

## **SUPPLIER QUALITY**

**Dr. H. J. Bajaria**  
**Multiface, Inc.**  
**Garden City, Michigan 48135**

### **ABSTRACT**

During the quality improvement movement of the 1980s, the idea of a reduced supplier base emerged as a means to keep only the fittest in business. The intention was to weed out the weak. Implementation of this idea, however, has not accomplished what was intended. Like many other improvement ideas that lack focus, this supplier-quality strategy failed in determining the fittest.

OEMs created extensive, costly guidelines for evaluating suppliers, keeping the suppliers busy attending seminars to understand the new rules of the game. In general, suppliers fell into the trap of merely rearranging their paperwork to show compliance to these rules. The presentation of plaques to suppliers who complied created a false front because, all the while, real improvement opportunities went begging. Too many suppliers unfortunately concluded that compliance was a public relations effort, rather than viewing it as an opportunity to make fundamental changes in how they conduct business with the OEMs.

The present supplier-quality strategy has bred four negatives: (1) incompetence in the supplier evaluation process, (2) costly window dressing by suppliers, (3) nonstrategic supplier activities, and (4) a false sense of confidence in suppliers. The failure of this strategy is evident by the growing number of foreign suppliers establishing manufacturing operations in the U.S.

The time is overdue to examine the basic assumptions underlying the present supplier-quality strategy and, in turn, propose ideas to redirect that strategy for more positive, profitable results. This paper suggests a change based on the true performance of the suppliers, instead of the subjective supplier evaluation currently used. A win-win strategy between suppliers and OEMs is the goal, eliminating all the negatives of the present system. With a redirected strategy, suppliers can be positively motivated as well as sufficiently pressured to avoid any potential shortcuts in their attention to quality.

### **INTRODUCTION**

The supplier quality issue took hold when a noted expert at an automotive OEM meeting declared he "would not do business with suppliers who do not use statistical methods" in response to the question "What do you do with 2000 suppliers?" It was 1981. Supplier quality assurance (SQA) personnel, particularly at automotive OEMs, were very excited with new possibilities for improving supplier quality. SQA activities quickly translated the expert's message into a new way to exercise administrative control over their suppliers. Supplier quality management personnel translated the expert's technical message into on-line statistical process control (SPC). The expert, however, had neither directly prescribed such control nor offered any strategic guidance for it. Regardless, top management at OEMs went along with the control idea. It was the beginning of a bad translation.

Some eight years later, it is a fact that the supplier (upstream) control model has not worked. Cosmetic versions of the model, however, give the impression that it has worked. Suppliers have collected plaques for the excellent demonstration of on-line SPC. Gages, software, data collection hardware and computers have been bought to increase the visibility of supplier charting. As far as any true progress in quality improvement, the jury is still out. In fact, there is strong evidence of economic damage due to use of SPC as translated by the OEMs. There is also supporting evidence that SQA execution of corporate quality policies is directly responsible for this damage. In other words, the supplier control policy has fizzled<sup>(1)</sup>.

Japanese competition gave impetus to U.S. quality efforts, particularly SPC. After spending over eight billion dollars to improve the quality of American products and services, the U.S. is unable to put a dent in the Japanese competition. Japanese presence in American markets has grown stronger. The number of transplants and Japanese parts suppliers in the U.S. is steadily increasing.

In the last ten years approximately 100 million American cars were sold. If their quality truly improved, then there are 100 million satisfied customers, bragging about their cars to their neighbors. Then why are American automakers still advertising quality in the media? Some Japanese cars bring prices considerably higher than their sticker price. How many American car models can make this claim?

Unless the underlying issues of supplier quality evaluation are openly examined, OEMs and suppliers are both likely to suffer significant setbacks and eventually go out of business. It is further alarming that other industries such as aerospace, appliance, and chemical as well as government agencies have copied the automotive supplier control model. At the same time, nobody is solving the inherent problems associated with products, processes services, and administrative mechanisms.

## **PRESENT THRUST OF SUPPLIER QUALITY PROGRAMS**

To reduce the cost burden on their product, the Big Three continue to place heavy emphasis on quality improvement as one of their strategies. Specifically, their quality strategies are designed to increase control of their suppliers. New quality requirements must be complied with as a condition of conducting business with the automakers. These strategies are supposed to be win-win for all participants because the elimination of waste is beneficial for all. While the intent is commendable, the specifics of supplier quality strategies are questionable.

First of all, the strategies assume both sides have equal interest and power in accomplishing quality goals. A partnership is what the strategies seeks. The approach is flawed, however, by specifying the achievement of utopia as a condition of doing business. A true partnership would seek an improvement path compatible with the supplier's technology and would then measure progress along that path.

