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Prescription for Success: Empowerment and Profitability

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Lincoln Electric Company

Lincoln Electric was founded in 1895. It is headquartered in Cleveland, Ohio and now operates 23 plants in 15 countries. The company had five plants in four countries six years ago. The company now employs 2,700 people domestically and about an equal number internationally. Its domestic work force is 16% female. Its 1992 sales were \$480 million, which makes it the largest company in its industry. Its primary products are equipment and consumables for arc welding. The Lincoln incentive system is practiced in some of the company's foreign plants and in domestic plants outside of Ohio.

The Lincoln family owns 50% of the company stock; company employees own the rest. Approximately 80% of the employees own 40-45% of the stock. Lincoln is a nonunionized company. The company has had an incentive profit-sharing bonus since 1934. Forty percent of employees are on piece-rate, 45% are hourly and 25% are salaried. There has never been a work stoppage in Lincoln's history. There has not been a layoff in over 50 years. Turnover is 1/2 to 3/4 percent per month, including retirements.

Lincoln's philosophy is to focus on people, which includes its customers as well as its employees. The heart of its philosophy is to give employees powerful incentives to be productive. For example, pay is based on what individuals produce plus a bonus that is based on company profits. This pay system has led Lincoln employees to be nearly three times as productive as their industry counterparts. Since 1934, the company has paid out \$420 million in bonuses or 12% of its revenues. The more work that piece-rate workers produce, the more they are paid. However, work that is defective must be repaired or re-worked on an employee's own time. The rate for piece-work cannot be changed unless there have been changes in technology, layout, operations, etc. This has allowed some workers to make up to 150% of their base-rate pay. The high level of internalized motivation permits Lincoln to manage with a ratio of supervisors to workers of 100 to 1.

The board of directors decides what the overall bonus will be. A percentage of the bonus is then allocated to individual workers on the basis of merit. Merit is based on evaluating a worker in four categories: output, quality, dependability (absenteeism), and ideas and cooperation. A worker can earn up to 25 points per category, which is based on an employee pool that must average 100 points. This means that if one worker gets a score of 105, then another worker must get a score of 95. The merit score is used to calculate a worker's bonus, which is based on the base-rate plus overtime for piece-rate workers, and on wages and salaries for other employees. The base-rate is set by a Job Evaluation Committee and can include wages plus overtime at time and a half (counts as more than eight hours or more than 40 hours per week).

All shop-floor workers are hired at the entry level and, with rare exception, promotions are from within the company. Employment is guaranteed for employees with two or more years of service. However, in order to make this policy workable, employees must be flexible on job assignment and overtime. Guaranteed employment means that each worker is guaranteed 30 hours of work per week. In the last 25 years, not more than eight weeks have had less than 30 hours. No worker can lose his or her job because of improved efficiency. There is a policy to give six months notice of an

impending lay-off; however, as noted earlier, no lay-offs have occurred in 50 years. Instead of being laid-off, people are assigned to clean-up, maintenance or repair.

The company has an Employee Advisory Board consisting of a group of 40 to 50 elected representatives. They meet twice a month to discuss with the chairman, president, etc. issues that concern them and the rest of the employees. No subject is off-limits and the results of the discussion are posted for everyone to review. The company practices an open-door policy that permits all workers direct access to top management without going through the normal chain of command. This helps deflate problems before they become serious.

There are no paid holidays nor sick days. Employees pay for their own health insurance by deductions from the bonus pool, which consists of pretax dollars. Employees appear to choose carefully from among the four plans that are offered and appear to take good care of themselves. The total bill for health insurance, in fact, declined last year by 8% while the rest of the country experienced price increases in the teens. The company has a pension plan that provides a benefit of 2.5% of annual compensation received per year of employment, thus permitting a worker with 40 years of service to retire at 100% of annual average pay received.

Training and Empowerment: An Indispensable Combination for Team Effectiveness

Gary P. Vogt
Corning Inc.

Corning produces 60,000 products which generated \$3.3 billion in sales last year. This sales figure rises to \$6.6 billion when its 19 joint ventures in 13 countries are added. The company is divided into five businesses or sectors: specialty materials, information display, opto-electronics, consumer products, and laboratory services. The last sector is one of its fastest growing and consists of 30 laboratories employing 1,500 scientists and engineers. Corning overall employs 32,000 people.

