

QUALITY PAYS

The Story of Employee-Driven Continuous Improvement: : 26 Minutes

The Quality Factor:

The L-S Electro-Galvanizing Company electro-plates zinc to sheet steel for automotive applications. The electro-galvanizing line is a state-of-the-art operation using vertical cell, insoluble anode plating technology of Sumitomo Metal industries. The steel strip is run through a series of 20 plating cell tanks. These tanks hold insoluble anodes in a zinc electrolyte solution. Electrical and chemical forces cause the anodes to induce positively-charged zinc particles from the solution to bond onto the negatively-charged steel strip. By varying the running speed of the steel strip or the voltage of the electrical current, operators control the weight of zinc coated onto the steel.

As well as coating weight, there are several other key product attributes, for which the manufacturing process must control. These include rust traces, packaging characteristics, and most importantly, smoothness of the coated steel surface, particularly minimal scratches or dents. Any such defects would detract from the lustre of the painted exterior of door panels or roofs that auto manufacturers want for their vehicles.

L-SE's electro-galvanized steel is supplied to all major automotive manufacturers in Canada and the United States. L-SE is the main supplier to "transplants" such as Toyota. There are at least five major competitors for L-SE in North America, plus numerous competitors off-shore. So, clearly, L-SE operates within a global market.

The framework of this market is different now from what it was before the 1970's. Now, quality dominates over production levels. High productivity and large production volumes do not assure high profitability. Quality has a major impact on profitability and is now the limiting factor in the profit equation.

"The technology of electro-galvanizing is really common to the business.....What is going to make the difference to L-SE is how well we service our customer and the quality of product he receives."

**- Cal Tinsley,
Plant Manager, L-SE**

The system of quality management which L-SE uses for these demanding customers is LTV's Integrated Process Control System (IPC). However, what has allowed L-SE to maximize the results of IPC is the participative work system within which IPC has been developed through tremendous employee involvement.

"The key aspect of integrated process control systems is involvement of the workforce in developing the process standard and the key variables that have to be monitored.

"So, we needed for successful IPC implementation to have significant, high-level involvement of the total workforce."

**- Frank Altimore,
Vice-President, LTV Steel**

1992

Winner of USA Today QUALITY CUP:

“The most critical step in getting the organization keyed into quality is that from day one you get employees involved, and you give them the real authority for it...the real ownership for it. If you don't do that, you will have problems.”

**- Quentin Skrabec,
Manager, Quality Control, L-SE**

“Employees bought into IPC here because everyone was part of it. That is what's different here, compared to a place where things are forced upon you, and there's resistance...”

“Here, IPC has made us better...it's secured our jobs...that's one of my goals as union president.”

**- Tom Zidek,
President, Local 9126, U.S.W.A.**

The Rochester Institute of Technology and USA TODAY newspaper received over 400 applications for the 1992 Quality Cup. This is one of the most prestigious U.S. national awards for excellence in quality and a demonstrated ability for continuous improvement. A panel of academics and quality professionals conducted extensive interviews and worksite visits with award nominees. L-SE was noteworthy for having significantly reduced the costs from customer complaints—86% reduction since 1989—and improving output yields—the amount of finished steel derived from one ton of untreated steel—by over 50%.

“ So far, L-SE's employees-in-charge approach has worked. It has cut the costs from customer complaints - about everything from surface dimples to rust to packaging problems - from \$8 a ton in 1989 to \$1.09 a ton last year. That translated into savings of \$2.2 million last year - equal to 27.5% of L-SE's net income.”

**- USA Today
April 10, 1992**

“ This company is not really management-driven. Its success is being driven and executed on the line.”

**-John Evans,
Flagler School of
Business,
University of
North Carolina.
(One of 11 Judges
for the Quality Cup)**

Integrated Process Control (IPC):

Integrated Process Control (IPC) is a “hybrid” of a number of quality systems and philosophies using a total quality approach. In particular, it incorporates the Japanese approaches of total quality control and Kaizen into American operating and cultural systems. It was also constructed using the key points of consultants such as Deming, Crosby, Conway and Juran. The very heart of IPC is employee participation in all of the six steps. A review of each step is necessary to fully understand how employee involvement can aid the implementation of a quality operating system.

-Step 1

is the Training that is fundamental to implementation of an Integrated Process Control system. L-SE employees receive 2 weeks of statistical training, including all new hires. Training is done by external quality professionals and internal L-SE resources. However, this training is considered only a foundation. The continuous upgrade of statistical tools is included in L-SE’s pay-for-skills approach. A pay increase follows independent training and a final skills test.

