ASQ 2008 Team Excellence Competition

Optimizing the Truckload / Less Than Truckload (TL/LTL) Decision for Bayer MaterialScience

ASQ Team Excellence Competition
Sean

Good Morning, I’m Sean Ritchie …

Bayer MaterialScience is a global manufacturer of polymers used as raw materials for products ranging from compact disks to automotive finishes to furniture. Bayer MaterialScience ships billions of pounds of material each year to thousands of customers.
Sean

Shipping costs are a significant component to the Cost of Goods Sold.

In July, 2005 one of our transportation representatives identified a potential problem with the way we choose carriers. While examining a sample of shipment data for truck shipments in the 16,000 to 25,000 lb range he observed that 83% were shipped “sub-optimally”, hence more costly.

Extrapolating this rate of sub-optimal shipping implied over $1 Million could be saved by shipping correctly.

But … was his extrapolation valid? And … if so, what were the root causes of failure in the shipping process?
## Introducing the Team

<table>
<thead>
<tr>
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<th>Role</th>
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<tbody>
<tr>
<td>Sean Ritchie</td>
<td>Team Leader</td>
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<tr>
<td>Kristen Hermick</td>
<td>Customer Master Data</td>
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<tr>
<td>Laurie Colao</td>
<td>Business Intelligence</td>
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<tr>
<td>Sam Phipps</td>
<td>Finance</td>
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<td>Marko Dodig</td>
<td>Technology Services</td>
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<tr>
<td>Ron Gadzinski</td>
<td>Logistics</td>
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<td>Amy Prevade</td>
<td>Freight Payment &amp; Audit</td>
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Sean
Section 1: Project Selection & Purpose

Sean

Project Selection and Purpose
Sean

A preliminary assessment of the problem led us to believe correcting it:

1. Strongly aligned with four overarching organizational goals:
   - Improving profitability. (Order to Cash thread)
   - Improving Customer Relations
   - Encouraging “Grass Roots” initiatives
   - Developing Lean Six Sigma as an Organizational Core Competency

2. The Return of Investment appeared high because we were confident the project would cost much less than the opportunity of $1 million

3. Was feasible because key stakeholders agreed that this was a significant problem they would provide resources to correct.
Sean

Our first step was to identify potential stakeholders and bring them together in a Discovery Kaizen event.

During highly focused brainstorming sessions we developed a SIPOC diagram, (Suppliers, Inputs, Process, Outputs, Customers) and a value stream map to clearly view the “as is” process flow and identify decision points, organizational transitions and potential non-value added steps.

Based on the results of these tools, we checked for identification of all key stakeholder groups. We then interviewed key stakeholders both within our business and as customers of the process.

Using baseline data available to us from our transportation system we examined trends and measured baseline performance. We evaluated questions of feasibility and resource requirements and developed a preliminary timeline for the project in Gantt chart format.

We then consolidated all of this into a document which we call a Project Charter. The Project Charter is an integral part of a formal signoff process in which senior management representing key stakeholder groups must endorse a project before it can move forward.
Sean

The project would only move forward if the key stakeholders agreed this project represented a compelling case for change that aligned with organizational goals, had a good chance of success and would be a decent investment of resources.
Sean

The collective resources and process knowledge of our working team of stakeholder representatives gave us the horsepower to extract a much larger sample of data from our transportation system. Moreover, we now had the capability to extract fields which allowed us to segment data chronologically and in terms of issues such as mode of shipment. This greatly increased our confidence in the original extrapolation and verified the problem was potentially a $1 million savings opportunity.

The “swim lane” organizational process map we developed allowed us to see the hand-offs between different parts of the organization, decision points and… potential root causes for sub-optimal shipments.

We discovered that root causes for sub-optimal shipment were too complex to be solved by a simple policy change of the truckload (TL) and less than truckload (LTL) weight breakpoint.
Sean

Bayer’s Define Phase is a rigorous study of the project’s potential impact, cost and feasibility.

A project moves forward only if the stakeholders are enrolled and formally endorse the project.

The foundation of the Define Phase is the identification and involvement of stakeholders from the outset providing them with the information they need to make an informed decision.

