



The Lincoln Electric Company

We're not a marketing company, we're not an R&D company, and we're not a service company. We're a manufacturing company, and I believe that we are the best manufacturing company in the world.

With these words, George E. Willis, president of The Lincoln Electric Company, described what he saw as his company's distinctive competence. For more than 30 years, Lincoln had been the world's largest manufacturer of arc welding products (**Exhibit 1**). In 1974, the company was believed to have manufactured more than 40% of the arc welding equipment and supplies sold in the United States. In addition to its welding products, Lincoln produced a line of three-phase alternating-current industrial electric motors, but these accounted for less than 10% of sales and profits.

Lincoln's 1974 domestic net income was \$17.5 million on sales of \$237 million (**Exhibit 2**). Perhaps more significant than a single year's results was Lincoln's record of steady growth over the preceding four decades, as shown in **Figure A**.

During this period, after-tax return on equity had ranged between 10% and 15%. Lincoln's growth had been achieved without benefit of acquisition and had been financed with internally generated funds. The company's historical dividend payout policy had been to pay to the suppliers of capital a fair return each year for its use.

Company History

Lincoln Electric was founded by John C. Lincoln in 1895 to manufacture electric motors and generators. James F. Lincoln, John's younger brother, joined the company in 1907. The brothers' skills and interests were complementary. John was a technical genius. During his lifetime he was awarded more than 50 patents for inventions as diverse as an apparatus for curing meat, an electric drill, a mine-door-activating mechanism, and an electric arc lamp. James's skills were in management and administration. He began as a salesman but soon took over as general manager. The Lincoln Electric Company was undeniably built in his image.

In 1911, the company introduced its first arc welding machine. Both brothers were fascinated by welding, which was then in its infancy. They recognized it as an alternative use for the motor-generator sets they were already producing to recharge the batteries for electric automobiles. The

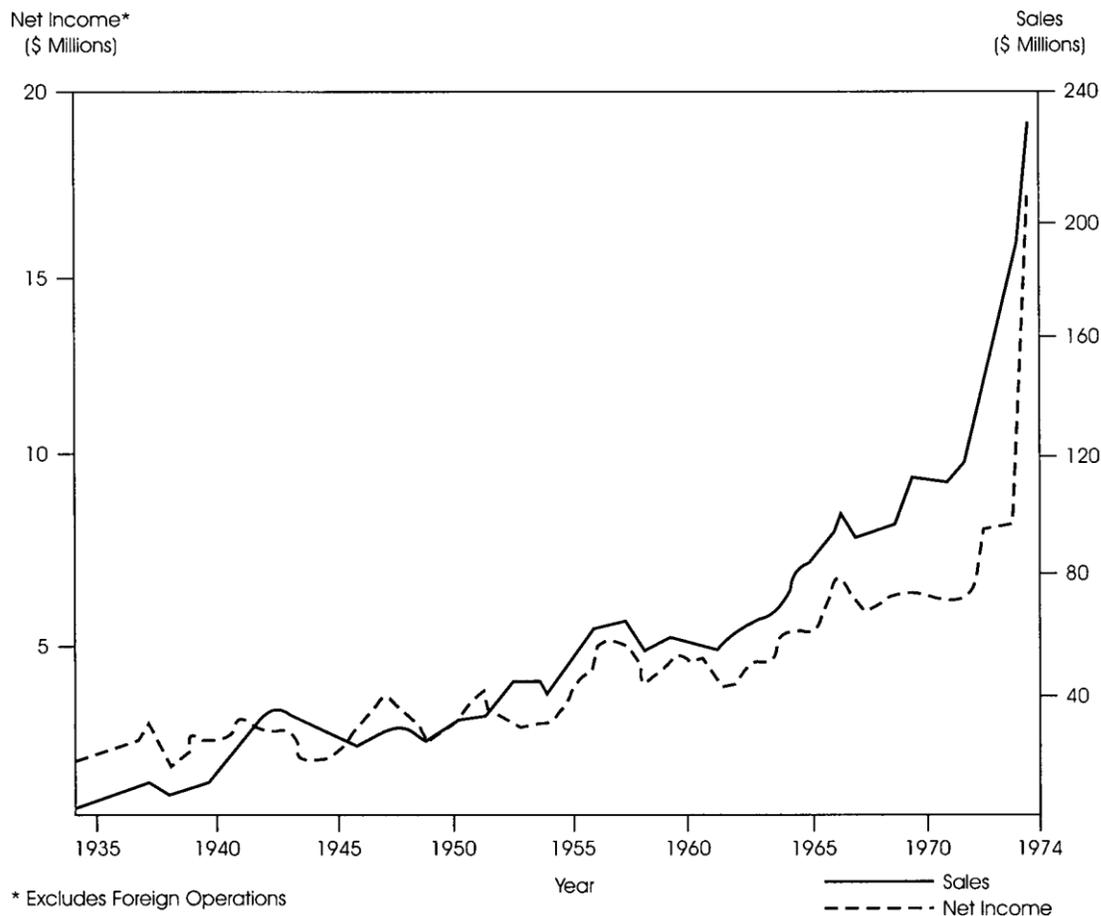
This case was prepared by Norman Fast, research assistant, under the direction of Professor Norman Berg, as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation.

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success of Ford, Buick, and others indicated that the days of the electric auto might be numbered, and the brothers were anxious to find other markets for their skills and products.

John's mechanical talents gave the company a head start in welding machines which it never relinquished. He developed a portable welding machine (a significant improvement over existing stationary models) and incorporated a transformer to allow regulation of the current. As his biographer noted, "This functional industrial development gave Lincoln Electric a lead in the field that it has always maintained, although the two giants—Westinghouse and General Electric—soon entered the market."¹

Figure A



By World War II, Lincoln Electric was the leading American manufacturer of arc welding equipment. Because of the importance of welding to the war effort, the company stopped producing electric motors and devoted its full capacity to welding products. Demand continued to outpace production, and the government asked the welding equipment manufacturers to add capacity. As described by Lincoln's president, George Willis:

Mr. Lincoln responded to the government's call by going to Washington and telling them that there was enough manufacturing capacity but it was being used

¹ Raymond Moley, *The American Century of John C. Lincoln* (New York: Duell, Sloan & Pearce, 1962), p. 71.

inefficiently by everyone. He offered to share proprietary manufacturing methods and equipment designs with the rest of the industry. Washington took him up on it and that solved the problem. As a result of Mr. Lincoln's patriotic decision, our competitors had costs which were close to ours for a short period after the war, but we soon were outperforming them like before.

In 1955, Lincoln once again began manufacturing electric motors, and since then its position in the market had expanded steadily.

Through the years, Lincoln stock had been sold to employees and associates of the Lincoln brothers. In 1975, approximately 48% of employees were shareholders. About 80% of the outstanding stock was held by employees, the Lincoln family, and their foundations.

In its 80-year history, Lincoln had had only three board chairmen: John C. Lincoln, James F. Lincoln, and William Irrgang, who became chairman in 1972.

Strategy

Lincoln Electric's strategy was simple and unwavering. The company's strength was in manufacturing. Management believed that Lincoln could build quality products at a lower cost than their competitors. Their strategy was to concentrate on reducing costs and passing the savings through to the customer by continuously lowering prices. Management had adhered to this policy even when products were on allocation because of shortages in productive capacity. The result had been an expansion of both market share and primary demand for arc welding equipment and supplies over the past half century. Lincoln's strategy had also encouraged the exit of several major companies (including General Electric) from the industry and had caused others to seek more specialized market niches.

Management believed its incentive system and the climate it fostered were responsible in large part for the continual increase in productivity upon which this strategy depended. Under the Lincoln incentive system, employees were handsomely rewarded for their productivity, high quality, cost reduction ideas, and individual contributions to the company. Year end bonuses averaged close to 100% of regular compensation, and some workers on the factory floor had earned more than \$45,000 in a single year.²

Lincoln's strategy had remained virtually unchanged for decades. In a 1947 Harvard Business School case study on the company, James F. Lincoln described the firm's strategy as follows:

It is the job of The Lincoln Electric Company to give its customers more and more of a better product at a lower and lower price. This will also make it possible for the company to give to the worker and the stockholder a higher and higher return.

In 1975, Chairman William Irrgang's description was remarkably similar:

The success of The Lincoln Electric Company has been built on two basic ideas. One is producing more and more of a progressively better product at a lower and lower price for a larger and larger group of customers. The other is that an

² By contrast, the median income for U.S. manufacturing employees in 1974 was less than \$9,200, according to Bureau of Labor Statistics data.

employee's earnings and promotion are in direct proportion to his individual contribution toward the company's success.³

Management felt it had achieved an enviable record in following this strategy faithfully and saw no need to modify it in the future. Lincoln Electric's record of increasing productivity and declining costs and prices is shown in **Exhibit 3**.