Even if the current supplier quality strategies were acceptable, it has these serious philosophical flaws:

(1) Power is heavily on the side of the customer. All quality improvement requirements are determined with practically no input from suppliers.

(2) Every quality improvement element mandated for suppliers is either absent or only cosmetically present at OEM locations.

(3) On-line SPC is required. Off-line problem solving using control charts for problem definition was never considered. Figure 1 illustrates the distinction between these two uses of SPC. It is almost impossible to execute the on-line control loop due to difficulties in understanding charts on a real-time basis. Further, some process corrections cannot be made instantaneously because they require significant modifications to existing process hardware.

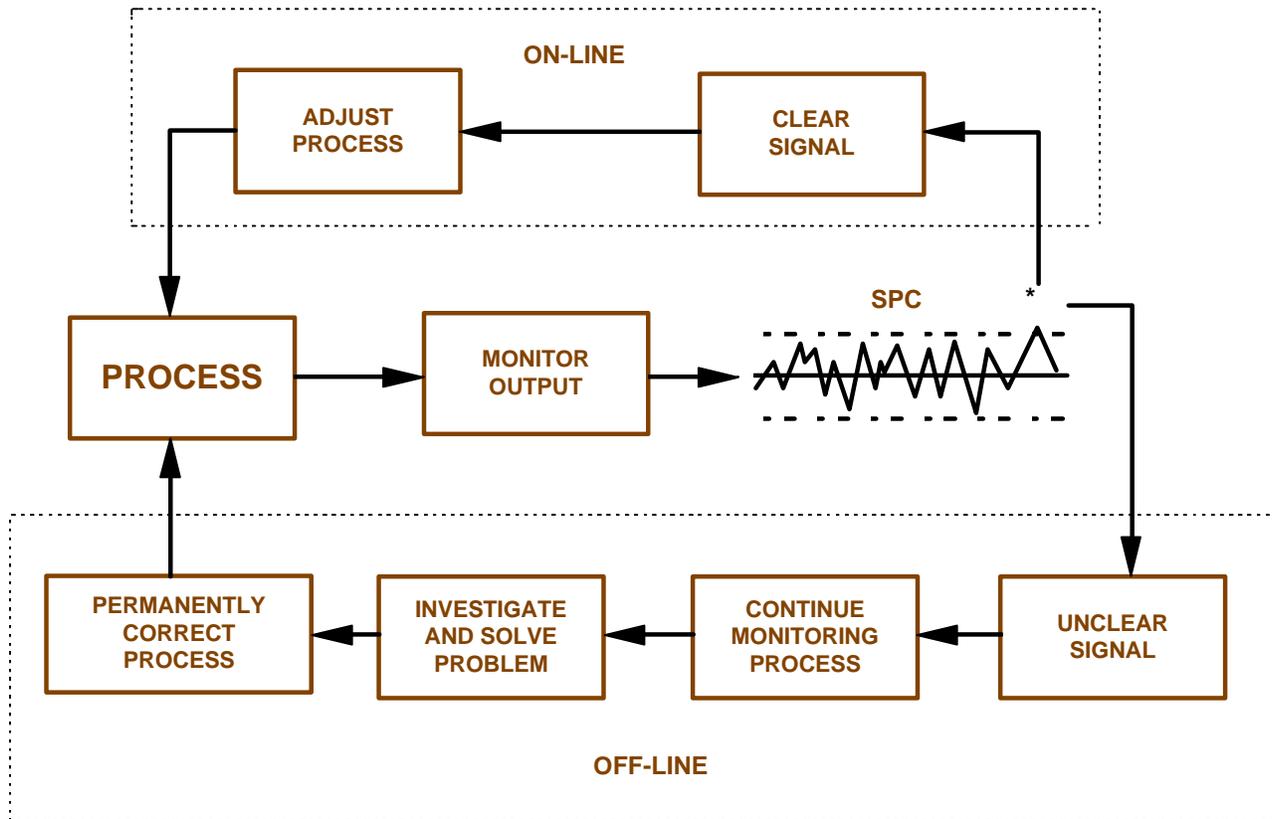


Figure 1 - Difference Between On-line SPC and Off-line Problem Solving

(4) Evidence of Taguchi studies at supplier locations is often demanded. Taguchi advocates robustness at downstream operations, meaning the customer should first consider how natural variation coming from the supplier can be accommodated. The OEMs, however, do not appear willing to look at their own processes first.

(5) Continuous education in quality improvement is advocated. The emphasis, however, is on quality improvement gurus rather than quality improvement opportunities.

## THE FOUR NEGATIVES OF IMPROVING SUPPLIER QUALITY

1. Incompetence in the Supplier Evaluation Process - The supplier evaluation process works from the assumption that suppliers have no knowledge of quality and evaluators know it all. In fact, evaluators are minimally trained in SPC and design of experiments and therefore are not able to guide suppliers. They are directed to look for conformance to rigid quality procedures, rather than evaluating how successful suppliers are at resolving inherent problems.