A project is formally sanctioned and resources provided only if the stakeholders are convinced of its alignment with organizational priorities, return on investment and feasibility.
Sean

Several segments of the organization were identified as potential stakeholders. Representatives from these groups participated in the development, evaluation and eventual endorsement of the Project Charter. They also went on to take the project through the measurement, analysis, improvement and control phases.
Laurie

Another fundamental element of the project charter is an assessment of the degree of alignment of the project with overarching organizational goals.

We found this project to align strongly with our goals of cost reduction and simplification. Existing performance metrics of cost per pound, on time in full and carrier turndown rates were all projected to be positively affected. Finally, we found it aligned well with our strategic organizational thread, “Order to Cash”, was synergistic with a multi-million dollar project involving premium freight costs and advanced our strategy to increase Lean Six Sigma competency.
Goals

- Cost Management – Shipping Costs Reduced by $800M
- Simplification – Streamlined the Process

Performance Measures

- Cost per lb – Reduced by 0.8 cents/lb
- On Time in Full (OTIF) – Held Constant
- Carrier Turndown Rates – Reduction of 30-50%

Strategies

- Order to Cash Objectives – Increased Carrier Contract Compliance
- Premium Freight – Increased Visibility of TL & LTL costs
- Development of Lean Six Sigma Competency – Team DMAIC Completion

Laurie

Each of the goals, performance measures and strategies identified in our project charter were affected in a positive way. Cost per pound went down by eight tenths of a cent. It may not sound like much but given the size of our transportation expenses, that translates into over a million dollars per year. Elimination of non-value added steps reduced the complexity of the process and supported our goal of simplification. On-Time-in-Full is a key performance indicator of importance to our customers. In our project charter one of the objectives we established was to reduce cost without adversely affecting On time in Full. We achieved this; it actually edged up a bit.
Laurie

Before beginning any Lean Six Sigma project we must identify and engage stakeholders. The preliminary analysis discussed on previous slides was developed by a stakeholder team.

Meeting and working together, representatives from potential stakeholder groups evaluated if the right groups and the right representatives were present.

Potential stakeholders are evaluated considering their:

**Involvement** (Are they working within or accountable for the performance of the current process?)

**Impact** (How integral are they to current processes? Are they suppliers to, customers of, or workers within the current process? How might they be affected by potential change?)

**Influence** (What would happen if they don’t support the project and it’s potential changes)

Based on this evaluation: we formed a core team, established management champions, sponsors and identified people required as technical support resources.
Laurie

As we just discussed, identifying and engaging stakeholders as participants in a cross functional team is fundamental to our methodology. Our high level process description or SIPOC, (supplier, inputs, process, outputs and customers) and a cross-functional process map helped us identify stakeholder groups.

Initial identification of champions and working team was an ad hoc assignment by the logistics sub-process owner, and discussions with process experts.

This ad hoc working team used SIPOC and organizational “swim lane” value stream process mapping to validate and add to the core team. Support resources were identified when the working team developed a preliminary Gantt chart. The final core team emerged as a result of this process.

Shipment carriers were recognized as an external stakeholder group. After much consideration we decided against including carrier representatives on the core team, however, because proprietary and confidential information concerning the negotiated transportation rates of all carriers would have to be part of the data we would analyze.
Laurie

Brainstorming together, our core team of stakeholder representatives took information from both subjective tools like our cause and effect analysis and value stream mapping as well as from objective tools like customer data segmentation and on time and full performance KPI.

From this we could see which stakeholders had higher potential positive and negative impacts and we could plan accordingly.
### 1C.c Types of Potential Impact to Stakeholders

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Potential Positive Impact</th>
<th>Potential Negative Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer Master Data</td>
<td>Could make their job easier</td>
<td>Conflict with existing workload, Could cause confusion</td>
</tr>
<tr>
<td>Business Intelligence</td>
<td>Increased project competency</td>
<td>Conflict with existing workload to obtain data for team use</td>
</tr>
<tr>
<td>Material Master Data</td>
<td>Could make their job easier</td>
<td>Conflict with existing workload</td>
</tr>
<tr>
<td>Finance</td>
<td>Participation in a project that improves profitability</td>
<td>New KPI’s to create and monitor</td>
</tr>
<tr>
<td>Transportation Operations</td>
<td>Simplified decision making process</td>
<td>Loss of decision making power over carriers</td>
</tr>
<tr>
<td>Logistics</td>
<td>Better performance against KPI, OTIF</td>
<td>Carrier damages from cross-docking more LTL</td>
</tr>
<tr>
<td>Carriers</td>
<td>Contract compliance, More business</td>
<td>Loss of some revenue</td>
</tr>
<tr>
<td>Customers</td>
<td>Better customer service from BMS Better OTIF</td>
<td>Carrier damages from cross-docking more LTL</td>
</tr>
<tr>
<td>Business Excellence</td>
<td>Increasing Organizational LSS Competency</td>
<td>Project Failure would damage LSS Credibility</td>
</tr>
</tbody>
</table>