Company Philosophy

Lincoln Electric's corporate strategy was rooted in the management philosophy of James F. Lincoln, a rugged individualist who believed that through competition and adequate incentives every person could develop to his or her fullest potential. In one of his numerous books and articles he wrote:

Competition is the foundation of man's development. It has made the human race what it is. It is the spur that makes progress. Every nation that has eliminated it as the controlling force in its economy has disappeared, or will. We will do the same if we eliminate it by trying to give security, and for the same reason. Competition means that there will be losers as well as winners in the game. Competition will mean the disappearance of the lazy and incompetent, be they workers, industrialists, or distributors. Competition promotes progress. Competition determines who will be the leader. It is the only known way that leadership and progress can be developed if history means anything. It is a hard taskmaster. It is completely necessary for anyone, be he worker, user, distributor or boss, if he is to grow.

If some way could be found so that competition could be eliminated from life, the result would be disastrous. Any nation and any people disappear if life becomes too easy. There is no danger from a hard life as all history shows. Danger is from a life that is made soft by lack of competition.⁴

Lincoln's faith in the individual was almost unbounded. His personal experience with the success of Lincoln Electric reinforced his faith in what could be accomplished under the proper conditions. In 1951 he wrote:

Development in many directions is latent in every person. The difficulty has been that few recognize that fact. Fewer still will put themselves under the pressure or by chance are put under the pressure that will develop them greatly. Their latent abilities remain latent, hence useless. . . .

It is of course obvious that the development of man, on which the success of incentive management depends, is a progressive process. Any results, no matter how good, that come from the application of incentive management cannot be considered final. There will always be greater growth of man under continued proper incentive. . . .

Such increase of efficiency poses a very real problem to management. The profit that will result from such efficiency obviously will be enormous. The output per dollar of investment will be many times that of the usual shop which practices output limitation. The labor cost per piece will be relatively small and the overhead will be still less.

³ *Employee's Handbook* (Cleveland: The Lincoln Electric Company, 1974).

⁴ James F. Lincoln, *Incentive Management* (Cleveland: The Lincoln Electric Company, 1951), p. 33.

The profits at competitive selling prices resulting from such efficiency will be far beyond any possible need for proper return and growth of an industry. . . .

How, then, should the enormous extra profit resulting from incentive management be split? The problems that are inherent in incentive dictate the answer. If the worker does not get a proper share, he does not desire to develop himself or his skill. Incentive, therefore, would not succeed. The worker must have a reward that he feels is commensurate with his contribution.

If the customer does not have a part of the saving in lower prices, he will not buy the increased output. The size of the market is a decisive factor in costs of products. Therefore, the consumer must get a proper share of the saving.

Management and ownership are usually considered as a unit. This is far from a fact, but in the problem here, they can be considered together. They must get a part of the saving in larger salaries and perhaps larger dividends.

There is no hard and fast rule to cover this division, other than the following. The worker (which includes management), the customer, the owner, and all those involved must be satisfied that they are properly recognized or they will not cooperate, and cooperation is essential to any and all successful applications of incentives.⁵

Additional comments by James F. Lincoln are presented in **Exhibit 4**.

Compensation Policies

Compensation policies were the key element of James F. Lincoln's philosophy of "incentive management." Lincoln Electric's compensation system had three components:

- wages based solely on piecework output for most factory jobs,
- a year-end bonus which could equal or exceed an individual's full annual regular pay, and
- guaranteed employment for all workers

Almost all production workers at Lincoln were paid on a straight piecework plan. They had no base salary or hourly wage but were paid a set "price" for each item they produced. William Irrgang explained:

Wherever practical, we use the piecework system. This system can be effective, and it can be destructive. The important part of the system is that it is completely fair to the worker. When we set a piecework price, that price cannot be changed just because, in management's opinion, the worker is making too much money. Whether he earns two times or three times his normal amount makes no difference. Piecework prices can only be changed when management has made a change in the method of doing that particular job and under no other conditions. If this is not carried out 100 percent, piecework cannot work.

⁵ Ibid., pp. 7-11.

Today piecework is confined to production operations, although at one time we also used it for work done in our stenographic pool. Each typewriter was equipped with a counter that registered the number of times the typewriter keys were operated. This seemed to work all right for a time until it was noticed that one girl was earning much more than any of the others. This was looked into, and it was found that this young lady ate her lunch at her desk, using one hand for eating purposes and the other for punching the most convenient key on the typewriter as fast as she could; which simply goes to show that no matter how good a program you may have, it still needs careful supervision.⁶

A Time Study Department established piecework prices which were guaranteed by the company, until methods were changed or a new process introduced. Employees could challenge the price if they felt it was unfair. The Time Study Department would then retime the job and set a new rate. This could be higher or lower but was still open to challenge if an employee remained dissatisfied. Employees were expected to guarantee their own quality. They were not paid for defective work until it had been repaired on their own time.

Each job in the company was rated according to skill, required effort, responsibility, and so on, and a base wage rate for the job was assigned. Wage rates were comparable to those for similar jobs in the Cleveland area and were adjusted annually on the basis of Department of Labor statistics and quarterly to reflect changes in the cost of living. In this way, salaries or hourly wages were determined. For piecework jobs, the Time Study Department set piece prices so that an employee producing at a standard rate would earn the base rate for his or her job.

The second element of the compensation system was a year-end bonus, which had been paid each year since 1934. As explained in the *Employee's Handbook*, "The bonus, paid at the discretion of the company, is not a gift, but rather it is the sharing of the results of efficient operation on the basis of the contribution of each person to the success of the company for that year." In 1974, the bonus pool totaled \$26 million, an average of approximately \$10,700 per employee, or 90% of pre-bonus wages.

The total amount to be paid out in bonuses each year was determined by the board of directors. Lincoln's concentration on cost reduction kept costs low enough that prices could generally be set (and not upset by competition) on the basis of costs at the beginning of the year to produce a target return for stockholders and to give employees a bonus of approximately 100% of wages. The variance from the planned profits was usually added to (or subtracted from) the bonus pool to be distributed at year end. Since 1945, the average bonus had varied from 78% to 129% of wages. In the past few years, it had been between 40% and 55% of pre tax, pre-bonus profit, or as high as twice the net income after taxes.

An individual's share of the bonus pool was determined by a semiannual "merit rating" which measured individual performance compared to that of other members of the department or work group. Ratings for all employees had to average out to 100 on this relative scale. If, because of some unusual contribution, an individual deserved a rating above 110, he or she could be rewarded from a special corporate pool of bonus points, without any penalty to co-workers. Ratings above 110 were thus reviewed by a corporate committee or vice presidents who evaluated the individual's contribution. Merit ratings varied widely, from as low as 45 to as high as 160.

In determining an employee's merit rating, four factors were evaluated separately:

- dependability
- quality

⁶ William Irrgang, "The Lincoln Incentive Management Program," Lincoln Lecture Series, Arizona State University, 1972, p. 13.

- output
- ideas and cooperation

Foremen were responsible for the rating of all factory workers. They could request help from assistant foremen (dependability), the Production Control Department (output), the Inspection Department (quality), and the Methods Department (ideas and cooperation). In the office, supervisors rated their people on the same items. At least one executive reviewed all ratings. All employees were urged to discuss their ratings with their department heads if they were dissatisfied or unclear about them.

Lincoln complemented its rating and pay system with a Guaranteed Continuous Employment Plan. This plan provided security against layoffs and assured continuity of employment. Every full-time employee who had been with the company at least two years was guaranteed employment for at least 75% of the standard 40-hour week. In fact, the company had not had any layoffs since 1951 when initial trials for the plan were put into effect. It was formally established in 1958.

The guarantee of employment was seen by the company as an essential element in the incentive plan. Without such a guarantee, it was believed that employees would be more likely to resist improved production and efficiency for fear of losing their jobs. In accepting the guaranteed continuous employment plan, employees agreed to perform any job that was assigned as conditions required, and to work overtime during periods of high activity.

The philosophy and procedures regarding the incentive plan were the same for management and workers, except that William Irrgang and George Willis did not share in the bonus.

Employee Views

To the researchers, it appeared that employees generally liked working at Lincoln. The employee turnover rate was far below that of most other companies, and once a new employee made it through the first month or so, he rarely left for another firm (see **Exhibit 5**). One employee explained, "It's like trying out for a high school football team. If you make it through the first few practices, you're usually going to stay the whole season, especially after the games start."

One long-time employee who liked working at Lincoln was John "Tiny" Carrillo, an armature bander on the welding machine line, who had been with the company for 24 years. Tiny explained why:

The thing I like here is that you're pretty much your own boss as long as you do your job. You're responsible for your own work and you even put your stencil on every machine you work on. That way if it breaks down in the field and they have to take it back, they know who's responsible.

Before I came here, I worked at Cadillac as a welder. After two months there I had the top hourly rate. I wasn't allowed to tell anyone because there were guys who still had the starting rate after a year. But, I couldn't go any higher after two months.

I've done well. My rating is usually around 110, but I work hard, right through the smoke breaks. The only time I stop is a half hour for lunch. I make good money. I have two houses, one which I rent out, and four cars. They're all paid for. When I get my bills, I pay them the next day. That's the main thing, I don't owe anyone.