Gary is the plant manager of the Erwin, New York plant, which produces ceramic substrates for catalytic converters. The plant is unionized by the Flint and Glass Workers. The ceramic substrate business has grown tremendously since 1975 when the federal government mandated catalytic converters for all cars. Since then, emissions have dropped by 90%. The ceramic substrate converts noxious hydrocarbons into carbon dioxide and water. The product and its manufacture are based on two patents; a ceramic composite consisting of clay, talc and alumina, and a die that extrudes the composite into a honeycomb structure. The plant works closely with its suppliers to improve the quality of the three raw materials. The production process consists of dry blending the raw materials that make up the composite, mixing them with water, extruding them by continuous feed through a die, then cutting and drying the logs and firing them for 64 hours at 1,400 degrees centigrade. All excess material is collected and recycled. The logs are sent to other companies where they are coated with precious metals and enclosed in a metal container. The final product is then shipped to automobile companies.

The lab was the first part of the plant to have self-managed teams with multi-skilled workers. The workers are paid for knowledge which must be certified by demonstrated proficiency. This gives the teams the flexibility to respond to varying customer needs. The business has now expanded to include

new plants in Blacksburg, Virginia and Kaiserslautern, Germany. The Erwin plant has been given broader responsibilities, which include being the technical center for new products, the back-up plant for the other two plants, and incubator and developer for new applications for substrates and dies. Some of the new applications include particulate filters for diesel engines, catalyst substrates to burn off creosote in wood stoves and pollution filtration for molten metal castings.

The change undertaken at the Erwin plant has its roots in the total quality initiatives that James Houghton launched when he became chairman in 1983. Every business had to become world-class in quality, but how that was to be achieved was left to local initiative. The plant's local initiative began in 1984 with training in total quality management. The training was followed by the development of four basic principles and 10 action steps. These principles included "customers are the reason we exist," "technology expands and enhances jobs." A steering committee (Quality Improvement Team) has been meeting every Wednesday and has guided the implementation of the 10 action steps. One of the steps taken in 1986 was the establishment of corrective action committees. Another step was increased recognition of employees for initiatives undertaken in the plant to improve quality, e.g., quarterly quality awards days, the awarding of plaques, membership in the gold club and the plant manager's club.

In 1990, design teams of 12 union and four management members were set up to examine jobs using a socio-technical systems approach. The team's charter was "to understand and challenge all that we do and make recommendations to bring us closer to meeting our mission." The team's targets were quality and profitability. The member's redesign recommendations were guided by four principles: (1) organize by dedicated processes rather than by functions, (2) develop self-managed, dedicated teams, (3) pay-for-knowledge, (4) analyze processes to eliminate nonvalued-added work.

In 1991, goal-sharing was introduced. Goals were established for long-term profitability. Goal-sharing was applied first to bargaining unit members with a guaranteed minimum and a maximum of 10% of profits. Salaried employees were included during the third year. Another initiative called FSTER (form strategy together-Erwin redesign) was an ambitious effort to share and discuss the plant's strategy and mission with 600 workers at a time in the same setting.

The steering committee found that although it had empowered workers, it had not prepared them well for the skills they would need to carry out their jobs. The committee members realized that success equalled customer focus x manufacturing excellence x human resource development. If any one of the three elements was missing from the equation, the outcome would be zero. As a result, the training and development staff was increased so that it accounted for 10% of payroll expenses. All salaried people must have a performance appraisal every six months, which Gary signs. It must state what a person wants to learn and what to teach.

One of the most recent initiatives was to develop a vision, mission and strategy for development of a learning factory. A learning factory allows people to "continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective dreams are set free, and where people are continually learning how to learn together." This was followed by a mission statement and a set of strategies by which to create a learning factory. These strategies or paradigms included making learning and teaching everyone's responsibility, instruction would be performance driven, and competency-based measures would be developed.

Several actions have been taken in line with the above strategies. They include reduction of managerial layers in the plant to two. Elimination of the traditional supervisory role. No supervisors were terminated in the transition, however. They were promoted or reassigned as subject experts. Teams can have as many as 25 members. Existing employees had up to one year to be certified for task modules. New hires are screened by team members. The team members have a right to involvement in decisions that affect their working life. They have access to all performance related numbers. The plant has not had a grievance in the last two and a half years.

Training and Compensation Practices That Best Fit With JIT, TQM and Advanced Manufacturing Technology

Scott Snell

Penn State University

Scott began with an overview of the major elements of integrated manufacturing (IM), which included advanced manufacturing technology (AMT), total quality management (TQM), and just-in-time (JIT) manufacturing. These components have in common that they more closely link organizational functions and data bases as well as inventories, inspection/rework and manufacturing cells. Scott undertook a research project with Jim Dean of the University of Cincinnati to understand better the relationship between IM and five human resource management factors. The first factor was job design. Scott and Jim identified two characteristics of job design that were related to IM: interdependence between jobs and increased uncertainty, the latter of which was measured as complexity and variety. The second and third factors were selection and training, which Scott posed as a "make" (train) versus "buy" (select) option for dealing with changes associated with IM. The fourth and fifth factors were appraisal and compensation, respectively.