**Laurie**

Potential positive and negative impacts were assessed in a variety of ways.
Section 2: Current Situation Analysis

Sean

Current Situation Analysis
Sean

A fundamental principle of our Lean Six Sigma methodology is the recognition that the output of the process, “Y” is a function, potentially, of several contributing input variables or “Xs”. Before beginning problem analysis there is a critical need to assess the accuracy of the data used in our analysis. Otherwise there is a risk in drawing incorrect conclusions regarding root cause, along with implementation of corrective actions which at best may fail and at worst may degrade performance.

We began with Process Variables Mapping. Building upon the SIPOC developed in the Define Phase we identified input variables and assessed the degree to which each are under our control. Building on the SIPOC and the Process Variables Map, we developed a Cause and Effect Matrix in which we estimated the degree of impact of various input variables on output performance. This information helped us to think ahead about data segmentation desirable for analysis and clarified appropriate requests of the technical support staff who would be extracting data from various systems.

Even though we weren’t dealing with data that lent itself to traditional Gage R&R or Attributes Agreement, we understood a need to test the integrity of our data. Each step along the way the team challenged the origin, operational definitions and potential sources of inaccuracy or bias in our data.
A Process Variables Map provided insight into which input variables were within our control and which not. For example …other orders coming from same sites/warehouses going to same area.
Sean

The Cause and Effects Matrix improved our understanding of the degree of correlation and impact of process inputs on the output value to the customer. It gave us a numerical basis for ranking issues from the customer’s set of priorities. For example, we drilled further into consolidation decision making and the actions related to transportation requests in order to assist the Logistics reps’ in their decision-making.
Sean

Having become confident in the reliability of the data, we began the analysis phase to identify potential root causes and opportunities.

Failure Modes and Effects Analysis (FMEA) and data segmentation were our principle analysis tools.
Sean

During the development of the Cause and Effect Matrix in the Measure Phase we began to identify and prioritize potential root causes based on the Voice of the Business and the Voice of the Customer. The Process Variables Map identified which inputs were within our control and which were not. Now, in the Analysis Phase we conducted a Failure Modes and Effects Analysis. Facilitated as another Kaizen event, the team spent six hours over two days identifying potential failure modes and ranking each in terms of: their probability of occurrence, the severity of the impact should they occur and our ability to detect the failure.

For each potential failure mode we ranked the Severity, Frequency and Detectibility of the risk with 1 low risk and 10 high risk. Multiplying these three yielded a Risk Probability Number (RPN)
With a sample size of over three hundred shipments per month and extraction of granular data for each shipment such as date, carrier, mode, origin, destination, product, customer and, of course, cost per pound we were in a position to stratify and segment the data in an attempt to gain insights into the relationship between cost per pound and a variety of potential input variables.

At the outset of this project we suspected the reason shipping costs were high was because we were incorrectly shipping too much with full truck load carriers as opposed to LTL. In this data stratification example, we grouped shipments into arbitrary weight brackets and examined the percentage of shipments shipped LTL versus full truckload. It was clear there was an opportunity to direct more shipments to the lower cost LTL mode.

We defined a defect as a shipment within a certain weight range shipped as full truckload instead of LTL. The proportion shipped incorrectly according to this definition gave us a different perspective when viewing baseline performance.
Several segments of the organization were identified as potential stakeholders. Representatives from these groups participated in the development, evaluation and eventual endorsement of the Project Charter. They also went on to take the project through the measurement, analysis, improvement and control phases.
In the previous section we discussed the FMEA as a method to identify potential root causes. During the selection of final root causes we ranked each potential failure mode on the basis of its Risk Probability Numbers. Those with the highest RPNs were judged to be root causes with the highest impact.