Sure, there are problems. There's sometimes a bind between the guys with low grades and the guys with high ones, like in school. And there are guys who sway everything their way so they'll get the points, but they [management] have good tabs on what's going on. . . .

A lot of new guys come in and leave right away. Most of them are just mamma's boys and don't want to do the work. We had a new guy who was a produce manager at a supermarket. He worked a couple of weeks, then quit and went back to his old job.

At the end of the interview, the researcher thanked Tiny for his time. He responded by pointing out that it had cost him \$7.00 in lost time, but that he was glad to be of assistance.

Another piece worker, Jorge Espinoza, a fine-wire operator in the Electrode Division, had been with the company for six years. He explained his feelings:

I believe in being my own man. I want to use my drive for my own gain. It's worked. I built my family a house and have an acre of land, with a low mortgage. I have a car and an old truck I play around with. The money I get is because I earn it. I don't want anything given to me.

The thing I don't like is having to depend on other people on the line and suppliers. We're getting bad steel occasionally. Our output is down as a result and my rating will suffer.

There are men who have great drive here and can push for a job. They are not leaders and never will be, but they move up. That's a problem. . . .

The first few times around, the ratings were painful for me. But now I stick near 100. You really make what you want. We just had a methods change and our base rate went from 83 to 89 coils a day. This job is tougher now and more complex. But, it's all what you want. If you want 110 coils you can get it. You just take less breaks. Today, I gambled and won. I didn't change my dies and made over a hundred coils. If I had lost, and the die plugged up, it would have cost me at least half an hour. But, today I made it.

Management Style

Lincoln's incentive scheme was reinforced by top management's attitude toward the men on the factory floor. In 1951, James Lincoln wrote:

It becomes perfectly true to anyone who will think this thing through that there is no such thing in an industrial activity as Management and Men having different functions or being two different kinds of people. Why can't we think and why don't we think that all people are Management? Can you imagine any president of any factory or machine shop who can go down and manage a turret lathe as well as the machinist can? Can you imagine any manager of any organization who can go down and manage a broom—let us get down to that—who can manage a broom as well as a sweeper can? Can you imagine any secretary of any company who can go

down and fire a furnace and manage that boiler as well as the man who does the job? Obviously, all are Management.⁷

Lincoln's president, George Willis, stressed the equality in the company:

We try to avoid barriers between management and workers. We're treated equally as much as possible. When I got to work this morning at 7:30, the parking lot was three-quarters full. I parked way out there like anyone else would. I don't have a special reserved spot. The same principle holds true in our cafeteria. There's no executive dining room. We eat with everyone else.⁸

Willis James felt that open and frank communication between management and workers had been a critical factor in Lincoln's success, and he believed that the company's Advisory Board, consisting of elected employee representatives, had played a very important role in achieving this. Established by James F. Lincoln in 1914, the board met twice a month, providing a forum in which employees could bring issues of concern to top management's attention, question company policies, and make suggestions for their improvement. As described in the *Employee's Handbook*:

Board service is a privilege and responsibility of importance to the entire organization. In discussions or in reaching decisions Board members must be guided by the best interests of the Company. These also serve the best interests of its workers. They should seek at all times to improve the cooperative attitude of all workers and see that all realize they have an important part in our final results.

All Advisory Board meetings were chaired by either the chairman or the president of Lincoln. Usually both were present. Issues brought up at board meetings were either resolved on the spot or assigned to an executive. After each meeting, William Irrgang or George Willis would send a memo to the executive responsible for each unanswered question, no matter how trivial, and he was expected to respond by the next meeting if possible.

Minutes of all board meetings were posted on bulletin boards in each department and members explained the board's actions to the other workers in their department. The questions raised in the minutes of a given meeting were usually answered in the next set of minutes. This procedure had not changed significantly since the first meeting in 1914, and the types of issues raised had remained much the same (see **Exhibit 6**).

Workers felt that the Advisory Board provided a way of getting immediate attention for their problems. It was clear, however, that management still made the final decisions.⁹ A former member of the Advisory Board commented:

There are certain areas which are brought up in the meetings which Mr. Irrgang doesn't want to get into. He's adept at steering the conversation away from these. It's definitely not a negotiating meeting. But, generally, you really get action or an answer on why action isn't being taken.

⁷ James F. Lincoln, *What Makes Workers Work?* (Cleveland: The Lincoln Electric Company, 1951), pp. 3-4 .

⁸ The cafeteria had large rectangular and round tables. In general, factory workers gravitated toward the rectangular tables. There were no strict rules, however, and management personnel often sat with factory workers. Toward the center was a square table that seated only four. This was reserved for William Irrgang, George Willis, and their guests when they were having a working lunch.

⁹ In some cases, management allowed issues to be decided by a vote of employees. Recently, for example, employees had voted down a proposal that the company give them dental benefits, recognizing that the cost of the program would come directly out of their bonuses.

In addition to the Advisory Board, there was a 12-member board of middle managers which met with Irrgang and Willis once a month. The topics discussed here were broader than those of the Advisory Board. The primary function of these meetings was to allow top management to get better acquainted with these individuals and to encourage cooperation between departments.

Lincoln's two top executives, Irrgang and Willis, continued the practice of James F. Lincoln in maintaining an open door to all employees. George Willis estimated that at least twice a week factory employees took advantage of this opportunity to talk with him.

Middle managers also felt that communication with Willis and Irrgang was open and direct. Often it bypassed intermediate levels of the organization. Most saw this as an advantage, but one commented:

This company is run strictly by the two men at the top. Mr. Lincoln trained Mr. Irrgang in his image. It's very authoritarian and decisions flow top down. It never became a big company. There is very little delegated and top people are making too many small decisions. Mr. Irrgang and Mr. Willis work 80 hours a week, and no one I know in this company can say that his boss doesn't work harder than he does.

Willis saw management's concern for the worker as an essential ingredient in his company's formula for success. He knew at least 500 employees personally. In leading the researcher through the plant, he greeted workers by name and paused several times to tell anecdotes about them.

At one point, an older man yelled to Willis good-naturedly, "Where's my raise?" Willis explained that this man had worked for 40 years in a job requiring him to lift up to 20 tons of material a day. His earnings had been quite high because of his rapid work pace, but Willis had been afraid that as he was advancing in age he could injure himself working in that job. After months of Willis's urging, the worker switched to an easier but lower paying job. He was disappointed in taking the earnings cut and even after several years let the president know whenever he saw him.

Willis pointed out another employee, whose wife had recently died, and noted that for several weeks he had been drinking heavily and reporting to work late. Willis had earlier spent about half an hour discussing the situation with him to console him and see if the company could help in any way. He explained:

I made a definite point of talking to him on the floor of the plant, near his work station. I wanted to make sure that other employees who knew the situation could see me with him. Speaking to him had symbolic value. It is important for employees to know that the president is interested in their welfare.

Management's philosophy was also reflected in the company's physical facilities. A nonsense atmosphere was firmly established at the gate to the parking lot where the only mention of the company name was in a sign reading:

\$1,000 REWARD for information leading to the arrest and conviction of persons stealing from the Lincoln Electric parking lot.

There was a single entrance to the offices and plant for workers, management, and visitors. Entering, one could not avoid being struck by the company motto, in large stainless steel letters extending 30 feet across the wall:

THE ACTUAL IS LIMITED
THE POSSIBLE IS IMMENSE

A flight of stairs led down to a tunnel system for pedestrian traffic which ran under the single-story plant. At the base of the stairs was a large bronze plaque on which were inscribed the names of the 8 employees who had served more than 50 years, and the more than 350 active employees with 25 or more years of service (the Quarter Century Club).

The long tunnel leading to the offices was clean and well lit. The executive offices were located in a windowless, two-story cement-block office building which sat like a box in the center of the plant. At the base of the staircase leading up to the offices, a Lincoln automatic welding machine and portraits of J. C. Lincoln and J. F. Lincoln welcomed visitors. The handrail on the staircase was welded into place, as were the ashtrays in the tunnel.

In the center of the office building was a simple, undecorated reception room. A switchboard operator/receptionist greeted visitors between filing and phone calls. Throughout the building, decor was Spartan. The reception room was furnished with a metal coat rack, a wooden bookcase, and several plain wooden tables and chairs. All of the available reading material dealt with Lincoln Electric Company or welding.

From the reception room, seven doors each led almost directly to the various offices and departments. Most of the departments were large open rooms with closely spaced desks. One manager explained that "Mr. Lincoln didn't believe in walls. He felt they interrupted the flow of communications and paperwork." Most of the desks and files were plain, old, and well worn, and there was little modern office equipment. Expenditures on equipment had to meet the same criteria in the office as in the plant: The Maintenance Department had to certify that the equipment replaced could not be repaired, and any equipment acquired for cost reduction had to have a one-year payback.¹⁰ Even Xerox machines were nowhere to be found. Copying costs were tightly controlled and only certain individuals could use the Xerox copiers. Customer order forms which required eight copies were run on a duplicating machine, for example.

