the claimant was covered, that the dental procedures performed were included in the group plan, and that the dentist's fee was within accepted guidelines. The company then reimbursed the plan member. In some cases Mutual Life paid the dentist directly. Increasingly, the dentist transferred the information electronically to Mutual Life.

Total Quality Management at the Mutual Group

Although Mutual Life had considered itself to be a provider of top quality service for decades, it first incorporated the principles of quality service into its mission statement in a formal way in 1990. It believed that one of a financial services organization's key objectives was to focus on client needs. Its stated vision was: "To be the best in the financial markets we serve." One of the organization's goals was to be recognized by its clients as a provider of excellent value and service. The company developed specific programs and initiatives to ensure that quality service became part of every staff member's work habits.

The company established Quality Councils in every division and offered special leadership and quality management training to ensure that every member of the organization had the knowledge and support needed to meet or exceed client needs. Mutual Life actively sought feedback from clients using devices such as questionnaires and focus groups. It viewed feedback as vital because it enabled the organization to solve problems and develop better processes to deliver services important to its clients.

The growing focus on quality service during the late 1980s led employers to demand more from the administrators of their benefit programs. In the United States several large companies had negotiated performance-based contracts, including penalty clauses, with their benefit plan administrators with reported savings of three to 10 per cent of paid claims.[2] These contracts focused on maintaining specific standards and making improvements in claims processing, payments, clerical work, and pricing. The portion of employers negotiating such contracts rose steadily from six per cent for those with fewer than 500 employees to 57 per cent for those with over 40,000 employees. The items covered in the contracts varied: turnaround time, 92 per cent of contracts; financial error rate, 64 per cent; administrative error rate, 66 per cent; percentage of benefits paid in error, 41 per cent. The most popular form of penalty was a cash payment (78 per cent).

Development of a Service Guarantee at Mutual Life

In early 1992, the concept of guaranteeing policyholders' satisfaction was raised at one of the regular meetings of the Group Division's seven-person Quality Service Council, whose membership included vice-presidents. The idea of guaranteeing service had originally occurred to Mr. Brown when he had seen an advertisement from a shipping company that, in essence, said: "If we don't deliver, you don't pay." Mr. Brown thought: "Why couldn't we do something like that?" The Council subsequently discussed the notion but reached no conclusions because it remained quite divided on the merits and feasibility of a service guarantee. Subsequently, the Council decided to refer the concept for detailed study to a working group responsible

to Mr. Brown. It wanted the working group to represent the whole division, to be small enough to be effective, to represent opinions that were strong, but different, and to be composed of staff who would be affected by a guarantee—marketing people, line area managers, and actuaries.

In late April Mr. Brown chose eight staff for the working group, and appointed the company's quality service officer, Maureen Long, who was also a Council member, as the chairperson. He explained that the concept was to guarantee policyholders' satisfaction or "your money refunded." In his words: "Because our errors increase our clients' costs, we should reimburse them."

Mr. Brown outlined one possible approach to the working group: survey policyholders just before their anniversary dates to determine satisfaction levels and reduce plan expenses for the following year by one to 10 per cent depending on the degree of dissatisfaction, with no questions asked, and indicate that a company manager would follow up to investigate the reasons for dissatisfaction.

Mr. Brown asked the working group to determine if there were overwhelming reasons not to proceed, and if not, how the Group Division could put the service guarantee concept into action. In his memorandum to the group he cited some potential advantages of a service guarantee:

- provide an opportunity to gain a competitive edge by being the first Canadian company to add this feature;
- send a message to people, both inside and outside the company, that Mutual Life was serious about quality service; and,
- open the door to more feedback from clients.

He asked the working group to report by late May.

The working group met for two or three days during May, produced a report in early June, and met with the Quality Council in mid-June to review progress. The Council agreed that the working group had not yet finished the job. Subsequently, the working group performed additional analysis and met twice. Now, the working group's final report was complete.

The Working Group's Report[3]

The working group did not find the task easy. Their meetings generated what they called "considerable fiery debate." As they commented:

> A performance guarantee is really not a very difficult concept, except for the few million details. And it was those few million details that generated much debate over the course of our meetings.