For example, the failure mode with the highest RPN was found in shipment consolidations. The failure mode identified that consolidation opportunities were not visible to the transportation rep in the system. The severity of this error was ranked a 10, the highest possible value. Because the reps could not consolidate these shipments, the probability of occurrence was also ranked a 10. And the ability to detect the error was ranked as 10, meaning virtually undetectable, because there was no way to know when this type of error occurred. The RPN, was 1000. The fact that the transportation system did not provide transportation reps with visibility of consolidation opportunities was, therefore, selected as one of our final root causes.
2B.b Analysis of Data to Select Final Root Causes/Improvement Opportunities

Using data to eliminate potential confounding factors

\[ \text{Shipping Cost } (Y) = f(x_1, x_2, x_3 \ldots) \]

\[ \$/Lb. = f(\text{origin, destination, carrier, customer, product, mode, date} \ldots) \]

- Some Xs are not significant contributing factors.
- Some Xs are not significant by themselves but interactions with other Xs may be.
- Changes in Xs over time may bias your perception of root cause/improvements.
- Activities of concurrent improvement efforts may bias your perception
- Knowledge of stability or instability in shipping patterns is essential.

Sean

We have described the use of data in identifying and selecting root causes. We feel it is equally important to use data to challenge assumptions of root cause, and both identify and quantify potential confounding issues.

In section 2Ab we discussed the use of data to identify the potential root cause of a transportation rep making an incorrect mode selection (TL/LTL). In our analysis of all such issues we were careful to consider data which would contradict our conclusions. We found, for example, if the shipment was a rush with agreed upon carrier lead times, available LTL shippers may refuse the shipment forcing the shipment to be placed via full truckload. In this situation the root cause was not incorrect carrier selection but rather the handling of rush orders. The origin of rush orders was outside the scope of our Project Charter but it was helpful to understand this issue and its possible affect on our data.
Sean

This process map is laid out so we could visualize the hand-offs between various internal and external stakeholder groups. Steps are color coded: Those important to the customer are green, important to business or required by the business are in yellow, those identified at important to neither, and hence non-value added, are in red.

Analysis of the value stream map revealed non-value added steps. As we compared this process map to the FMEA, we realized some important steps were missing and correlated to failure modes, root causes and improvement opportunities.
2B.c Identification and Validation of Final Root Cause

1. Text messages require a two step drill-down
   - Only checked if Reps have time
   - Accuracy of data was not verified when transported into new ERP

2. YTO-4 screen is “really ugly”
   - Cannot sort for important information
   - Special requirements and consolidation opportunities are all but invisible

3. Guidelines of when to choose TL or LTL are unclear
   - Tribal knowledge – no statistically based guideline
   - Reps often do not know backup carriers
     • Routing Guide usage is spotty
     • If all else fails, shipments are sent TL (higher rates in this range)

4. Lack of planning time consumes Logistics Reps
   - Three-day “Delivery Window”
   - Carrier turndown rates are high
   - Significant rework when turndowns occur

Sean

As part of our FMEA we had assigned each failure mode a potential cause. Looking down the list of failure modes ranked in terms of their RPN, these four root causes, or variants of them, appeared repeatedly. Grouping these similar potential causes for each failure mode resulted in the list you see here. Thus, “affinity” mapping provided us with our first level of validation.

Another validating observation was the reaffirmation of the links between failure modes in our FMEA and the key input and output relationships in our cause and effects matrix.

The identification of non-value added steps and the correlation between missing steps in the current process with failure modes, potential cause and improvement opportunities provided further validation that these four major categories represented the significant root causes for shipping errors in this weight class.
Section 3: Solution Development

Marko

Solution Development
Marko

The key tools employed in developing solutions were the Design FMEA and Organizational Process Mapping.
An improvement action item was developed for each failure mode.

### Design FMEA

Design FMEA entailed developing a potential improvement or corrective action for each of the fifty failure modes identified within our FMEA.
Marko

We then developed a new, “to be” process flow which eliminated non-value added steps and added missing steps based on what we had learned from cause and effect, FMEA and our original process map.
Marko

Each corrective action or improvement was designed to mitigate or significantly reduce the probability of occurrence and/or increase the detectability of a given failure mode.

For example, the failure mode discussed in section 2B.a in which shipping consolidation opportunities were not visible to transportation reps had a baseline RPN of 1000. A potential corrective action was identified which could reduce the RPN to 225.