The private offices were small, uncarpeted, and separated by green metal partitions. The president's office was slightly larger than the others, but still retained a Spartan appearance. There was only one carpeted office. Willis explained: "That office was occupied by Mr. Lincoln until he died in 1965. For the next five years it was left vacant and now it is Mr. Irrgang's office and also the Board of Directors' and Advisory Board meeting room."

Personnel

Lincoln Electric had a strict policy of filling all but entry level positions by promoting from within the company. Whenever an opening occurred, a notice was posted on the 25 bulletin boards in the plant and offices. Any interested employee could apply for an open position. Because of the company's sustained growth and policy of promoting from within, employees had substantial opportunity for advancement.

An outsider generally could join the company in one of two ways: either taking a factory job at an hourly or piece rate, or entering Lincoln's training programs in sales or engineering.¹¹ The company recruited its trainees at colleges and graduate schools, including Harvard Business School. Starting salary in 1975 for a trainee with a bachelor's degree was \$5.50 an hour plus a year-end bonus

¹⁰ Willis explained that capital projects with paybacks of up to two years were sometimes funded when they involved a product for which demand was growing.

¹¹ Lincoln's chairman and president both advanced through the ranks in Manufacturing. Irrgang began as a pieceworker in the Armature Winding Department, and Willis began in Plant Engineering. (See Exhibit 7 for employment history of Lincoln's top management.)

at an average of 40% of the normal rate. Wages for trainees with either a master's degree or several years of relevant experience were 5% higher.

Although Lincoln's president, vice president of sales, and personnel director were all Harvard Business School graduates, the company had not hired many recent graduates. Clyde Loughridge, the personnel director, explained:

We don't offer them fancy staff positions and we don't pretend to. Our starting pay is less than average, probably \$17,000—\$18,000¹² including bonus, and the work is harder than average. We start our trainees off by putting them in overalls and they spend up to seven weeks in the welding school. In a lot of ways it's like boot camp. Rather than leading them along by the hand, we like to let the self-starters show themselves.

The policy of promoting from within had rarely been violated, and then only in cases where a specialized skill was required. Loughridge commented:

In most cases we've been able to stick to it, even where the required skills are entirely new to the company. Our employees have a lot of varied skills, and usually someone can fit the job. For example, when we recently got our first computer, we needed a programmer and systems analyst. We had twenty employees apply who had experience or training in computers. We chose two, and it really helps that they know the company and understand our business.

The company did not send its employees to outside management development programs and did not provide tuition grants for educational purposes.

Lincoln Electric had no formal organization chart and management did not feel that one was necessary. (The chart in **Exhibit 8** was drawn for the purposes of this case.) As explained by one executive:

People retire and their jobs are parceled out. We are very successful in overloading our overhead departments. We make sure this way that no unnecessary work is done and jobs which are not absolutely essential are eliminated. A disadvantage is that planning may suffer, as may outside development to keep up with your field.

Lincoln's organizational hierarchy was flat, with few levels between the bottom and the top. For example, Don Hastings, the vice president of sales, had 37 regional sales managers reporting to him. He commented:

I have to work hard, there's no question about that. There are only four of us in the home office plus two secretaries. I could easily use three more people. I work every Saturday, at least half a day. Most of our regional men do too, and they like me to know it. You should see the switchboard light up when 37 regional managers call in at five minutes to twelve on Saturday.

The president and chairman kept a tight rein over personnel matters. All changes in status of employees, even at the lowest levels, had to be approved by Willis. Irrgang also had to give his approval if salaried employees were involved. Raises or promotions had to be approved in advance. An employee could be fired by his supervisor on the spot for cause, but if the grounds were

¹² In 1975, the median starting salary for Harvard Business School graduates who took positions in industrial manufacturing was \$19,800.

questionable, the decision had to be approved afterward by either Willis or Irrgang. Usually the supervisor was supported, but there had been cases where a firing decision was reversed.

Marketing

Welding machines and electrodes were like razors and razor blades. A Lincoln welding machine often had a useful life of 30 years or more, while electrodes (and fluxes) were consumed immediately in the welding process. The ratio of machine cost to annual consumables cost varied widely, from perhaps 7:1 for a hand welder used in a small shop to 1:5 or more for an automatic welder used in a shipyard.

Although certain competitors might meet Lincoln's costs and quality in selected products, management believed that no company could match the line overall. Another important competitive edge for Lincoln was its sales force. Al Patnik, vice president of sales development, explained:

Most competitors operate through distributors. We have our own top field sales force.¹³ We start out with engineering graduates and put them through our seven-month training program. They learn how to weld, and we teach them everything we can about equipment, metallurgy, and design. Then they spend time on the rebuild line [where machines brought in from the field are rebuilt] and even spend time in the office seeing how orders are processed. Finally, before the trainees go out into the field, they have to go into our plant and find a better way of making something. Then they make a presentation to Mr. Irrgang, just as if he were one of our customers.

Our approach to the customer is to go in and learn what he is doing and show him how to do it better. For many companies our people become their experts in welding. They go in and talk to a foreman. They might say, "Let me put on a headshield and show you what I'm talking about." That's how we sell them.

George Ward, a salesman in the San Francisco office, commented:

The competition hires graduates with business degrees (without engineering backgrounds) and that's how they get hurt. This job is getting more technical every day. . . . A customer in California who is using our equipment to weld offshore oil rigs had a problem with one of our products. I couldn't get the solution for them over the phone, so I flew in to the plant Monday morning and showed it to our engineers. Mr. Willis said to me, "Don't go back to California until this problem is solved. . . ." We use a "working together to solve your problem" approach. This, plus sticking to published prices, shows you're not interested in taking advantage of them.

I had a boss who used to say: "Once we're in, Lincoln never loses a customer except on delivery." It's basically true. The orders I lost last year were because we couldn't deliver fast enough. Lincoln gets hurt when there are shortages because of our guaranteed employment. We don't hire short-term factory workers when sales take off, and other companies beat us on delivery.

The sales force was paid a salary plus bonus. Ward believed that Lincoln's sales force was the best paid and hardest working in the industry. He said, "We're aggressive, and want to work and get

¹³ The sales force was supplemented in some areas by distributors. Sales abroad were handled by wholly owned subsidiaries or Armco's International Division.

paid for it. The sales force prides itself on working more hours than anyone else. . . . My wife wonders sometimes if you can work for Lincoln and have a family too.”

Manufacturing

Lincoln’s plant was unusual in several respects. It seemed crowded with materials and equipment, with surprisingly few workers. It was obvious that employees worked very fast and efficiently with few breaks. Even during the 10-minute smoke breaks in the morning and afternoon, employees often continued to work.

An innovative plant layout was partly responsible for the crowded appearance. Raw materials entered one side of the plant and finished goods came out the other side. There was no central stockroom for materials or work-in-process. Instead, everything that entered the plant was transported directly to the work station where it would be used. At a work station, a single worker or group operated in effect as a subcontractor. All required materials were piled around the station, allowing visual inventory control, and workers were paid a piece price for their production. Wherever possible, the work flow followed a straight line through the plant from the side where raw materials entered to the side where finished goods exited. Because there was no union, the company had great flexibility in deciding what could be performed at a work station. For example, foundry work and metal stamping could be carried out together by the same workers when necessary. Thus, work could flow almost directly along a line through the plant. Intermediate material handling was avoided to a great extent. The major exception arose when multiple production lines shared a large or expensive piece of machinery, and the work had to be brought to the machines.

Many of the operations in the plant were automated. Much of the manufacturing equipment was proprietary,¹⁴ designed and built by Lincoln. In some cases, the company had modified machines built by others to run two or three times as fast as when originally delivered.

From the time a product was first conceived, close coordination was maintained between product design engineers and the Methods Department; this was seen as a key factor in reducing costs and rationalizing manufacturing. William Irrgang explained:

After we have [an] idea . . . we start thinking about manufacturing costs, before anything leaves the Design Engineering Department. At that point, there is a complete “getting together” of manufacturing and design engineers—and plant engineers, too, if new equipment is involved.

Our tooling, for instance, is going to be looked at carefully while the design of a product is still in process. Obviously, we can increase or decrease the tooling very materially by certain considerations in the design of a product, and we can go on the basis of total costs at all times. In fact, as far as total cost is concerned, we even think about such matters as shipping, warehousing, etc. All of these factors are taken into consideration when we’re still at the design stage. It’s very essential that this be done: otherwise, you can lock yourself out from a lot of potential economies.¹⁵

In 1974, Lincoln’s plant had reached full capacity, operating nearly around the clock. Land bordering its present location was unavailable and management was moving ahead with plans to build a second plant 15 miles away on the same freeway as the present plant.

¹⁴ Visitors were barred from the Electrode Division unless they had a pass signed by Willis or Irrgang.

¹⁵ “Incentive Management in Action,” *Assembly Engineering*, March 1967. Reprinted by permission of the publisher ©1967 by Hitchcock Publishing Co. All rights reserved.

Over the years, Lincoln had come to make rather than buy an increasing proportion of its components. For example, even though its unit volume of gasoline engines was only a fraction of its suppliers', Lincoln purchased engine blocks and components and assembled them rather than buying completed engines. Management was continually evaluating opportunities for backward integration and had not arbitrarily ruled out manufacturing any of Lincoln's components or raw materials.