Objectives

The working group recognized that a service guarantee would differentiate the division by visibly demonstrating its commitment to service and leadership in the Canadian marketplace. Their report commented that visibility would help distinguish Mutual Life from all the other companies which claimed to be committed to, and providing, high quality service. Mutual Life considered that it already was a good provider of service and that a guarantee would allow it to do more than just talk about it. The working group also recognized that a service guarantee would help the division develop a stronger, more aggressive, and innovative image in the marketplace.

Principles

The group identified the following principles as being important in guarantee design:

1. Clients should see the guarantee as being simple and uncomplicated. A simple "money back guarantee" would lose all of its sizzle if it was layered with conditions that the client had to meet before making a claim.
2. Although the division could always make its guarantee better over time, once it launched the guarantee, it could not revoke it—at least not without considerable market damage. The working group wanted the guarantee to stretch the division, but not unrealistically—there had

to be a good chance of success. They wanted the division to be capable of meeting the needs of at least 95 per cent of its clients.

3. The division wanted an opportunity for clients to tell it why they were dissatisfied so the division could learn and improve.

4. The cost of the guarantee should come from the bottom line rather than be recovered from clients through higher administrative fees. The working group believed that because the guarantee would bring the division new business, keep business on the books longer, and help reduce expenses through process improvement, the division should view its cost as an investment to help reach these objectives.

Options

The working group considered several options, including the following:

1. The division would guarantee to meet certain specified standards for turnaround time, accuracy, responsiveness, and courteousness, expressed as 100 per cent achievement within X days; if the client believed that the division had not met the guarantee, the division would pay, no questions asked.

The working group believed that although Option 1 would make the strongest statement to clients, it would also be the most difficult for the division to live up to. Once the division guaranteed 100 per cent performance, it could not later back off to 90 per cent without suffering significant market damage. The working group agreed that, although all clients wanted good performance on the proposed measures, the real issue was how much they valued these features compared to others such as cost and flexibility.

The group believed that the division was already close to meeting the proposed standards. However, committing to perform at the stated level consistently was another matter. Would the company be prepared to add the needed space and human resources? Would staff be prepared to work shifts of variable length to match fluctuating work volumes? Would support areas in the rest of the company, such as mail services, computer systems, and translation, function well enough?

The group realized that, although the division would not always be able to meet the standards, if it met them 97 to 99 per cent of the time, many clients would not make a claim.

2. The division would guarantee client satisfaction, and would provide guidelines for what to expect for turnaround time, accuracy, responsiveness, and courteousness, expressed as, for example, 85 per cent achievement within Y days. It would also state that, although the division expected to be able to meet or exceed the stated standards, the guarantee was not built around meeting them; if the client was not satisfied with the division's performance on these dimensions, the division would pay, no questions asked.

The attractive features of Option 2 were that it would require neither the large initial investment of Option 1, nor immediate adherence to the standards. However, the working group recognized that this option also had some potential problems:

- The service guidelines might be for items that clients did not value.
- This option might not have an impact on clients.
- Any advantage it offered might not be sustainable.

3. The division would guarantee client satisfaction. If the division's efforts did not satisfy the client, the division would pay, no questions asked.

The working group described this option as the most wide open. Because clients would have to initiate claims against the guarantee, the division would get important information concerning what clients valued. On the other hand, there was the potential that this option could flood the division with relatively minor items; for example, some clients might want duplicate copies of forms, or request that multiple copies be mailed to different addresses. Although Option 3 allowed the division an attempt to resolve the problem, it might decide not to support the changes needed to implement the correction. How would the division deal with a similar claim the next year? Would this option really add value?

The working group was unable to choose among the options without input from senior management on several questions:

- How serious is the division about this?
- How big a splash does the division want to make in the marketplace?
- How difficult does the division want to make it for competitors to copy it?
- Is the division prepared to make a service guarantee its primary focus and defer or eliminate other initiatives?