Just as we had experienced in the grouping of root causes in section 2B we now saw groupings of corrective actions with similar themes emerging.
Marko

A force field analysis of the feasibility for implementing an improvement versus the risk probability number (RPN) of the failure mode it addressed was used to select and prioritize final improvements.

The team wanted to reduce shipping costs as rapidly as possible. Having already grouped and ranked improvement opportunities based on RPN, we now took another cut and overlaid feasibility criteria. Which could we implement immediately? Which required some effort but could be done in the near term? Which involved significant or expensive changes?

The improvements highlighted in green were selected for implementation. Those in orange are examples of potential improvements which were deemed to have an unfavorable feasibility to RPN ratio and not selected for implementation.

We also set the criteria of SMART design: specific, measurable, achievable, responsible, time-bound.
Marko

There were members of the management stakeholder group and the core team who believed that a simple policy change increasing the breakpoint at which shipments should be sent TL versus LTL would suffice to reduce the cost per pound.

We are proud, as a core team, to have shrugged off that developing paradigm and continued on applying the Lean Six Sigma methodology with open-mindedness; following the data wherever it led. Not only were there root causes unaffected by a change in the TL/LTL breakpoint, there were other root causes acting to prevent a breakpoint policy change from being effective.
Marko

The key analysis used to select final improvements was therefore a synthesis of results obtained from:

- Improvement opportunities associated with FMEA failure modes with the highest risk probability numbers
- Analysis of value added and non-value added steps within the organizational process map
- Assessment of feasibility of implementation versus impact of implementation
Marko

Internal stakeholders covered various roles and responsibilities in the selection of final improvements to be implemented.

Responsible – “The Buck Stops Here” with overall responsibility to make certain this step happens.

Accountable – The people who perform the identification based upon the data and information available through work with the team.

Consulted – People with specific knowledge to the project focus area that bring their specific abilities (such as datamining) to the project to enable decision making.

Informed – People who are told the project is in progress and updated where their specific area is impacted or change on their part may be required.

<table>
<thead>
<tr>
<th>Stakeholder Group</th>
<th>Potential Cause</th>
<th>Final Cause</th>
<th>Potential Improvement</th>
<th>Final Improvement</th>
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<td>Accountable</td>
<td>Consulted</td>
<td>Consulted</td>
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Bayer MaterialScience
Ron

The team identified four major improvements.

1) We established a new TL/LTL weight breakpoint but we did so based on data, not conjecture. Moreover, we hard coded carrier recommendations into our system.

2) We gave the transportation reps visibility of consolidation opportunities and the ability to sort on origin, destination and weight. This, as you may recall, addressed the failure mode with the highest Risk Probability Number.

3) Enhancement of the carrier tables offered a software and process execution upgrade which provided transportation reps with accurate carrier recommendations based on weight and origin-destination pair and a vendor managed lane rating system created a closed loop with our external transportation billing service.

4) Enabling the routing guides provided another level of visibility to the transportation reps. For any proposed shipment the routing guide now provides four carrier options consistent with established BMS Logistic and Procurement contracts.

Concurrently, we worked to inform product planning about missed opportunities to utilize lower cost intermodal equipment due to lack of planning time, and we embedded text messages in our master data for a Poke-Yoke or mistake proofing solution.
Ron

Cost reduction was our key objective and the most tangible measure of the affect of our improvements. Implementation of improvements began in February of 2006 and we validated a savings of $505,000 for that year. In 2007 we have reduced cost by over $800,000, and the project continues to generate results.

New measurements were established to chart the cost per pound of shipments within the affected range. These charts are published and pushed electronically to 15 people each month. In addition, backup files show that the cost per pound of shipments within the range studied are within controls established by the team.
3C.b  Tangible Benefits

- 5% of BMS shipments shifted to shorter leadtimes
  - Carrier turndown rates improved!
  - Remaining turndowns were primarily due to product shortages
  - Less Non-value Added rework trying to find backup carriers

- No negative impact to On-Time in Full (OTIF) Metric

- No Increase in carrier damages (possible due to increased handling)

Ron

Carrier shipment refusals are down by 50% in the one to two day notice timeframe and down about 30% for same day notice. This effect had a collateral positive impact on transportation reps because they now spent less time chasing backup carriers to make transportation arrangements.
Ron