-Step 2

identifies Key Input Variables (KIV’s) in the process that affect end-product characteristics/output variables (KOV’s). These key input variables are not the design engineer’s concepts, but must be identified by the workforce. This identification process is done in employee workshops. The employee workshops call in special resources such as engineers as technical questions arise. Finally, a detailed process control map is developed for each KOV (e.g. Rust).

-Step 3

requires that each key input variable be addressed in a process Standard. Again, employee workshops are used to develop these standards so that ownership is maintained. Development of standards by employee participation is fundamental to IPC.

The employees enlist outside resources as needed in the development of process standards. A Process Standard indicates What is to be controlled, Who is responsible for this control, Why is control needed, and What procedures are required to hold a process in control.

-Step 4

is the critical Communication step of the IPC system. At L-SE, handbooks are developed for all Process Standards. These handbooks are used at the employee training sessions to review and to update all standards.

-Step 5

is a combination of Monitoring compliance to process standards and more classic statistical tools, such as control charts. Employees at every operating work station and in each maintenance function have key input variables which they monitor one or more times each operating shift. Employees enter the corresponding data into the computer at their work station. From this data-base, they are now able to conduct longer-term trend analysis of key variables.

-Step 6

is the Problem-Solving or Continuous Improvement step in IPC. Participation of everyone throughout the process is vital to diagnosing problems with variables out-of-control, or to meet objectives like a two-percent yield improvement. This step also closes the quality chain of supplier-processor-customer. Employee involvement with customers and suppliers provides information and cooperation for improving inputs to the manufacturing process and direct feedback on how well the product meets customer needs.

IPC Workshops:

Once every 5 weeks, from noon Friday to the start of afternoon shift, each crew holds an IPC workshop for approximately 3 hours. Attendance is voluntary, although most people including the crew's Process Coordinator are present for most workshops. A light lunch is served, and participants are paid at overtime rates. The workshop is led by the Quality Control Manager, the (hourly) Chairman of the IPC Committee, or the Maintenance Manager.

Initially, IPC workshops were devoted to determining key input variables and then, writing process standards. Over a five year cycle, it has come to where 50% of the workshop is devoted to Diagnostics (Step 6). What began as a vehicle for Education and System Design has become one of the primary avenues for employee participation in Problem-Solving quality issues. It has also remained an opportunity to share information about customer feedback or updates to process standards.

"The IPC workshops have helped us alot. We talk about problems which customers are having....and it keeps you aware of what to look for on-the-job. There's also alot of problem-solving through IPC. It keeps everybody on the same path."

**- Diane Scott,
Process Technician, L-SE**

"It provides a feedback from the individual crews back to Maintenance Manager or the Quality Control Manager. It's an opportunity for people with more experience to share their experience with younger employees, but also enables alot of communication that may not go through the regular channels."

**- Barry Oiler,
Process Coordinator, L-SE**

"The workshop is important when standards do change.

"The system is dynamic. They change from customer changes as well as internal technological changes..."

"The bigger phase now is customer satisfaction. Communication to the employees of what's going on with the customer, and how we can tie those problems back into our IPC system.

"IPC is a long-term proposition...It can't be a program. It's continuous improvement."

**- Quentin Skrabec,
Manager, Quality Control, L-SE**

Customer/Supplier Employee Teams:

"We actively send employees to customers any time there's any problem whatsoever. We foster getting employees involved with our customers as well as with our suppliers in diagnostics. This is fed back into IPC to improve standards."

**- Quentin Skrabec,
Manager, Quality Control, L-SE**

A wide array of employee teams has been formed to achieve excellence in the product.

-Supplier Continuous Improvement Teams have been set up with L-SE employees to address incoming quality and service.

-AD HOC Problem-Solving Teams handle customer concerns as they occur and actively address them with employee problem-solving teams. Teams are assembled on a volunteer basis and visits are made to the customer in need. The average life of a team may only be a few weeks, but problem resolution is the determinant.

-Customer Concern Team is a set group of L-SE employees that has been formed to review and recommend corrective action based on monthly customer surveys. The CCT is usually organized in association with a specific L-SE customer, such as GM Lordstown.

"We help to identify cost savings, streamlining the process, making changes and communicating those changes to other employees..."

