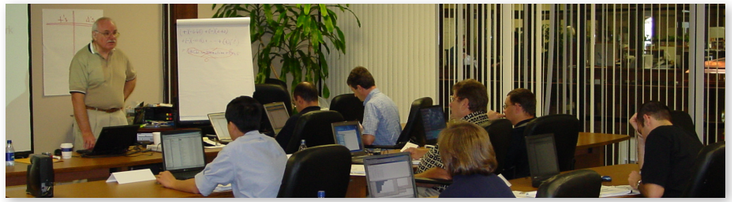

Value Proposition

Recognized as thought leaders and innovators in business process improvements, Sigma Breakthrough Technologies Inc. (SBTI) is a global management consulting firm specializing in deployment of Six Sigma and Lean methodologies. SBTI delivers innovative and sustainable business process excellence solutions by developing future leaders with core competencies to drive superior top and bottom line results. We advance our clients with best-in-class results in revenue growth, cost reduction, new product development and process improvement.

What We Provide

SBTI offers a full range of programs and services. These offers include leadership workshops, asset maximization, strategic planning and assessments, multilevel managerial workshops and specialized "belt" training at the tactical level.

Results. Guaranteed.

SBTI delivers the fastest and highest return on investment in the industry. Always incorporating a measurement benchmark, most of our clients experience an average of 30X return on investment within the first 24 months of engagement.

Global Resources

Throughout our history, SBTI has demonstrated a track record of quickly responding to clients' global needs. Our international offerings are handled through regional offices in Latin America, Europe and Asia. Materials are available in English, Spanish, Italian, French, German, Mandarin, Korean and Japanese.

Our History

Dr. Stephen Zinkgraf, one of the original Six Sigma developers, founded SBTI in 1997. Beginning with two corporate clients, SBTI has grown to more than 50 global corporate deployments and an additional 50 clients using SBTI methodology.

SBTI Executive Directors and Master Consultants have a minimum of 10 years industry experience – some 25 or more. Our international offices provide the same unmatched experience and capabilities as in the states, while offering local language and bilingual instructors. All of SBTI's consultants have lead multiple waves of training, completed numerous projects and continually mentor Black Belts.

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CASE STUDY

Industry: Manufacturing

Client: OSRAM SYLVANIA

Event: Lean and Six Sigma

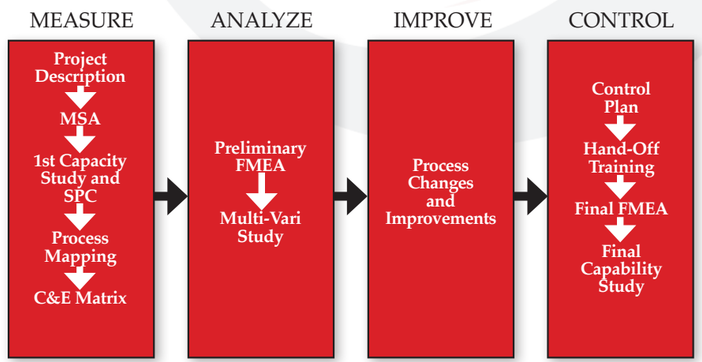
50 Words or Less

This case study illustrates how using a combination of Lean and Six Sigma methodologies can increase capacity while reducing costs.

Increasing Capacity and Reducing Costs in Chemical Batch Manufacturing Process

OSRAM SYLVANIA is the North American business of OSRAM GmbH of Germany, one of the world's largest lighting manufacturers and part of the Siemens family of companies. OSI manufactures and markets a wide range of lighting products, precision materials and components for many industries, including consumer, automotive, computer, aerospace and other major industries worldwide. It employs about 11,200 people in North America and is headquartered in Danvers, MA.