As an outcome of the project, we held a number of Lunch and Learn events open to all employees engaged in transportation planning entitled “Transportation: Balancing Costs and Service”. Feedback from these meetings showed there were a number of cost drivers that were not clearly communicated to people influencing carrier selection. One such cost driver was the use of the word “guaranteed” when discussing freight arrangements with a carrier. “Guarantees” can drive costs for transportation upwards by as much as 40%.
Control charts and hypothesis testing were used to validate that the improvements had the desired effect. Care was taken to consider any confounding issues like carrier price negotiations or fuel surcharges.

As we said, we ranked improvements based on feasibility. Those which could, were implemented immediately, followed within a month or two by a next wave as we developed and implemented changes to SAP software. Here we see the impact of improvements over these various implementation phases. Note: Not only did the mean cost per pound decrease in a statistically significant way, the variance in cost decreased as well.
Marko

Another way to view improvement. This is a p-chart: the defect is defined as a shipment which should have gone LTL but was incorrectly shipped via a full truckload carrier.
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Hypothesis Testing 2-Sample T-Test Results

Two-Sample T-Test and CI: Cost / Lb, Period

<table>
<thead>
<tr>
<th>Period</th>
<th>N</th>
<th>Mean</th>
<th>StDev</th>
<th>SE Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2111</td>
<td>0.0562</td>
<td>0.0342</td>
<td>0.00075</td>
</tr>
<tr>
<td>4</td>
<td>1495</td>
<td>0.0482</td>
<td>0.0320</td>
<td>0.00083</td>
</tr>
</tbody>
</table>

Difference = mu (1) - mu (4)

Estimate for difference: 0.008026

95% CI for difference: (0.005841, 0.010211)

T-Test of difference = 0 (vs not =): T-Value = 7.20  P-Value = 0.000  DF = 3341

- Minimum difference is $0.006/lb.  Mean is $0.008/lb.
- Over 74,000,000 lbs in this weight range annually

**Annual Cost savings at $0.008/lb. = $590,000**

Marko

A two sample t test had a P value of zero indicating that a shift in mean cost per pound from baseline to post improvement was statistically significant. We also checked the confidence interval and used it to provide our management sponsors and champions with a statistical projection of the upside and downside potential for savings.
Section 4: Improvement Implementation

Kristen
Kristen

Internal stakeholders were integral to the selection and implementation of each improvement.

Due to internal proprietary issues and legal implications of confidentiality agreements with our carriers, we could not involve them in the decision making process. Normal communications channels through our Logistics and Procurement Group were employed to obtain feedback from these external stakeholders.
Kristen

The principal strategy to identify and address potential resistance to change was to ensure …

1. we had the right stakeholder groups represented on the core team,

2. that stakeholder group was represented by respected people from that group

3. identification of root cause and planning for corrective action was a collaborative process

4. core team stakeholder representatives provided good two way communication with members of their respective groups to discuss potential changes and resistance in advance of implementation
Kristen

Stakeholder buy-in was assured first through consensus of the core team who represented all major stakeholder groups.

In addition, core team representatives communicated with their colleagues throughout all phases of the project.

Logistics and Procurement communicated with carriers as appropriate.
Kristen

A detailed action plan was developed for implementation in which each task was identified, assigned and a deadline established. The core team met regularly to assess progress and make adjustments as necessary. By meeting and communicating regularly we were able to stick pretty close to our original plan.
Ron

The team implemented four major changes through Kaizen events.

1) We established a new TL/LTL weight breakpoint and entered carrier recommendations into our system.

2) We improved the ability to sort based on origin, destination and weight.

3) We enhanced the carrier tables through a software and process execution upgrade to provide transportation reps with accurate carrier recommendations based on weight and origin-destination pair.

4) We provided routing guides and trained reps on their use.

