Abstract. Those familiar with quality control gurus will recognize Genichi Taguchi, who is famous for his Quality Loss Function. He argued that any deviation from perfect quality results in a loss to society from misused materials, wasted labor and other losses. Taking that same logic, we can suggest that all costs in excess of a perfect transaction are the costs of supplier (and perhaps buyer) failures. These costs should be measured in monetary terms and should draw attention to process improvement, cost recovery and cost prevention.

Introduction. In most organizations, the focus of supply management performance is cost reduction. Indeed, many supply professionals have as their primary performance measure, the cost savings they generate. More enlightened organizations include measures of cost avoidance. The primary focus of all of these reductions tends to be on prices paid for the goods and services the organizations acquire. However, there are several other categories of cost that are worthy of consideration and evaluation in a total cost model, such as inventory carrying costs, administrative costs, and logistical costs.

There is another category of cost that is rarely recognized nor formally evaluated, but is nonetheless, as important as any of the costs noted above. That is the cost of process failures, either by buyers or suppliers. The follow-on notion is that, if an organization were to begin to enumerate those process failure costs, then it offers an opportunity to begin recovery. While most suppliers genuinely try to satisfy customers, some are continual problems. The 80/20 rule applies, where 80 percent of supplier problems are usually caused by 20 percent of the supply base. It is from those that recovery efforts should be concentrated, yet these cost recovery efforts are rarely exercised. If major retailers charge suppliers for late deliveries, invoice errors or other shortcomings, why should industrial and institutional organizations not do the same?

Buyers do not penalize suppliers when they attempt to recover costs incurred as the result of suppliers’ failures. Such recoveries are compensation for damages suffered as a consequence of supplier failure, in one form or another. Indeed the Uniform Commercial Code contains provisions for just such recovery. When suppliers fail to deliver on time, and buyers are forced to buy outside of the contract, the UCC enables buyers to recover the ‘cost to cover’ (UCC 2-712).¹ Buyers are entitled to recover from suppliers, the difference between the contract price and what was paid in the spot market to secure goods to cover supplier’s failure to deliver.

Furthermore, the UCC also allows buyers to recover damages that are incidental or consequential to supplier’s breach of contract. Such expenses include inspection, receiving, transportation and care for goods rightfully rejected, and any other reasonable expenses incident to the delay or other breach (UCC 2-715). The question is whether organizations routinely pursue those cost recoveries.

When organizations plan and budget for purchases and projects, costs of supplier failures are typically not included. Unfortunately, these situations frequently result in cost overruns, costly delays or both. Examples include late deliveries, back orders, quality rejects, and incorrect invoices. Equally problematic are an organization’s internal failures, such as incomplete specifications, receiving errors, poor forecasting and rush orders, since they likewise result in increased costs or delays. This session will demonstrate a tool to capture and display these extra cost events, as well as illustrate methods to quantify common failures.

**Supplier Failures.** Common supplier failures may be defined in two categories – quality failures and failures of timing. Quality failures may result in additional costs to the buying firm for such activities as product review, rejections, returns, expediting, reordering, rereceiving and reinspection. If quality failures are not discovered until the goods are in production, downtime, and rework may result. Costs associated with having to address quality problems after products are in the hands of customers are significantly greater and may include returns, warranty repair or replacement, liquidated damages and order cancellation. Failures of timing typically come in the form of late deliveries, back orders, variable lead times and incorrect shipments. Results may include production shutdowns, late deliveries to customers, and increased inventories. With a bit of effort, these actual costs may be identified and quantified. Holding suppliers responsible for their transgressions accomplishes two things; first, it recovers some of the costs incurred, and second, it provides incentive for suppliers to vigorously pursue process improvements to avoid future costs.

**Impacts on Inventory.** Many of the supplier failures enumerated above have an influence on inventory levels, safety stock and inventory carrying cost. In one instance, a firm’s suppliers had wildly variable lead times. In fact, the standard deviation of lead-time frequently was several multiples of the actual lead-time. The result was that the firm experienced significant stockouts while at the same time, it saw its inventory investment grow. One of the elements of a safety stock calculation is lead-time. It is relatively straightforward to calculate the additional safety stock required to protect against this variability. Supply professionals should strive for commitments of stable lead times from suppliers, and continually work with them to reduce lead times. Persistent late deliveries, back orders and quality failures all demand significant increases in inventory investment in the form of extra safety stock to enable the firm to meet its customer commitments.