Administrative Productivity

Lincoln's high productivity was not limited to manufacturing. Clyde Loughridge pointed to the Personnel Department as an example: "Normally, for 2,300 employees you would need a personnel department of about 20, but we have only 6, and that includes the nurse, and our responsibilities go beyond those of the typical personnel department."

Once a year, Loughridge had to outline his objectives for the upcoming year to the president of the company, but as he explained, "I don't get a budget. There would be no point to it. I just spend as little as possible. I operate this just like my home. I don't spend on anything I don't need."

In the Traffic Department, workers also seemed very busy. There, a staff of 12 controlled the shipment of 2.5 million pounds of material a day. Their task was complex. Delivery was included in the price of their products. They thus could reduce the overall cost to the customer by mixing products in most loads and shipping the most efficient way possible to the company's 39 warehouses. Jim Biek, general traffic manager, explained how they accomplished this:

For every order, we decide whether it would be cheaper by rail or truck. Then we consolidate orders so that over 90% of what goes out of here is full carload or full truckload, as compared to perhaps 50% for most companies. We also mix products so that we come in at the top of the weight brackets. For example, if a rate is for 20,000 to 40,000 pounds, we will mix orders to bring the weight right up to that 40,000 limit. All this is computed manually. In fact, my old boss used to say, "We run Traffic like a ma and pa grocery store."

As in the rest of Lincoln, the employees in the Traffic Department worked their way up from entry level positions. Jim Biek had become general traffic manager after nine years as a purchasing engineer. He had received an M.B.A. degree from Northwestern after a B.S. in mechanical engineering from Purdue, started in the engineering training program, and then spent five years in Product Development and Methods before going to Purchasing and finally to Traffic. Lack of experience in Traffic was a disadvantage, but the policy of promoting from within also had its advantages. Biek explained:

One of my first tasks was to go to Washington and fight to get welders reclassified as motors to qualify for a lower freight rate. With my engineering experience and knowledge of welders, I was in a better position to argue this than a straight traffic man. . . .

Just about everybody in here was new to Traffic. One of my assistant traffic managers had worked on the loading platform here for 10 years before he came into the department. He had to go to night school to learn about rates, but his experience is invaluable. He knows how to load trucks and rail cars backwards and forward. Who could do a better job of consolidating orders than he does? He can look at an order and think of it as rows of pallets.

Some day we'll outgrow this way of operating, but right now I can't imagine a computer juggling loads like some of our employees do.

Lincoln's Order Department had recently begun computerizing its operations. It was the first time a computer had been used anywhere in the company (except in engineering and research), and according to Russell Stauffer, head of the Order Department, "It was a three-year job for me to sell this to top management." The computer was expected to replace 12 or 13 employees who would gradually be moved into new jobs. There had been some resistance to the computer, Stauffer noted:

It's like anything new. People get scared. Not all the people affected have been here for the two years required to be eligible for guaranteed employment. And even though the others are assured a job, they don't know what it will be and will have to take what's offered.

The computer was expected to produce savings of \$100,000 a year, and to allow a greater degree of control. Stauffer explained:

We're getting information out of this that we never knew before. The job here is very complex. We're sending out more than two million pounds of consumables a day. Each order might have 30 or 40 items, and each item has a bracket price arrangement based on total order size. A clerk has to remember or determine quickly whether we are out of stock on any items and calculate whether the stock-out brings the order down into another bracket. This means they have to remember the prices and items out of stock. This way of operating was okay up to about \$200 million in sales, but now we've outgrown the human capability to handle the problem.

Although he had no previous experience in computers, Stauffer had full responsibility for the conversion.

I've been here for 35 years. The first day I started, I unloaded coal cars and painted fences. Then I went to the assembly line, first on small parts, then large ones. I've been running the Order Department for 12 years. Since I've been here, we've had studies on computers every year or two and it always came out that we couldn't save money. Finally, when it looked like we'd make the switch, I took some courses at IBM. Over the last year and a half, they've totaled eight and a half weeks, which is supposed to equal a full semester of college.

To date, the conversion had gone well, but much slower than anticipated. Order pressure had been so high that many mistakes would have been catastrophic. Management thus had emphasized assuring 100% quality operations rather than faster conversion.

Lincoln's Future

The 1947 Harvard Business School case study of Lincoln Electric ended with a prediction by a union leader from the Cleveland area:

The real test of Lincoln will come when the going gets tough. The thing Lincoln holds out to the men is high earnings. They work like dogs at Lincoln, but it pays off. . . .

I think [Mr. Lincoln] puts too much store by monetary incentives—but then, there's no denying he has attracted people who respond to that type of incentive. But I think that very thing is a danger Lincoln faces. If the day comes when they can't offer those big bonuses, or his people decide there's more to life than killing yourself making money, I predict the Lincoln Electric Company is in for trouble.

Lincoln's president, George Willis, joined the company the year that this comment was made. Reflecting on his 28 years with the company, Willis observed:

The company hasn't changed very much since I've been here. It's still run pretty much like Mr. Lincoln ran it. But today's workers are different. They're more outspoken and interested in why things are being done, not just how. We have nothing to hide and never did, so we can give them the answers to their questions.

Looking forward, Willis saw no need to alter Lincoln's strategy or its policies:

My job will continue to be to have everyone in the organization recognize that a common goal all of us can and must support is to give the customer the quality he needs, when he needs it, at the lowest cost. To do this, we have to have everyone's understanding of this goal and their effort to accomplish it. In one way or another, I have to motivate the organization to meet this goal. The basic forms of the motivation have evolved over the last 40 years. However, keeping the system honed so that everyone understands it, agrees with it, and brings out disagreements so improvements can be made or thinking changed becomes my major responsibility.

If our employees did not believe that management was trustworthy, honest, and impartial, the system could not operate. We've worked out the mechanics. They are not secret. A good part of my responsibility is to make sure the mechanics are followed. This ties back to a trust and understanding between individuals at all levels of the organization.

I don't see any real limits to our size. Look at a world with a present population of just under four billion now and six and a quarter billion by the year 2000. Those people aren't going to tolerate a low standard of living. So there will be a lot of construction, cars, bridges, oil and all those things that have got to be to support a population that large.

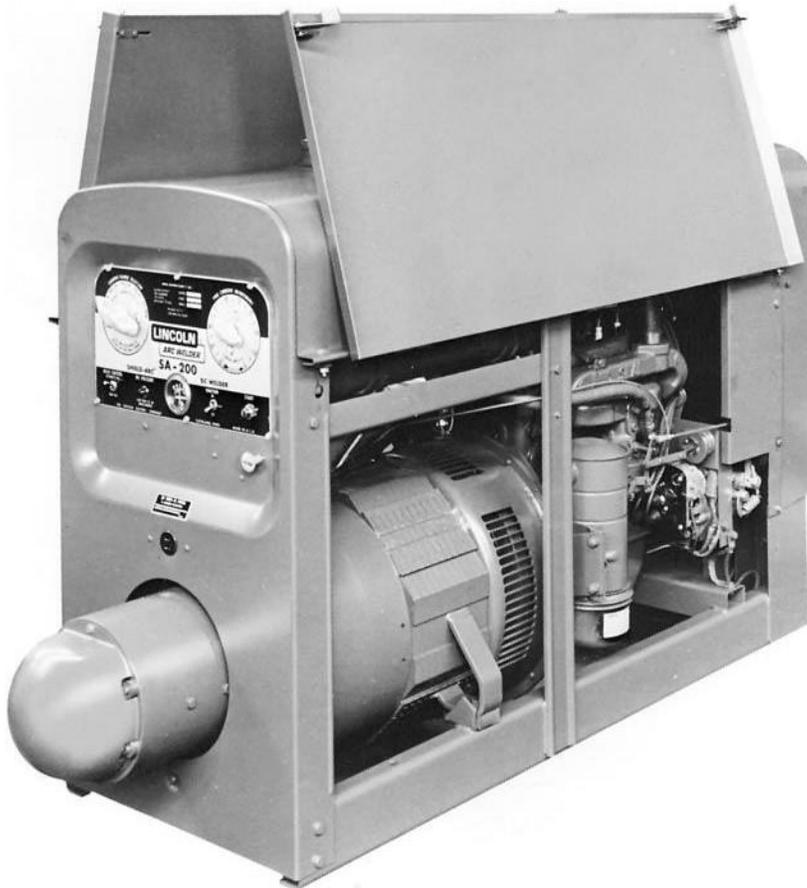
My job will still be just the traditional things of assuring that we keep up with the technology and have sufficient profit to pay the suppliers of capital. Then, I have to make sure communication can be maintained adequately. That last task may be the biggest and most important part of my job in the years ahead as we grow larger and still more complex.

Exhibit 1 Arc Welding

Arc welding is a group of joining processes that utilize an electric current produced by a transformer or motor generator (electric or engine powered) to fuse various metals. The temperature at the arc is approximately 10,000 Fahrenheit.