We kept in touch with our stakeholders’ needs and educated production planners to take advantage of lower cost intermodal freight. We also verified text messages as they were converted into Master data and eliminated “whisper down the lane” errors.
Ron

A Microsoft Excel based lane-rating measurement tool was published, distributed and personnel trained for the Logistics Reps to use when choosing carriers. This tool provided a simple, sort-able method to show which carrier would be preferred for a particular shipment. In addition, the freight payment vendor has an online query available to rate lanes that include the actual cost for the shipment. This is particularly useful when shipping to a new customer location. Coding the information from the routing guides into our transportation management software provided a virtually mistake proof or Poke Yoke way for transportation reps to chose an appropriate carrier.
Sam

As we said, we ranked improvements based on feasibility. Those which could, were implemented immediately, followed within a month or two by a next wave as we developed and implemented changes to SAP software. Here we see the impact of improvements over these various implementation phases. Note: Not only did the mean cost per pound decrease in a statistically significant way, the variance in cost decreased as well.

. This p-chart in the lower right hand corner is another way to monitor improvement. It tracks when a shipment should have gone LTL but was incorrectly shipped via a full truckload carrier.
Sam

Bayer MaterialScience goals, performance measures and strategies were linked to our project through the charter and ended up in positive territory as a result of the teams efforts.
Sam

Shipping cost per pound went down by eight tenths of a cent. Given the size of our transportation expenses, this small amount translated to $800,000 dollars per year of cost reduction. Elimination of 5 non-value added steps reduced process complexity hence supporting Bayer’s goal of simplification. “On Time in Full” is a key performance indicator of importance to our customers. We managed to reduce cost without adversely affecting On time in Full, in fact the metric edged up a bit.
Business stakeholders (Customer Service, Transportation, Product Planning and Master Data) were provided with the opportunity to attend “lunch and learns”. These meetings were well attended by management stakeholders and persons involved in the transportation decision making process. Following completion of the project we also communicated results to the project sponsor and key stakeholders.
Section 5: Team Management and Project Presentation

Laurie
Laurie

The first step in identifying team members occurred during our Define Phase in which we used a high level SIPOC, process map and preliminary Gantt chart to identify functional groups involved in the process, potentially impacted by any change to the process, and technical support functions required to obtain data, analyze data and help implement any required changes to software or SOPs.
Once we had a list of functional groups required for the project, we began the process of selecting core team members. The criteria for selection varied depending on the functional group. We felt strongly that functional groups directly involved in the current process needed to have a representative on the core team with expertise in the details of their functional group’s role in the process. They would not, however, necessarily require expertise in… let’s say… the SAP system and its software. Likewise, those providing systems expertise in data mining or software development would not need to have prior intimate knowledge of the shipping process.

We needed to find people with both the time, and the backing of their functional management to attend meetings and do the work required of the project. Our sponsor group helped us with this task.
Laurie

Before we began to work on the project itself, we needed to talk about how we were going to work as a team. What were our relative roles and responsibilities? Did we need any additional team members? What were our mutual agreements regarding how we would conduct ourselves? What did we expect of each other? What did we think management expected? How much of our time will this require and over what period? How will we make decisions? What is Lean Six Sigma and how is it different from what we’ve been doing? We spent some extra time reviewing the DMAIC process and some of the tools we would be using along the way.

Working out these basics before we began laid the foundation for us to be an effective team.
Laurie

We didn’t just talk about roles and responsibilities or mutual expectations in that first meeting and then forget about it. Here is an example page of our consolidated work plan. Having identified and prioritized improvement opportunities, we made commitments to one another relative to who would do what and when it should be completed. We published the list so that all could see if we were on track and make adjustments as necessary.
Laurie

As a part of our Lean Six Sigma methodology, the core team was required to provide regular, face to face, presentations to the sponsors and champions outlining the team’s progress, findings, and performance against plan.

This not only helped motivate and keep the team on track, but more importantly managed the expectations of the sponsors and provided regular and formal opportunities for the team to identify potential roadblocks and solicit the help of the sponsor group.

As a team, we agreed to meet weekly or bi-weekly depending upon project objectives and resource loading. Project action item updates were published following meetings. We also ran special meetings whenever the team felt they were necessary to take remedial action to put things back on track.
Working together as a cross-functional team utilizing the Bayer Lean Six Sigma Methodology, we were able to optimize the Truckload / Less than Truckload Decision Making Process and reduce Bayer MaterialScience Transportation costs by over $800M in 2007.

Thank You for Your Attention

Laurie

Thank you for providing us the opportunity to obtain your feedback on our on-going process improvement endeavors. We would now like to take your questions.
Questions?

ASQ Team Excellence Competition

Laurie