The Amount and Structure of Payment

The working group decided to abandon two proposals: paying claimants a percentage of administrative expenses paid, and paying them a percentage of premiums paid. They rejected the first because many clients did not readily know how much they paid in administrative expenses, and the second because the very small (single digit) percentages involved would not have much impact. However, this second method would be much more visible to clients. In the end, the working group decided to recommend a flat rate per member. The working group recommended that for clients with several plans, payment be limited to the number of members covered in the section making the claim.

The working group decided that the launch of the guarantee should focus on the fact that the division's preparedness to refund administrative expenses, rather than concentrate on the details of how it calculated those expenses. In their words: "We do not want the details to detract from the impact of our message." The division would explain details to clients when they made a claim.

Payment of the Guarantee

The working group recommended that the division immediately issue a cheque for the full amount of the refund payable to the plan sponsor. An alternative was to issue a credit against future expenses or assess it against a plan deficit. The group also recommended that the division be prepared to make the cheque payable to a chosen charity, or to allocate refunds directly to members should the client be unable to accept a refund. These variations would require some changes to the division's internal processes and record keeping. For clients with multiple plans, the working group believed that it was preferable to make payment through the client's main administrative section so that the client was aware that one of its sections was making a claim. Should the plan sponsor demand a different route, the division should at least inform the client's main section.

Collecting Feedback From Clients

The working group believed that collecting feedback regularly from clients would represent an excellent opportunity for the division, whether or not it proceeded with a service guarantee. They recommended that the division formally ask clients to evaluate the division annually at renewal time. They also recommended that clients be sent a short, informal comment card each month to encourage them to send in their comments—both good and bad—only some of which might be related to guaranteed items. The working group advised that the cards be distributed with monthly statements; clients that did not receive monthly statements would be given a number of cards in advance so that they could submit comments with their regular mailings to the division.

The working group recognized that the division would face the critical challenge of having to deal with the comments in a timely, effective manner. They recommended that sufficient staff at a junior management level be allocated to this task. These staff would be responsible for resolving the issues raised; this would most likely involve coordinating the activities of line managers. Because client concerns entered the division at many points, it was difficult to determine how many comments the division received now; making it easier for clients to comment should increase the number of enquiries. Centralizing responsibility for responding to comments would

give the division a better overall feel for client concerns and ensure that dealing with client concerns would become a priority. It would be important for the client contact person to act first and inform others second. Although it would be important to keep front line sales and service workers informed, waiting to ensure that representatives were involved before responding to a client concern would unacceptably reduce responsiveness.

The working group recommended that the division develop a simple on-line tracking system to capture data on client comments and the action taken to resolve them. If used wisely, such a data base could both keep field staff informed efficiently and allow better client management. They recognized that they had to do more analysis of a tracking system, particularly as it affected other data systems within the division.

Launch Date

The working group established September 1992 as a target for launch with the guarantee being announced and effective immediately. They chose this date because competition for clients with January renewal dates was high in the fourth quarter.

Preparation for Launch

The working group recognized that the division would have to be ready prior to launch, especially if it chose Option 1. They believed that it would be unfair and very stressful to expect managers to react to new standards without prior warning. However, they also realized that the division wanted no public discussion of the guarantee until shortly before implementation. The working group recommended that the division talk to the managers most affected about the new standards and level of service towards which it wished to work without revealing that they were tied to a guarantee. In September, when the division hoped to meet the standards, it could go the extra step of announcing that it was prepared to guarantee its performance.

The working group acknowledged that communication to staff at all levels would be a critical factor for success. They recommended that any communication be done in person, not writing. It was important to communicate that: the division believed it was a good service provider; it wanted to continue to improve; the guarantee initiative would demonstrate to its clients its commitment to quality service; and, the guarantee would help to focus the division's improvement efforts on items clients valued most (through client feedback). It would be important that the division's devotion of time, money, systems, and people to the guarantee be visible to staff.

The working group believed that the division should inform management staff first, followed shortly by non-management staff. Regarding announcing the guarantee to Group and Claims offices, the working group suggested that a video with a message from Mr. Brown, supported by written material, would be appropriate.