**Other Considerations.** Many organizations favor FOB Destination terms with their suppliers. Ownership is retained with the supplier until delivery to the buyer. Consequently, the supplier is responsible for pursuing freight claims for loss or damage. However, if the goods are damaged in transit, the result is the same as a late shipment, with additional costs associated with notifying the supplier, expediting, storing the goods until the supplier and carrier resolve

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disposition, rereceiving and reinspection. Since the supplier is responsible for carrier selection, and is contractually bound to deliver the goods at the required place and time, the supplier is equally responsible for disruption and costs associated with failure to do so. These costs are both quantifiable and recoverable.

At times, failed materials are replaced under warranty. While this offsets the cost of the material, it does not address the costs associated with removing the failed part and replacing it. As an example, a utility must replace a transformer that failed under warranty. The supplier readily provides a replacement unit, but what does it cost to send a line crew many miles to climb the pole and replace the failed unit? A few utilities are now asking suppliers to share in the replacement cost in these situations.

In all of these cases, supplier failures result in significant additional real costs to the buying organization. In a study of construction quality failures, it was determined that that between 16 and 23 percent of the entire project costs could be attributed to various quality failures, both large and small.\(^3\) While admittedly this study covered only two construction projects in the UK, it suggests that failures may represent a significant portion of the cost of many projects, and are certainly worthy of examination, quantification and recovery.

**Determining Costs of Failure.** Many organizations routinely track supplier performance, at least to the level of on-time delivery and quality. If a firm does not, perhaps the notion of recovering costs of supplier failures would provide motivation to begin. This is the first necessary step, followed by the calculation of the cost of the incident. Undoubtedly, the methodology and difficulty of calculating the amount of damage will be raised in negotiation with suppliers. As a solution, we may apply the principle of liquidated damages to negotiated rates for failures. Liquidated damages are allowed under the UCC (2-718) where “the difficulties of proof of loss, and the inconvenience or nonfeasability of otherwise obtaining an adequate remedy,” exist.\(^4\) In other words, where it may be difficult to quantify actual damage suffered by supplier failure, a negotiated approximation may be substituted. The amount must be reasonable, however. Unreasonably large amounts are deemed penalties and are void. Recovery of damage is always allowed, but buyers are never allowed to penalize suppliers; only recover the amount of damage.

**Turnabout.** Without doubt, if buying organizations expect to recover costs associated with supplier failures, suppliers may ask the same from buyers. For example, any time the buyer places an order inside the supplier’s normal lead-time, it might be classified as ‘rush’. Clearly, such orders cause suppliers to alter their normal processes and thus incur extra costs. It would be reasonable for suppliers to ask for compensation for those added costs, but it would also point out to the buying organization the need for an evaluation of the internal processes that resulted in the rush orders.

Typically, both buyers and suppliers are aware that their processes fail on occasion. It is too easy just to say that, since it happens on both sides, everything will eventually balance out.

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This approach, while it requires no additional effort, provides neither a formal recognition of the failures nor does it offer motivation for either side to improve. The ultimate idea is for both buyer and supplier to examine their processes and the way they interact so that the total cost of doing business together might be minimized for both. In one example, a manufacturing firm and its long-standing LTL carrier spent several days in a value stream mapping exercise. They evaluated every activity from the moment the manufacturer received an order from its customer until the carrier delivered the order to the customer. The result was that each side improved its processes, resulting in higher customer satisfaction and lower costs for both organizations. Interestingly, at no time during the three days of this exercise was the word ‘price’ mentioned.

**A Managerial Caution.** Without question, firms experience damage – incur actual costs – as a consequence of supplier failures. It is appropriate that suppliers be accountable for their performance (or lack thereof). It is imperative that management recognize and acknowledge that there may be significant cost recovery values at stake, but it is essential that supply professionals be allocated both the time and resources necessary to pursue and recover these losses. Internally, faulty processes that lead to increased costs, both to the buying firm and to suppliers also require time and resources to remedy, and represent both cost reduction and cost avoidance opportunities. Cost reduction, cost avoidance and cost recovery are all part of supply management fundamental objectives, but goals without time and resources are hollow and guaranteed to fail.

**Conclusions.** Organizations commonly measure the incidence of supplier failures (late, rejects) but rarely do they measure the costs associated with those failures. Since we appear to be in a significant inflationary period, it is important to pursue not only all available cost reductions, but cost avoidance and cost recovery opportunities, as well. This session is intended to help supply professionals highlight these opportunities and to translate them into terms that can be included in contracts and supplier agreements.