Surveys asking about IM, the five factors, and plant performance (morale, satisfaction, scrap rate, etc.) were distributed initially to 150 plant managers. They, in turn, selected four functional managers, operations, quality, production control and human resource management, whose surveys asked about the factors that were most closely related to their function responsibilities. They, in turn, selected two or three nonmanagerial personnel to whom surveys were distributed. One hundred twenty-three plants were included in the final sample.

Scott initially assumed that a strong relationship would exist between the three IM elements (AMT, TQM and JIT) and job characteristics (uncertainty and interdependence). However, the data showed no direct relationship. It was found that organizational size, dependency, unions, and performance were moderators of the relationship. In other words, larger organizations with plants that were dependent on parent companies for decision-making approval tended to have a negative impact on the IM-JC (job characteristics) relationship. Unions often, but not always, had a negative impact on the IM-JC relationship. There was a strong positive IM-JC relationship when plants had low performance, while the reverse was the case when plants had high performance. Scott suggested that high performance gave the plants "cushioned slack" which allowed them to delay or not respond to the changes usually associated with the new technology. The low performers did not have this luxury, so they had to respond immediately to align its technology and job characteristics.

Scott reviewed the "make versus buy" decision that firms faced when they had to train workers for IM. His initial view was that companies would be reluctant to train workers because of the risk of losing those skills if the workers left the company. The data did not support this view. Selection for workers with both technical and problem solving skills decreased considerably as an option for jobs that had increased interdependence and uncertainty. One reason is that it may be very difficult to find appropriately skilled workers on the job market. Training increased considerably in most companies when IM was introduced, regardless of whether or not job characteristics changed.

Scott offered hypotheses about likely changes in compensation practices associated with introducing IM. The data showed that IM increased management's concern with external equity (match local standards) when setting wages. There was greater use of group incentives over individual incentives for jobs with increased interdependence and uncertainty. There was an increased use of salary-based pay with increased interdependence, and, finally, seniority remained an important basis for determining pay for jobs with high uncertainty.

Scott summarized the findings by stressing the importance of a total systems perspective for understanding IM and job characteristics. Several factors must change simultaneously when responding to IM, and many factors impact human resource management in ways that are contingent on the organizational context. It was encouraging to find that very few of the companies studied pursued a deskilling strategy in response to the introduction of integrated manufacturing.

Managing Diversity: Challenge and Opportunity for the Twenty-First Century Corporation

Tom Buffum, Joyce Cofield, Lee Fraser and Lynn Tartaglia
Polaroid Corporation

Polaroid thinks of diversity in broader terms than legal moral constraints. It also thinks of diversity as making compelling business sense. Competition for the best available skills and talents of future employees and the attraction and loyalty of diverse domestic and global customers will compel companies to focus more seriously on diversity issues. Diversity also can enhance team creativity, if it is understood and appreciated, and thereby contribute to a company's competitive success.

Joyce Cofield offered some guidelines for undertaking a diversity initiative. A successful diversity initiative needs to be an integral part of other organizational change programs rather than an isolated component. For example, it should be an integral part of the development of total quality management teams. Diversity means including all forms of differences, such as age, sex, race, and physical challenge. It should not be a program for minorities only. White males should play an important role too. While a specific program can bubble up from below, it must have strong, visible support from the most senior management levels. Any program also should be an in-house affair in which people learn from each other rather than a program that involves outsiders. Using these guidelines, Polaroid launched a Diversity Conference in 1991 at a local college. One-hundred twenty-five people attended for a day and a half.

Tom Buffum discussed some of the critical themes that emerged from the conference. The intent was for everyone to learn from his or her experience and apply it to other contexts. It was deliberate

that no action steps were to be developed, the idea simply was to care, appreciate and understand differences. No one had to solve problems; just listen and care. It was also deliberate that both diversity advocates and skeptics should attend the workshop, to avoid a "mutual admiration" effect. There was an agenda, but no compelling pressure existed to cover all topics. Twelve white males attended the first workshop.

Lynn Tartaglia discussed some of the seven workshops that were formed during the conference. Lynn was involved in one set of issues that involved managing work and family. The participants found that they could ask people of color, gays and lesbians, people who were physically challenged, etc. about the issues that affected their working lives at Polaroid and learn from their responses.

Lee Fraser discussed the divisional conferences that began to follow the first company conference as well as the second Diversity Conference that took place in 1992. Lee described the atmosphere as celebrative. It included multicultural food and music. This kind of experiential and participative learning is particularly effective. One theme was that everyone has a role to play. They were there to discuss real issues by real people telling real stories. One outcome was the shattering of many stereotypes about others. The people who had clustered into workshops to share common problems became consultants and speakers at other sites. Learning is assumed to be a steady gradual process, with something new to be learned every day back at work. During the second year, a new statement of sexual harassment was developed, as well as new programs of assistance, including an Office of Affirmative Action and Work Force Diversity.

