Complex Product Problem Solving

3 levels of supply chain disrupted by issues with a mechanism of complex functionality. Applying systematic root cause analysis and data based problem solving to save a launch and repair supply chain relationships.

CASE STUDY

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9/1/11

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The situation called for a reasoned approach to problem solving across company lines. So, issues that span three tiers of a supply chain are commonly challenged to put the interests of issue resolution ahead of those of the individual organizations. When the collective team settles down to science and statistics, arriving at the corrective action is only a matter of time.

Case Study #2 – Product

Situation:

A seating manufacturer in the auto industry was to engineer and launch seating for a new sport utility vehicle ($75MM estimated annual revenue) that was eagerly anticipated by the market and industry. A supplier was selected to engineer and manufacture a highly complex flip and fold mechanism to facilitate folding a second row seat for ingress/egress. The annual cost, at projected volumes, was just over $11MM in mechanism buy. The product failed to meet functionality and craftsmanship expectations and threatened to interrupt the OEM new vehicle launch. 500 vehicles were contained and couldn't be shipped until a $1M retrofit could take place with the eventual re-engineered mechanisms. The supplier technical staff was actively working on corrective actions but the noise in the supply chain led to frequent priority changes. Morale was low. The OEM could not launch this truck until the mechanism supplier was capable of supplying high quality, fully functional mechanisms with only 5 months before launch. The relations between OEM, seat supplier and mechanism supplier were strained by the circumstances.

Action Plan:

- I was deployed to mechanism supplier as troubleshooter and problem solver and negotiated my on-site presence, status and relationship with their board of directors. Was given broad latitude to control their product development team.
- Gathered all known product issues and sorted them into 3 categories of issue ownership:
    a) Mechanism supplier (tier 2)
    b) Seat supplier (tier 1)
    c) OEM customer
- Assigned tier 1 and OEM responsibility for resolution of their issues and set up daily conference calls to review status.
- Sorted the mechanism supplier (tier 2) issues into safety, no-build and "customer dissatisfier" categories, to be worked on in that order. Determined the staffing levels and skill sets required to resolve all performance issues in time for launch.
- Set up daily, on-site, issue status updates on the production floor. In the style of "go to gemba", reviewed CAD, drawings, parts and processes to confirm root cause and corrective action with the ability to turn issues on and off.
- Created a list of 150 "customer-care-abouts" or things that the customer might reasonably expect of the product. Assessed DFMEA's, drawings, PFMEA's, control plans and operator instructions and made changes or added content to ensure customer satisfaction, beyond any scope defining documents.
- Ensured all changes were properly documented.
- Implemented many inexpensive process poka-yoke's to prevent the mechanisms from being built incorrectly.
- Developed containment process whereby each mechanism was manually inspected for each "customer-care-about" to ensure no faulty mechanism was sent to the seating JIT

plant. Each containment inspection was removed from the process once it was statistically proven that no defects would be manufactured for it's related "customer-care-about".

- Eliminated emotion by making decisions based on data. Each issue, hypothesis and corrective action was processed by Kepner-Tregoe, 8D and 5-Why problem solving methodologies.

Results:

Within 3 months, the mechanism performed as intended without a hint of the size of the engineering challenge the team faced. Using data as the currency exchanged in every discussion, conflict was replaced by respect and relationships were completely restored. The culture of organization and accomplishment repaired strained relations throughout the supply chain. The cost of poka-yokes was negligible to include in the processes and all of the design changes to ensure performance were essentially free, in terms of bill of materials cost. The team's focus shifted from "designing" to "engineering" the mechanism. The retrofit of the 500 vehicles was conducted at the mechanism supplier's expense and the seats were ready for launch.