OSRAM SYLVANIA has 22 manufacturing plants, one equipment assembly operation and 12 research and development laboratories, and a network of sales offices and distribution centers serving all of the United States, Canada, Puerto Rico, and Mexico. Most of the company's products are marketed in North America and South America under the SYLVANIA or OSRAM brand name.



Objective

This case study is based on a project leb by Mr. Todd Smith of Sylvania, who is credited for his hard work and contributions at integrating Lean and Six Sigma early, prior to the existing K-Sigma™ roadmap. The forecast for a potential increased demand is one business consideration and lower-cost foreign competition is another consideration, which may impact the first item.

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CASE STUDY

Diagram 1

This effort involves a three-step chemical manufacturing process as depicted in Diagram 1. By evaluating the quantity produced and the cycle times, it became clear that Step 2 is the bottleneck of the process. This was one initial focus as it is the pacing item in flow of the entire process.

Actions

Focusing on the bottleneck revealed some additional aspects of this step in the process. There were three furnaces, with a theoretical capacity of 7,000 kg per day of materials processing. However, the uptime for this step was 71 percent. The scrap rate was 9.2 percent, and rework is not possible for out-of-spec batches.

The bottleneck showed that increasing the uptime would be beneficial to the entire process. By using TPM and Six Sigma, maintenance schedules were more on target and uptime became more predictable..

Key items that were discovered to have synergy between Six Sigma tools and TPM can be seen in Table 2.

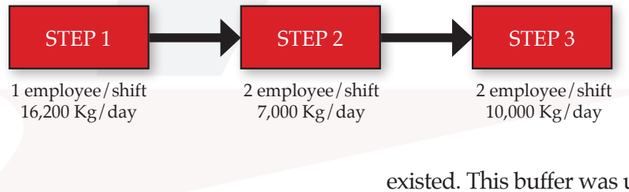
TPM Items	Six Sigma Tools
Initiate Downtime Tracking	Failure Mode Pareto, Time Series Analysis
Operator-Based Maintenance	Process FMEA
Preventative Maintenance Plan	Process FMEA
Cleaning and Inspection	Process FMEA
Wear Part Replacement Freq..	CpK > 1.5
SPC on Key Parameters	Variable Priority Filter, Multi-Vari Analysis
Process Control Plan	Process FMEA

Table 2

After applying these tools together, the uptime increased to 91percent, with a 6,300 kg/day average output. Time series analysis revealed that start up and shut down were major sources of inefficiency so a seven- day schedule was implemented. Maintenance costs were reduced by over $10,000 per month. Additionally, the scrap rate was

reduced to 5.1 percent, and breakage of a key handling item was reduced by 66 percent, for a net annualized savings in this step over $250,000.

Returning to Step 1, it was discovered that while rework is possible, it takes four-days to rework a faulty batch. The first pass yield in this step was 92 percent, with corresponding subjective criteria for the rework decision. A measurement systems analysis revealed that the measurement system contribution was 56 percent of total variation in the data. Correction of measurement system deficiencies resulted in a first pass yield of over 99 percent. Additionally, a second shift employee was able to run another process due to the lack of rework. The net annualized savings at this step was over $150,000.



The final effort was to look at Step 3, which had been ignored previously because it followed the bottleneck. The total output initially was only 5,100 kg/day. This step had a utilization of 41 percent, meaning that one shift too many existed. This buffer was unnecessary and was costing money. The third shift was then staffed with only one operator to build ahead for second and third shifts. The second issue in Step 3, was an unknown scrap cause. This work followed the traditional Six Sigma roadmap. Work on a faulty measurement system followed by a multi-vari study of key factors resulted in over $500,000 of additional savings.

Case Summary

- Three additional projects generated from this project, netting $600,000 annually.
- Over 50 percent of the savings in this project were realized just by correcting poor measurement systems.
- The total project time was four months
- The total analysis resulted in a 26 percent reduction in labor cost with no loss of production capacity and much greater flexibility with which to serve the customer.

The total projected annualized savings was $2.9 million.