The presenters closed with a reminder to integrate diversity into mainstream corporate goals so that it doesn't appear to be an issue of concern to only a few. Mutual respect among employees will be critical for survival. Team members must respect each other in order to be successful. Metrics should be developed to track progress. For example, Polaroid keeps track of the work force demographics, but it also conducts attitudinal surveys. Its 18 vice presidents include women and minorities. It is possible to reward managers for diversity initiatives, but important to keep the focus on pull rather than push. Avoid emphasis on counting the number of diversity seminars attended, for example, and focus more on the quality, impact and sincerity of the initiatives undertaken.

Developing Critical Human Resources: Making In-House Training a Source of Competitive Advantage

Charles Larocque

Bell Helicopter, Inc.

Bell Helicopter Textron, which is headquartered in Fort Worth, Texas, decided to move all of its commercial helicopter production to Canada in the early 1980s. The Mirabel facility was opened in 1986. It is fully integrated, so that all administration, research and development, and marketing are situated at the site. The company now produces five models of helicopters. The smallest, the Jet Ranger, carries five passengers and has a base price of \$600,000. The largest models carry 12 passengers and have a base price of \$2.5 million.

The Mirabel site is located on 152 acres and is 19 miles from the Montreal airport. The plant is 400,000 square feet. The facility employs 1,200 people. Its engineers carry out joint projects with

the Canadian Research Council, Industrial Materials Institute, and with other aviation-related companies. Two key types of aerospace technologies are important to the company. One is materials, including metals, fiberglass and composites. The other is tooling and electrical fabrication. Six labs support engineering and manufacturing by performing appropriate testing procedures, e.g., quality assurance audits, use of fluoroscopes to detect defective parts.

The company initiated a new approach to human resource management in 1986 when it formed a task force of 25 managers and workers to design semi-autonomous work groups based on socio-technical principles. A guiding principle is that workers should manage their own jobs. They are permitted to take 15 to 20 minutes at the start of each shift to talk about problems. They also are allowed to assign overtime to themselves. It is a company policy not to have more than five levels between employees and the president. In fact, there are only three levels.

Training was an early important issue for Bell because there was a need to transfer a lot of technical knowledge quickly, the industry is high-technology, quality is extremely important, the work force is young with an average age of 31, people were to be paid for knowledge rather than the job held. The training philosophy was to supplement the classroom with job site training to assure that the training was utilized. Seventy-five percent of the training is technical, 15% is interpersonal and 10% is general knowledge, e.g., blue print reading. The training program lasts for 14 weeks; eight weeks consists of theory and six weeks of practical training for a total of 480 hours.

Training made up 5.5% of the total payroll last year, that is, \$2.8 million out of a total payroll of \$45 million. This amount includes the salary of trainers, operating and capital budget, and wages of employees who are being trained. Many of the instructors are supervisors from the facility who conduct evening classes. Seventy-five hundred hours of training were given in 1992. This is the equivalent of eight full days per employee per year.

The company used to hire employees with two years of technical training. However, their training tended to focus on repair, while Bell's work required assembly work. As a result, the turnover rate was 25% in 1987. It was difficult to find replacements because Canada has a national shortage of aircraft assemblers. The company therefore turned to unemployed high school graduates with good math scores and generally good work habits based on two or three years of work in other industries. The selection process included communication skills, openness to working in teams, and a positive work attitude. These new workers also needed manual dexterity and good skills in written english, which was the language used in all technical material. The Canadian government subsidized some of the initial training of these workers. The lower base-rate paid to high school versus college graduates saved the company \$2.2 million dollars.

A pay-for-knowledge system was used throughout the plant, while the office retained a pay-for-performance system. A Level I entry job paid \$22,300 in Canadian dollars. This job required a high school degree, but less than five years of experience. Higher pay levels were based on combinations of high school or junior college graduation and years of work experience. At present, the plant has no Level I or II positions. Workers can progress through the pay levels by having their degree of multi-skilling reviewed every six months.

In comparisons between 1988 and 1992, employment has increased 76% from 683 to 1,200 personnel, and turnover has decreased from 17% to 3%. The number of aircraft produced has risen 150% from 74 to 185. Sales have increased 297% during this period, but this is due in part to the recent trend toward larger helicopters. Worldwide market-share has increased by 40% from 27% to 37.7%.

In 1991, the plant produced \$6 million in scrap. Since none of these nonconforming parts is recyclable, it is the equivalent of throwing away two or three helicopters. A training effort has led to reducing this amount to \$4 million. Bell expects to produce 160 helicopters this year or about 30% of worldwide production. Ninety-five percent of their production is international. While most is shipped to the United States, about 20% goes to Japan.