"One example is a time-saving step. If the customer gets a coil and he puts it into his machine the wrong way, it's a delay...so, he loses productivity. The simple change that we took care of here was just identifying which way the lap of the coil goes when we package it. We put an arrow on the coil showing them which way to load it. The time-saving factor paid off substantially."

**- Mark Wirtz,
Process Technician, L-SE**

Customer Concern Team (CCT):

The CCT becomes a "manager" and coordinator by analyzing and monitoring customer inputs and then, directing corrective action, employee communication, and the development of process standards. The CCT replaces many of the functions traditionally done by a Quality Control Department.

Customer Surveys cover total satisfaction, service and packaging on a 0 to 10 scale. The CCT summarizes this data and reviews them monthly at a full team meeting. In addition, every employee gets a full package of each customer survey, to be reviewed at the regular IPC workshops.

Product Quality Coordinator (PQC) is an L-SE union employee assigned to visit each major customer monthly and review problems. These PQC's talk to both management and on-the-floor employees to maximize quality feedback. In many cases, the PQC serves on a joint L-SE/Customer continuous improvement team.

Customer Visits are encouraged to review specific problems or to upgrade employee understanding of the customer. These visits supply critical feedback.

Service Engineers are assigned to every customer. Every month the engineer attends a CCT meeting to review control charts of rejections and trend analysis of problems.

Complaint Analysis was always in place, but the role of the CCT is to prioritize these by customer and initiate corrective action.

Development of Process Standards is one technique used by a CCT. If a customer problem can be related to the process, then the key input variables must be identified and standards written to control the variable. The CCT directs and monitors resources applied to this problem, tracking progress towards a more satisfied customer.

Special Action Plans are real road maps to problem-solving. Depending upon the problem or opportunity, the CCT directs the proper resources for resolution. For example, a service problem would be analyzed by the relevant CCT and presented to the management area as required to correct it.

Communication to Employees is a major role of the CCT. Every possible form of communication is utilized—monthly all employee/team meetings, IPC workshops, daily “face” meetings, electronic message boards, bulletin boards, defect display cases and written reports to employees who all have their own mailboxes.

“What you need to do is understand the customer and why he’s always right. Some people go by the principle that the customer is right and employees become very frustrated. They don’t believe that anybody is always right. The way to overcome that is to get the employees involved in understanding the customer. Then, it becomes natural.”

**- Quentin Skrabec,
Manager, Quality Control, L-SE**

“When we think we have a quality problem, we get it corrected right away. The old philosophy was if the company hasn’t had a claim on its product, let it go,...kind of fester until the customer says, hey, we can’t take this any more.”

**- Rich Harrell
Process Technician, L-SE**

Basic Foundation For Employee-Driven TQM:

Beyond employee involvement in the specifics of IPC itself, L-SE benefits from aspects of its total participative work system that reinforce attention to quality. Some would say that IPC could not succeed without a participative work system.

“In the past 10 years of IPC and 8 years of L-SE, the evidence is mounting that participative systems do provide, on a day-to-day basis, the kind of continuous improvement, the kind of enlightenment of both the management and the workforce. The whole system could not function independent of a participative work system.”

**- Frank Altimore,
Vice-President, L-SE**

A New Role for Inspection

is key for successful TQM. At L-SE, all employees work all job functions, that is, an operator one day, might be an inspector the next day. This rotation exists instead of a stable inspection workforce. The role change for inspection brings many advantages and challenges. The main advantage is that the inspector moves from sort inspection to a process diagnostic role as well, since (s)he is trained in both functions.

The inspector is now an active part of the problem-solving team in all phases since (s)he blends defect identification with process root causes. The challenge, of course, is that customer problems, concerns, specifications must be communicated actively to the whole workforce instead of only Quality Control and inspection people. Although this is an added burden to the managers, the benefits of a fully dedicated customer-oriented workforce are many.

Employee Involvement in all Phases of the Business.

Many avenues are used to achieve this at L-SE—IPC workshops, the monthly all employee/Team meeting, Customer Concern Teams, Pay for Skills including participation in IPC activities, and indeed, the IPC Committee of employees that administers the whole IPC system.

A New Role for Quality Control Managers.

Moving to a quality control system that is employee owned and driven clearly changes the role of the Quality Control Manager. The Quality Control Manager must become a leader, facilitator of problem-solving and a key communicator of customer concerns to all employees.