The welding circuit consists of a welding machine, ground clamp, and electrode holder. The electrode carries electricity to the metal being welded and the heat from the arc causes the base metals to join together. The electrode may or may not act as a filler metal during the process; however, nearly 60% of all arc welding that is done in the United States utilizes a covered electrode that acts as a very high quality filler metal.

The Lincoln Electric Company manufactured a wide variety of covered electrodes, submerged arc welding wires and fluxes, and a unique self-shielded, flux-cored electrode called Innershield. The company also manufactured welding machines, wire feeders, and other supplies that were needed for arc welding.



Lincoln Arc Welding Machines

Exhibit 2 Lincoln's Status In 1974**Statement of Financial Condition
(Foreign Subsidiaries Not Included)**

<u>December 31</u>	<u>1974</u>
Assets	
Current Assets	
Cash and certificates of deposit	\$ 5,691,120
Government securities	6,073,919
Notes and accounts receivable	29,451,161
Inventories (LIFO basis)	29,995,694
Deferred taxes and prepaid expenses	<u>2,266,409</u>
Total	73,478,303
Other Assets	
Trustee—notes and interest receivable	1,906,871
Miscellaneous	<u>384,572</u>
Total	2,291,443
Intercompany	
Investment in foreign subsidiaries	4,695,610
Notes receivable	<u>0</u>
Total	4,695,610
Property Plant and Equipment ^a	
Land	825,376
Buildings	9,555,562
Machinery, tools and equipment	<u>11,273,155</u>
Total	21,654,093
Total Assets	<u>\$102,119,449</u>
Liabilities and Shareholders' Equity	
Current Liabilities	
Accounts payable	\$13,658,063
Accrued wages	1,554,225
Taxes, including income taxes	13,262,178
Dividends payable	<u>3,373,524</u>
Total	31,847,990
Shareholders' Equity	
Common capital stock, stated value	281,127
Additional paid-in capital	3,374,570
Retained earnings	<u>66,615,762</u>
Total	70,271,459
Total Liabilities and Shareholders' Equity	<u>\$102,119,449</u>

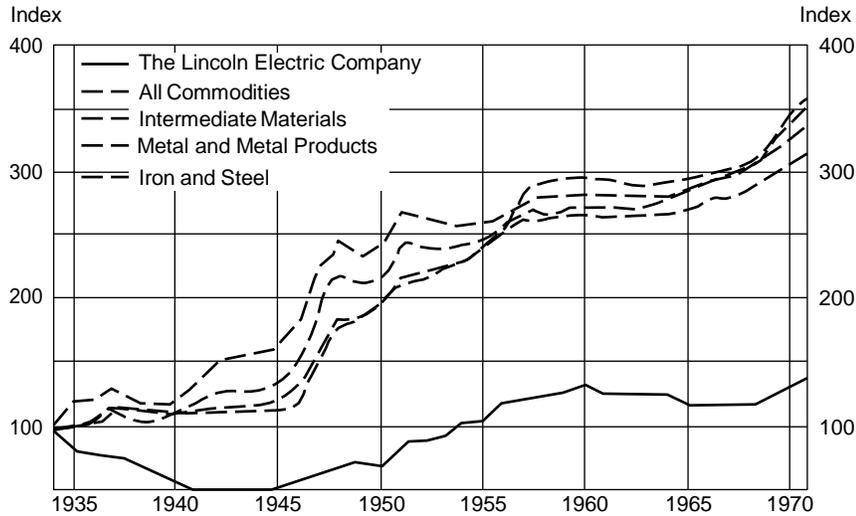
^a After depreciation

Exhibit 2 (continued)

Income and Retained Earnings	
<i>Year Ended December 31</i>	<i>1974</i>
Income	
Net sales	\$232,771,475
Interest	1,048,561
Overhead and development charges to subsidiaries	1,452,877
Dividend income	843,533
Other income	<u>515,034</u>
Total	236,631,480
Costs and Expenses	
Cost of products sold	154,752,735
Selling, administrative, and general expenses and freight out	20,791,301
Year-end incentive bonus	24,707,297
Pension expense	<u>2,186,932</u>
Total	<u>202,438,265</u>
Income Before Income Taxes	34,193,215
Provision for Income Taxes	
Federal	14,800,000
State and local	<u>1,866,000</u>
	<u>16,666,000</u>
Net Income	<u>\$17,527,215</u>

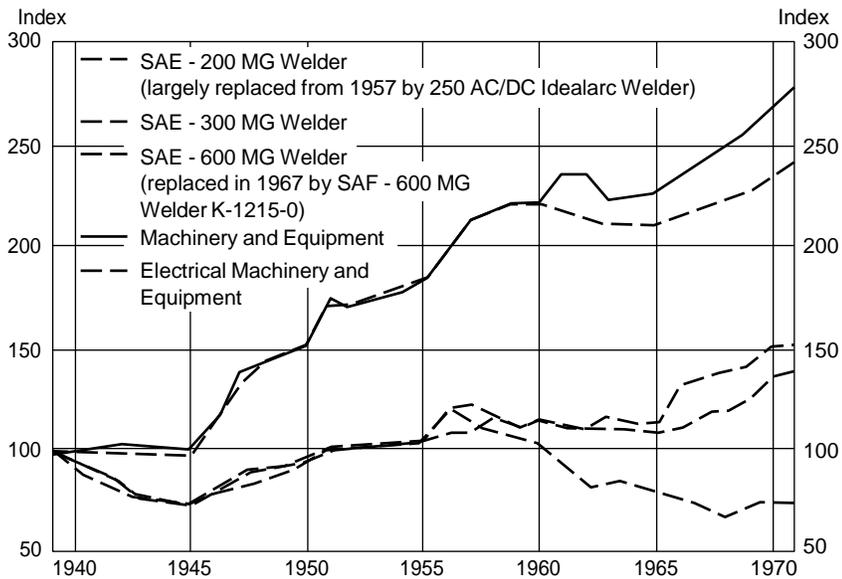
Exhibit 3 Lincoln Electric's Record of Pricing and Productivity

A. Lincoln Prices^a Relative to Commodity Prices^b, 1934–1971



- a. Index of annual selling prices of 3/16-inch diameter electrode in No. 5 and No. 5P in 3,000 pound quantities
- b. Indexes of wholesale prices

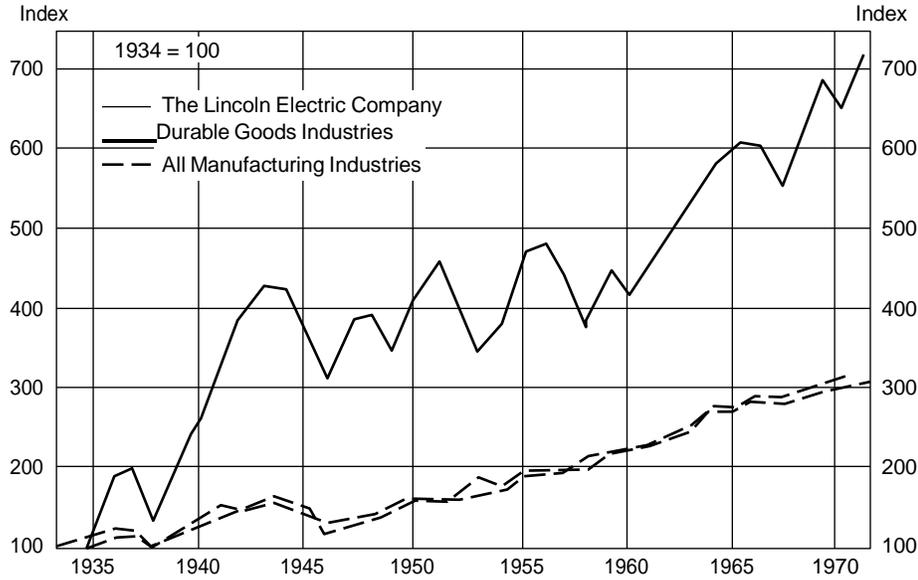
B. Lincoln Prices^c Relative to Wholesale Machinery and Equipment Prices, 1939–1971



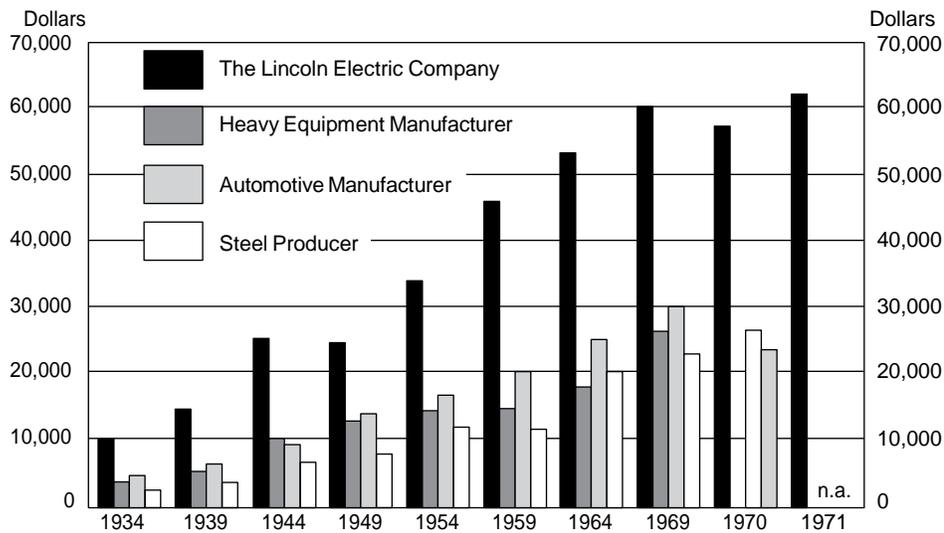
- c. Average annual prices of specific Lincoln welders