All supplier evaluation models are designed with the **customer's administrative convenience** as the focus rather than the **supplier's technology improvement**. Further, evaluation procedures are insensitive to the size of a supplier organization.

The supplier evaluation process has no realistic point of reference. Improvement procedures being evaluated are not even successfully practiced in customer companies. When SQA personnel are confronted with questions about their own improvement activities, they imply what the customer does is independent of what the supplier should be doing.

Suppliers have several choices in facing these issues. They can be truthful about their quality improvement status and suffer the consequences of their honesty. Or, they can cosmeticize their presentation of reality and thereby satisfy the auditor. Or, they can simply stop doing business with the customer. Suppliers have generally found the middle of the road is the best business option. Evaluators are either not smart enough to recognize they are being fooled, or the customer's management has chosen to ignore the issue.

2. Costly Window Dressing by Suppliers - Suppliers are posting control charts wherever customers want the charts to be. In many instances charts are falsified by suppliers to make it appear a process is under control when, in fact, actual out-of-control conditions are not plotted. Suppliers further jeopardize their position because when they remove out-of-control conditions from the charts, operators begin to think they are not supposed to plot out-of-control conditions. Consider these examples of falsification:

(a) The process output during set up shows more out-of-control points than during the run. The supplier chooses to plot only during the run.

(b) The initial and final portions of a lot of material show out-of-control conditions, while the in-between portion shows an in-control condition. The supplier chooses to plot only the in-control portion.

(c) An out-of-control output condition prompts a series of actions to bring the process under control, but the operators only plot the final outcome. Neither the out-of-control point that prompted action nor the points that followed because of a series of corrective actions are plotted.

(d) If one or two parts in a subgroup are found to be grossly out-of-control, they are set aside and replaced with other parts that are in control.

(e) Operators simply pencil whip charts at the end of the day, assigning no meaning whatsoever to

charting activities.

(f) Suppliers have hired one or two persons to cosmeticize the documentation just to qualify for quality awards.

(g) Some charts are made up only three or four days prior to an auditor's visit.

(h) Software programs are used that can give authenticity and credibility to the data being presented when, in fact, out-of-control points are easily suppressed.

These examples point up the costly charade that has resulted from current supplier quality programs.

3. Nonstrategic Supplier Improvement Activities - Suppliers were not given a chance to form their own strategies for improvement. Instead, the OEMs insisted their own strategies be instituted. This insistence created nonstrategic activity for many suppliers. Consider these examples:

(a) The OEMs wanted everyone in their supplier organizations to be trained. Training is a strategic issue. How to train, who to train, how much to train, what to train in, what training source to use are questions demanding strategic answers. Instead, OEMs insisted on defining all these elements. Some even went so far as to create their own profitable training organizations by forcing suppliers to attend their classes. It is further alarming that many people who have never participated in the improvement process nor possess effective teaching skills have been turned into trainers.

(b) OEMs pressured suppliers to invest large sums in improvement programs--including training and updating gages. They assumed a 20% or greater return. The rate of investment, however, exceeded the rate of improvement, violating a fundamental principle of improvement. **Quality improves productivity.** A \$10.00 investment should bring \$12.00 back. The \$2.00 gain can be reinvested to bring yet bigger rewards. Thus, starting with a modest investment, **incremental** improvements are realized.

(c) OEMs wanted control charts everywhere. Suppliers were not allowed to decide on the strategic placement of charts in their own plants.

(d) OEMs insisted that all product characteristics be charted, rather than only those that can signal out-of-control process conditions.

(e) OEMs rigidly insisted that process control can be demonstrated only by the presence of control charts and by no other means. Suppliers saw standard operating procedures (SOPs) and hardware controls as other means of controlling their processes. They wanted to use SPC for strategic guidance in improving their processes, without necessarily keeping permanent control charts.

(f) OEMs stressed simple on-line SPC, or situations with easily understood instability and the means to control it. There are actually three other situations to understand, as illustrated in Figure 2.

|                                 |   |  |
|---------------------------------|---|--|
|                                 | Easy to understand instability          | Difficult to understand instability or incapable process |
| Presence of adjustable controls | Opportunity 1<br>Needs on-line SPC      | Opportunity 3<br>Needs on-line SPC                       |
| Absence of adjustable controls  | Opportunity 2<br>Needs on-line SPC + \$ | Opportunity 4<br>Needs on-line SPC + \$                  |

Figure 2 - Four Improvement Opportunities

Typical SQA activities evaluate only Opportunity 1. In the author's experience, this represents less than 1% of all the problems to be solved<sup>(2)</sup>. Supplier evaluations neither recognize Opportunities 2, 3 and 4 nor are designed to handle them.