The Quality Control Manager no longer manages a department. At L-SE, the quality system known as Integrated Process Control is managed, designed, implemented and monitored by an employee committee, the IPC Committee, of which the Quality Control Manager is a member and major resource. This system allows for total employee ownership as well as accountability and responsibility for the quality effort.

Employee Gain Sharing on Customer Satisfaction.

Another keystone of getting all employees involved in customer satisfaction is to set specific quality-related goals for the gain sharing plan. At L-SE, the number of customer complaints was targeted for improvement in the employee gain sharing goals. This, of course, is a team goal that if achieved, means all employees share in financial rewards.

Rationale For Gain Sharing:

The L-SE/USWA collective agreement provides that L-SE employees can achieve gain sharing equivalent to a maximum payout of 25% of their eligible earnings. Thus, every 6 months the employee-management Gain Sharing Committee sets goals for company and employee gains. The objective is to set goals which contain genuine “gain” and which will reward employees as well as the company for achieving mutual gains.

Customarily, gain sharing programs focus on output variables. However, the in-process variables are those over which employees have the most control. These in-process variables are the primary focus of gain sharing at L-SE. For example, a recent 6-month gain sharing period allotted up to 10% of earnings to a goal for improved Prime Yield, another 10% for improved results in the Customer Satisfaction Index, and potentially 5% of earnings for improved productivity in Prime Tons Per Hour.

“Gain Sharing is important...Depending upon what percentage we meet those goals, we get a percentage of extra pay.....It gives us something to shoot for.

“It’s something we can control...That’s why people invest so much in it.”

**- Ed Yonchak
Process Technician, L-SE**

“You might look at that as paying for quality but it really isn’t. Gain Sharing really pays in that employees own the system. They own the output. It fosters everybody....

It’s a team reward versus an individual reward. That’s just reinforced in the paycheck.”

**- Quentin Skrabec,
Manager, Quality Control, L-SE**

Since start-up in 1986, L-SE employees have earned the maximum 25% payout during half of the 6-month gain sharing periods. Moreover, their actual performance has often exceeded the targets set for maximum payout.

“Quality did pay tremendously (for the company). During the 5-year improvement of claim costs coming down...and they came down to that zero world-class mark in 1991, productivity also increased dramatically. Internal scrap was reduced.

It wasn't just an inspection effort. It was true process improvement....

We're talking millions of dollars a year.”

- Quentin Skrabec,
Manager, Quality Control, L-SE

1989-1990 Gain Sharing Goals - SPC/IPC Implementation

1. IPC Standard Handbook And Training

as noted through employee workshops, standards on key input variables were developed. As gain sharing goals, the publishing of these in employee handbooks and the training on these books was set. This goal required a full team effort of putting these standards into a form that would allow monitoring and training. To reach the goal of seven control area handbooks took a great deal of employee effort and overtime.

2. Use of Control Charts

After a year of SPC training, a clear goal in 1989 was to implement these tools for process improvement. The IPC Committee identified seven areas in the process that required manual control charting. The IPC Committee proposed and jointly developed the goal of seven working control charts with the Gain Sharing Committee. Again, it was a team goal requiring re-training and focus of all team members to maintain control charting.

3. The Use of Computers in SPC

In 1989, another goal was to start the implementation of the use of process control computers. the ultimate goal was to have statistical data and compliance to process standards input by each crew every turn. Two phases of implementation were identified to achieve this goal by the end of 1990.

Clearly, the major hurdle was the training of all employees in the use of L-SE's statistical software known as Model 204. In Phase 1, the gain sharing goal was that every L-SE employee receive 8 hours of training in the Model 204 statistical program. Again, this was approached as a team goal. Crew coordinators were trained first and then, they in turn trained their fellow workers.

With general training completed by the team, usage goals were set by the Gain Sharing committee. Again, seven process control areas were identified for input of statistical data. The first 6 months of 1990 were focused on goals of 95% input in the seven key areas by each crew. Again, the crew IPC coordinators were key to on-the-job input training and data collection. This 6-month effort was highly successful in building a statistical base to analyze and improve the process standards.

4. Compliance to Standards,

with SPC diagnostic tools are the force of the IPC system. By June, 1990, L-SE employees had progressed through the first four steps of IPC, and were on steps 5 and 6. Again, Gain Sharing and IPC Committees set goals now focusing on step 5 — compliance to standards. Compliance to process standards offered major quality gains to the company. Including compliance to standards as part of gain sharing focused the team on quality improvement, standard review, and finally diagnostics to achieve high compliance.