Exhibit 3 (continued)

C. Productivity of Lincoln Production Workers Relative to Workers in Manufacturing and Durable Goods Industries, 1934–1971



D. Lincoln Productivity Relative to Three Other Companies: Sales Value^d of Products per Employee, 1934–1971



d. At current prices
Source: Company records

Exhibit 4 James F. Lincoln's Observations on Management

- Some think paying a man more money will produce cooperation. Not true. Many incentives are far more effective than money. Robert MacNamara gave up millions to become Secretary of Defense. Status is a much greater incentive.
- If those crying loudest about the inefficiencies of labor were put in the position of the wage earner, they would react as he does. The worker is not a man apart. He has the same needs, aspirations, and reactions as the industrialist. A worker will not cooperate on any program that will penalize him. Does any manager?
- The industrial manager is very conscious of his company's need of uninterrupted income. He is completely oblivious, though, to the worker's same need. Management fails—i.e., profits fall off—and gets no punishment. The wage earner does not fail but is fired. Such injustice!
- Higher efficiency means fewer manhours to do a job. If the worker loses his job more quickly, he will oppose higher efficiency.
- There never will be enthusiasm for greater efficiency if the resulting profits are not properly distributed. If we continue to give it to the average stockholder, the worker will not cooperate.
- Most companies are run by hired managers, under the control of stockholders. As a result, the goal of the company has shifted from service to the customer to making larger dividends for stockholders.
- The public will not yet believe that our standard of living could be doubled immediately if labor and management would cooperate.
- The manager is dealing with expert workers far more skillful. While you can boss these experts around in the usual lofty way, their eager cooperation will not be won.
- A wage earner is no more interested than a manager in making money for other people. The worker's job doesn't depend on pleasing stockholders, so he has no interest in dividends. Neither is he interested in increasing efficiency if he may lose his job because management has failed to get more orders.
- If a manager received the same treatment in matters of income, security, advancement, and dignity as the hourly worker, he would soon understand the real problem of management.
- The first question management should ask is: What is the company trying to do? In the minds of the average worker the answer is: "The company is trying to make the largest possible profits by any method. Profits go to absentee stockholders and top management."
- There is all the difference imaginable between the grudging distrustful, half-forced cooperation and the eager, whole-hearted, vigorous, happy cooperation of men working together for a common purpose.
- Continuous employment of workers is essential to industrial efficiency. This is a management responsibility. Laying off workers during slack times is death to efficiency. The worker thrown out is a trained man. To replace him when business picks up will cost much more than the savings of wages during the layoff. Solution? The worker must have a guarantee that if he works properly his income will be continuous.

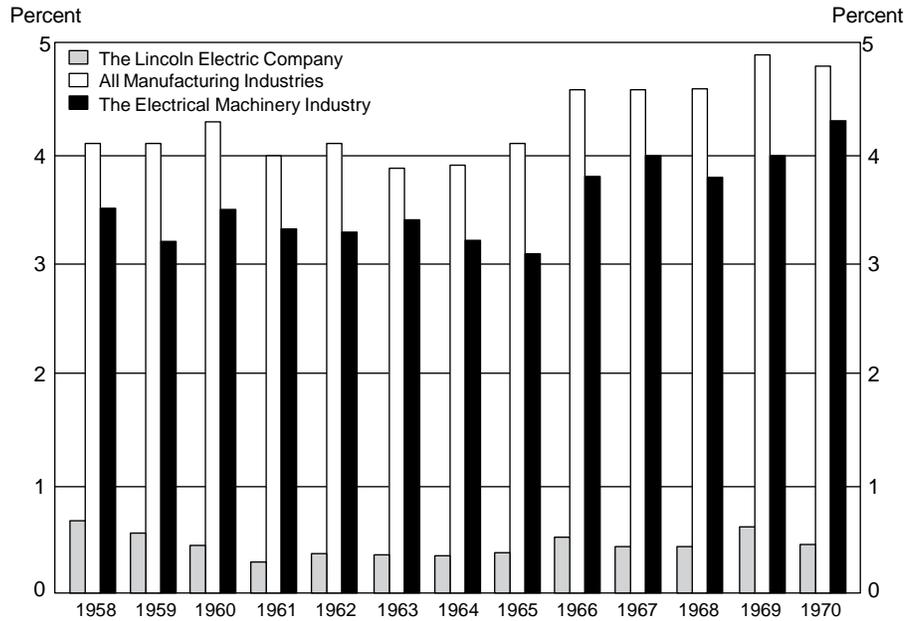
Exhibit 4 (continued)

- Continuous employment is the first step to efficiency. But how? First, during slack periods, manufacture to build up inventory; costs will usually be less because of lower material costs. Second, develop new machines and methods of manufacturing; plans should be waiting on the shelf. Third, reduce prices by getting lower costs. When slack times come, workers are eager to help cut costs. Fourth explore markets passed over when times are good. Fifth, hours of work can be reduced if the worker is agreeable. Sixth, develop new products. In sum, management should plan for slumps. They are useful.
- The incentives that are most potent when properly offered are:
 - Money in proportion to production.
 - Status as a reward for achievement.
 - Publicity of the worker's contributions and skill.
- The calling of the minister, the doctor, the lawyer, as well as the manager, contains incentive to excel. Excellence brings rewards, self-esteem, respect. Only the hourly worker has no reason to excel.
- Resistance to efficiency is not normal. It is present only when we are hired workers.
- Do unto others as you would have them do unto you. This is not just a Sunday school ideal, but a proper labor-management policy.
- An incentive plan should reward a man not only for the number of pieces turned out, but also for the accuracy of his work, his cooperation in improving methods of production, his attendance.
- The progress in industry so far stems from the developed potentialities of managers. Wage earners, who because of their greater numbers have far greater potential, are overlooked. Here is where the manager must look for his greatest progress.
- There should be an overall bonus based on the contribution each person makes to efficiency. If each person is properly rated and paid, there will not only be a fair reward to each worker but friendly and exciting competition.
- The present policy of operating industry for stockholders is unreasonable. The rewards now given to him are far too much. He gets income that should really go to the worker and the management. The usual absentee stockholder contributes nothing to efficiency. He buys a stock today and sells it tomorrow. He often doesn't even know what the company makes. Why should he be rewarded by large dividends?
- There are many forms and degrees of cooperation between the worker and the management. The worker's attitude can vary all the way from passivity to highly imaginative contributions to efficiency and progress.

Source: *Civil Engineering*, January 1973, p. 78. Reprinted by permission.

Exhibit 5 Stability of Employment

A. Lincoln and Industry Labor Turnover Rates, 1958–1970



B. Employee Distribution by Years of Service, 1975

Employee's Years of Service	Number of Employees
Less than 1	153
1	311
2	201
3	93
4	34
5	90
6–10	545
11–20	439
21–30	274
31–40	197
41–50	27
51 or more	1
Total	2,365

Exhibit 6 Management Advisory Board Minutes**September 26,1944**

Absent: William Dillmuth

A discussion on piecework was again taken up. There was enough detail so it was thought best to appoint a committee to study it and bring a report into the meeting when that study is complete. That committee is composed of Messrs. Gilletly, Semko, Kneen and Steingass. Messrs. Erickson and White will be called in consultation, and the group will meet next Wednesday, October 4th.

The request was made that the members be permitted to bring guests to the meetings. The request was granted. Let's make sure we don't get too many at one time.

The point was made that materials are not being brought to the operation properly and promptly. There is no doubt of this difficulty. The matter was referred to Mr. Kneen for action. It is to be noted that conditions of deliveries from our suppliers have introduced a tremendous problem which has helped to increase this difficulty.

The request was made that over-time penalty be paid with the straight time. This will be done. There are some administrative difficulties which we will discuss at the next meeting but the over-time payment will start with the first pay in October.

Beginning October 1st employees' badges will be discontinued. Please turn them in to the watchmen.

It was requested that piecework prices be put on repair work in Dept. J. This matter was referred to Mr. Kneen for action.

A request was made that a plaque showing the names of those who died in action, separate from the present plaques, be put in the lobby. This was referred to Mr. Davis for action.

The question was asked as to what method for upgrading men is used. The ability of the individual is the sole reason for his progress. It was felt this is proper.

J. F. Lincoln
President

Exhibit 6 (continued)**September 23, 1974 (Excerpts)**

Members absent: Tom Borkowski, Albert Sinn

Mr. Kupetz had asked about the Christmas and Thanksgiving schedules. These are being reviewed and we will have them available at the next meeting.