The working group decided that representatives should receive two weeks' advance notice and promotional material to give them time to notify their market sources.

The pre-launch preparation would have to include internal services, such as translation, computer systems, and mail services. This option would require early involvement, support, and commitment. Regardless of the option chosen, the division would have to ensure that internal services did not make changes that might affect the Group Division without prior discussion.

The working group decided that Mr. Brown should inform clients of the guarantee by letter. They suggested that the division inform potential clients, using such media as newspaper advertising or industry magazines.

Finally, the working group recognized a need for follow-up communication to increase the division's profile for its work on this initiative and to capture positive staff reaction. They suggested using existing company newsletters for this purpose.

Financial Impact

The working group projected the financial impact of a number of scenarios. However, they had no idea what the actual claim rate or the claim amount would be.

Measuring Effectiveness

The working group concluded that although no one measure would be definitive, the division should measure several items to gauge the guarantee's effectiveness. Although the working group identified these items, they recognized that they would not be easy to measure and that it would be even more difficult to establish cause and effect relationships between their values and the service guarantee. The working group proposed that the division could measure performance using surveys, and feedback (both solicited and unsolicited) from sales staff and business sources. They also pointed out the need for good measures of the division's processes to allow it to identify and correct problems before they became issues to clients. The identified items were:

1. The retention of the division's block of business compared to pre-guarantee levels and industry averages.
2. Staff awareness and demonstrated commitment to quality service.
3. Market response to the division's delivery of quality service.
4. Client satisfaction.
5. The effect of the guarantee in generating new business.
6. The direct cost of the guarantee.
7. The benefits realized from improved processes and services.
8. The division's responsiveness in fixing concerns raised by clients.
9. The effectiveness of advance warning controls in identifying and correcting problems before they became issues for clients.

Uncontrollable Factors

Guaranteeing service was a big move. Although the division could take action on several fronts to support the guarantee, many other factors, which could affect service or client perceptions about service, remained outside its control. These included:

1. Communication between offices could fail—or example, through postal strikes, or failure of equipment or services.
2. Legislation could add to Mutual Life's administrative load and/or change its environment. For example, when the government introduced its registered retirement savings plan (RRSP) home buyers' loan plan, Mutual Life's requirements increased, affecting the company's ability to complete RRSP withdrawals within its stated time frame.
3. Actions taken by agents and other divisions and offices within The Mutual Group could affect client satisfaction because clients did not differentiate among the various arms of Mutual Life.

Problems

In its report, the working group identified a number of questions or potential problems. They were concerned whether the message to staff should be an objective or a by-product of the guarantee. If a message to staff were the objective, was a service guarantee the right way to do it?

Second, the working group pointed out that, no matter how well the division performed, some clients might abuse a guarantee. How large would this group be? How much might they cost? What should the division do about them?

A final issue concerning client feedback had to do with clients that did not fit well with the division. How should the division deal with such clients?

Conclusion

Although the working group had recommended that the division proceed with the notion of a

service guarantee, they left several questions unresolved. Should the division guarantee its service? If so, what should the details of the guarantee be? If not, what would happen if one or more of the division's competitors successfully introduced a guarantee? Mr. Brown now had to decide whether to accept the working group's main recommendation, and, if so, what changes he should make to the proposal and how he should answer the unresolved issues. The decision was not an easy one for him:

> A guarantee is really a leap of faith. I don't think anyone can really tell in advance exactly what will happen. The guarantee could be seen as a blank cheque and going with one is essentially an irreversible decision. Once we offer one, it will be almost impossible to step back from it, or even to make significant changes. But, if we don't offer one, how else can we continue to demonstrate our commitment to service and differentiate ourselves?

NOTES

1. J. Charles, "Sea of Shove," Benefits Canada, **10** (7), 32–35, (July-August 1992).

2. N. Connors, "Employees Are Demanding More From Their Claims Administrators," Business and Health, **10** (5), 70–73, April, 1992; and, "Data Watch: Tackling Claims Administration Expenses," Business and Health, **10** (5), 18–19, April, 1992.

3. This section presents edited extracts from the report, not the report in its entirety.