(g) OEMs insisted that capability indexes such as Potential Capability Index ( $C_p$ ), Actual Capability Index ( $C_{pk}$ ), and Capability Ratio ( $cr$ ) be reported on the product's variable characteristics even when most of the defects were attribute related. Strategically, this does not make sense.

(h) OEMs forced the measurement of characteristics that needed no measuring. Suppliers ended up buying expensive instruments that had no direct relationship to process control or problem solving or product quality improvement.

4. A False Sense of Supplier Confidence - Suppliers who get quality awards from their customers think they have truly improved. Their employees believe whatever they are doing is of world-class quality. Plaques adorning the lobby are a constant reminder of their supposed excellence. These suppliers then become sluggish about real improvement efforts.

Suppliers also think they will get more business as a result of receiving quality awards. This is not true 100% of the time. Receiving awards becomes the minimum criteria for continuing business rather than getting more business, thus demoralizing the supplier workforce.

### **WIN-WIN STRATEGY TO IMPROVE SUPPLIER QUALITY**

A win-win strategy must have simultaneous partnership and pressure elements. A true partnership creates the motivation to improve. Pressure keeps both sides from taking shortcuts. A win-win philosophy would eliminate the four negatives of current supplier quality programs as discussed above.

Table 1 identifies the elements of a win-win strategy for improving supplier quality. Each element is described as creating partnership, exerting pressure, or both. Each element also works to eliminate one or more of the four negatives.

Table 1 - Elements of Proposed Win-win Strategy

| No. | Elements  | Partnership | Pressure | Incompetence | Window dressing | Nonstrategic efforts | False sense of confidence |
|-----|---|-------------|----------|--------------|-----------------|----------------------|---------------------------|
| 1   | Convert basic philosophy of improvement from on-line control to off-line problem-solving.   |             |          |              | x               | x                    |                           |
| 2   | Judge on actual supplier performance versus supplier audits.                                |             | x        |              |                 |                      | x                         |
| 3   | Discuss supplier quality deficiency with production superintendent and not quality manager. |             | x        |              |                 |                      | x                         |
| 4   | When the defects are not obvious, perform experiments common to customer and supplier.      | X           |          | x            |                 | x                    |                           |
| 5   | When the defects are obvious, make that experience as painful as possible for the supplier. |             | x        |              |                 |                      | x                         |
| 6   | Assign SQA personnel to supplier plants for resolving problems.                             | X           |          | x            |                 | x                    |                           |
| 7   | Assist in resolving tolerance conflicts between design engineers and plants.                | X           | x        | x            |                 | x                    |                           |
| 8   | Encourage an open forum among presidents to discuss OEM/Supplier quality issues.            | X           | x        | x            |                 | x                    |                           |
| 9   | Tie purchasing management bonus to supplier quality performance.                            |             | x        | x            |                 |                      |                           |
| 10  | Supplier plant manager and operators should explain QC control plan to the customer.        |             | x        | x            | x               | x                    | x                         |
| 11  | Assign each customer trainer to solve at least one major problem at supplier location.      | x           | x        | x            |                 | x                    |                           |

**SUMMARY**

What have we done to ourselves? The automotive industry wanted to teach quality improvement to everyone so that it could be integrated into all tasks performed. Even though the intent was noble, execution was delegated to SQA activities in the organization. As a result, the industry has created confusion in its supplier base.

What has happened is very precarious. Suppliers are losing their shirts on entertaining SQA personnel while true improvements go begging. Evaluation sites are chosen because of their interesting locations rather than due to a strategic need for a particular product improvement. For example, west coast suppliers are flocked by evaluators in January and February.

Further, many SQA personnel have interpreted company policies inconsistently. They have changed their interpretations from time to time and from person to person. Then they have cut off any possible path for suppliers to complain about unfair evaluation practices to their customer's purchasing management or top management. In fact, the customer's top management is shielded from the true picture.

Supplier confusion begins with unrealistic design tolerances. And yet, almost no effort is made to improve the science of tolerancing. Equally incredible are the process capability indexes based on those unrealistic tolerances. In spite of massive training, most operator action is still oriented to specifications rather than target and control limits

The issue of evaluating supplier quality is truly worrisome. The observations in this paper are based on invited visits to hundreds of plants over the past 12 years. The author has witnessed first hand how suppliers keep guessing what their true requirements are rather than formulating workable improvement strategies for their companies.

The elements of a win-win strategy identified in this paper offer some turnaround possibilities. It is expected they will be disputed initially. To carefully consider them, however, will likely test how serious the Big Three and their supplier base are about quality improvement.

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