Mr. Howell had reported that the time clocks and the bells do not coincide. This is still being checked.

Mr. Sharpe had asked what the possibility would be to have a time clock installed in or near the Clean Room. This is being checked.

Mr. Joosten had raised the question of the pliability of the wrapping material used in the Chemical Department for wrapping slugs. The material we use at the present time is the best we can obtain at this time. . . .

Mr. Kostelac asked the question again whether the vacation arrangements could be changed, reducing the fifteen year period to some shorter period. It was pointed out that at the present time, where we have radically changing conditions every day, it is not the time to go into this. We will review this matter at some later date. . . .

Mr. Martucci brought out the fact that there was considerable objection by the people involved to having to work on Saturday night to make up for holiday shutdowns. This was referred to Mr. Willis to be taken into consideration in schedule planning. . . .

Mr. Joosten reported that in the Chemical Department on the Saturday midnight shift they have a setup where individuals do not have sufficient work so that it is an uneconomical situation. This has been referred to Mr. Willis to be reviewed.

Mr. Joosten asked whether there would be some way to get chest x-rays for people who work in dusty areas. Mr. Loughridge was asked to check a schedule of where chest x-rays are available at various times. . . .

Mr. Robinson asked what the procedure is for merit raises. The procedure is that the foreman recommends the individual for a merit raise if by his performance he has shown that he merits the increase. . . .

Chairman

William Irrgang: MW
September 25, 1974

Exhibit 7 Employment History of Top Executives*William Irrgang, Board Chairman*

1929 Hired, Repair Department
 1930 Final Inspection
 1934 Inspection, Wire Department
 1946 Director of factory engineering
 1951 Executive vice president for manufacturing and engineering
 1954 President and general manager
 1972 Chairman of the board of directors

George E. Willis, President

1947 Hired, Factory Engineering
 1951 Superintendent, Electrode Division
 1959 Vice president
 1969 Executive vice president of manufacturing and associated functions
 1972 President

William Miskoe, Vice President, International

1932 Hired, Chicago sales office
 1941 President of Australian plant
 1969 To Cleveland as vice president, international

Edwin M. Miller, Vice President and Assistant to the President

1923 Hired, factory worker
 1925 Assistant foreman
 1929 Production Department
 1940 Assistant department head, Production Department
 1952 Superintendent, Machine Division
 1959 Vice president
 1973 Vice president and assistant to the president

D. Neal Manross, Vice President, Machine and Motor Divisions

1941 Hired, factory worker
 1942 Welding inspector
 1952 General foreman, Extruding Department and assistant plant superintendent
 1953 Foreman, Special Products Department, Machine Division
 1956 Superintendent, Special Products Division
 1959 Superintendent, Motor Manufacturing
 1966 Vice president, Motor Division
 1973 Vice president in charge of Motor and Machine Divisions

Albert S. Patnik, Vice President of Sales Development

1940 Hired, sales student
 1940 Welder, New London, Conn.
 1941 Junior salesman, Los Angeles office
 1942 Salesman, Seattle office
 1945 Military service
 1945 Reinstated to Seattle
 1951 Rural Dealer Manager, Cleveland sales office
 1964 Assistant to the vice president of sales
 1972 Vice president

Donald F. Hastings, Vice President and General Sales Manager

1953 Hired, sales trainee
 1954 Welding engineer, Emeryville, Cal.
 1959 District manager, Moline office
 1970 General sales manager, Cleveland
 1972 Vice president and general sales manager

Exhibit 8

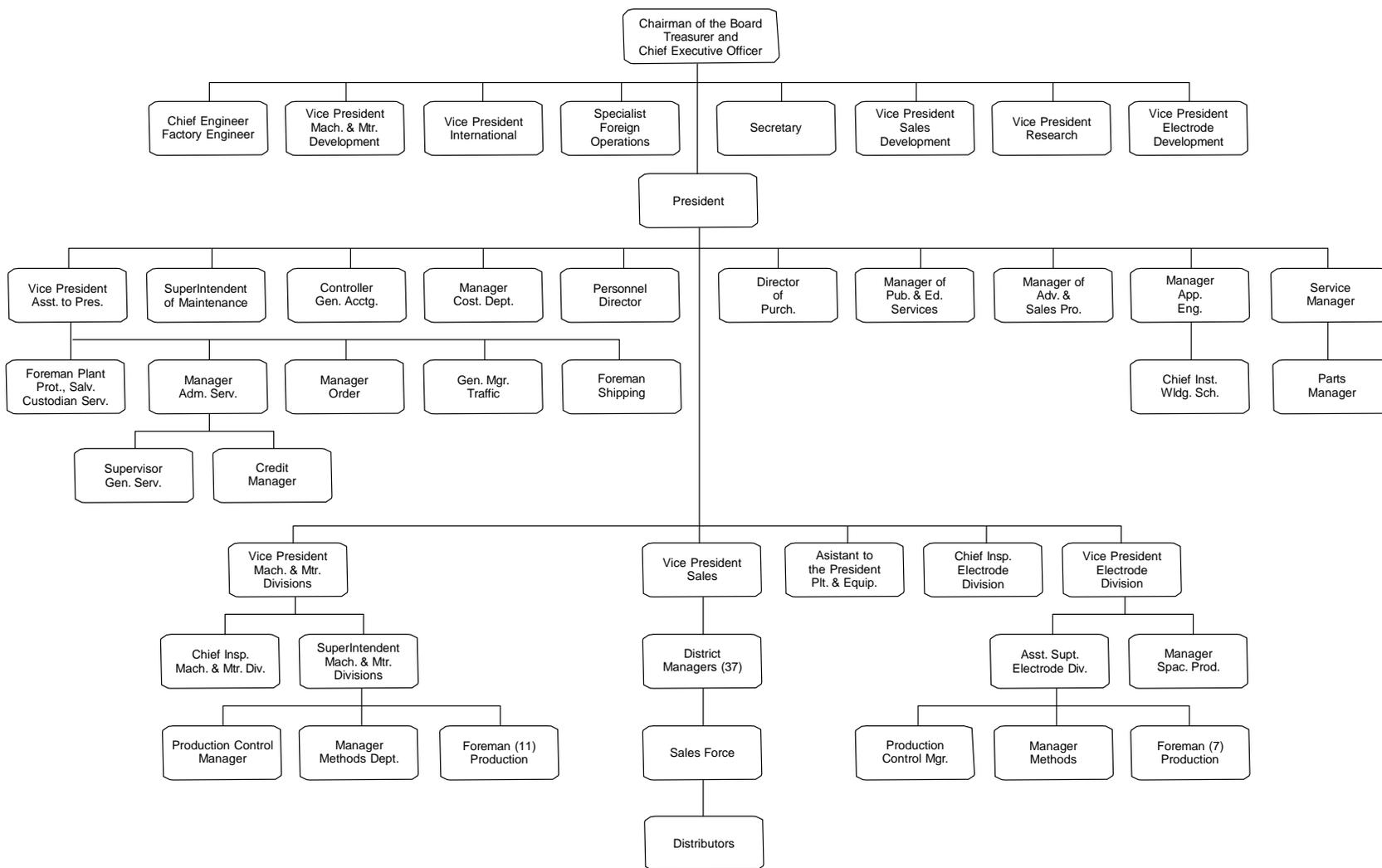


Exhibit 9 Lincoln Comment on the Case

After reading the 1975 Harvard case study, Richard S. Sabo, manager of publicity & educational services, sent the following letter to the casewriter:

July 31, 1975

To: Mr. Norman Fast

Dear Mr. Fast:

I believe that you have summarized the Incentive Management System of The Lincoln Electric Company very well; however, readers may feel that the success of the Company is due only to the psychological principles included in your presentation.

Please consider adding the efforts of our executives who devote a great deal of time to the following items that are so important to the consistent profit and long range growth of the Company.

I. Management has limited research, development and manufacturing to a standard product line designed to meet the major needs of the welding industry.

II. New products must be reviewed by manufacturing and all production costs verified before being approved by management.

III. Purchasing is challenged to not only procure materials at the lowest cost, but also to work closely with engineering and manufacturing to assure that the latest innovations are implemented.

IV. Manufacturing supervision and all personnel are held accountable for reduction of scrap, energy conservation, and maintenance of product quality.

V. Production control, material handling and methods engineering are closely supervised by top management.

VI. Material and finished goods inventory control, accurate cost accounting and attention to sales costs, credit and other financial areas have constantly reduced overhead and led to excellent profitability.

VII. Management has made cost reduction a way of life at Lincoln and definite programs are established in many areas, including traffic and shipping, where tremendous savings can result.

VIII. Management has established a sales department that is technically trained to reduce customer welding cost. This sales technique and other real customer services have eliminated non-essential frills and resulted in long term benefits to all concerned.

IX. Management has encouraged education, technical publishing and long range programs that have resulted in industry growth, thereby assuring market potential for The Lincoln Electric Company.

Richard S. Sabo

bjs