



Committing to a Lean Six-Sigma Roadmap

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Overview

- The lean and six-sigma toolbox consists of several tools
 - Companies cherry pick the easiest tools to implement
 - Expectations are unmet
- Commit to a systematic roadmap
- Roadmap
 - Divided into ten phases
 - Stay in phase until satisfactory progress is made
- Lean six-sigma assessment tool

Lean Manufacturing¹

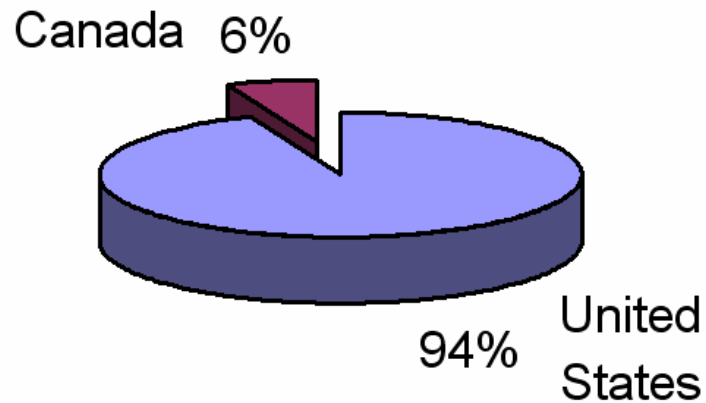
- A systematic approach to identifying and eliminating waste (non-value-added activities) through continuous improvement by flowing the product at the pull of the customer in pursuit of perfection” – NIST

Six Sigma²

- Six-sigma methodologies are a business philosophy and initiative that enables world-class quality and continuous improvement, to achieve the highest level of customer satisfaction—Six-sigma Academy

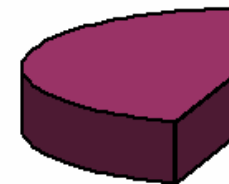
The Need—Study³ in Nov 2004

276 Executives

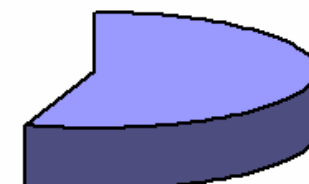


Performance Improvement Initiatives

Objectives not achieved



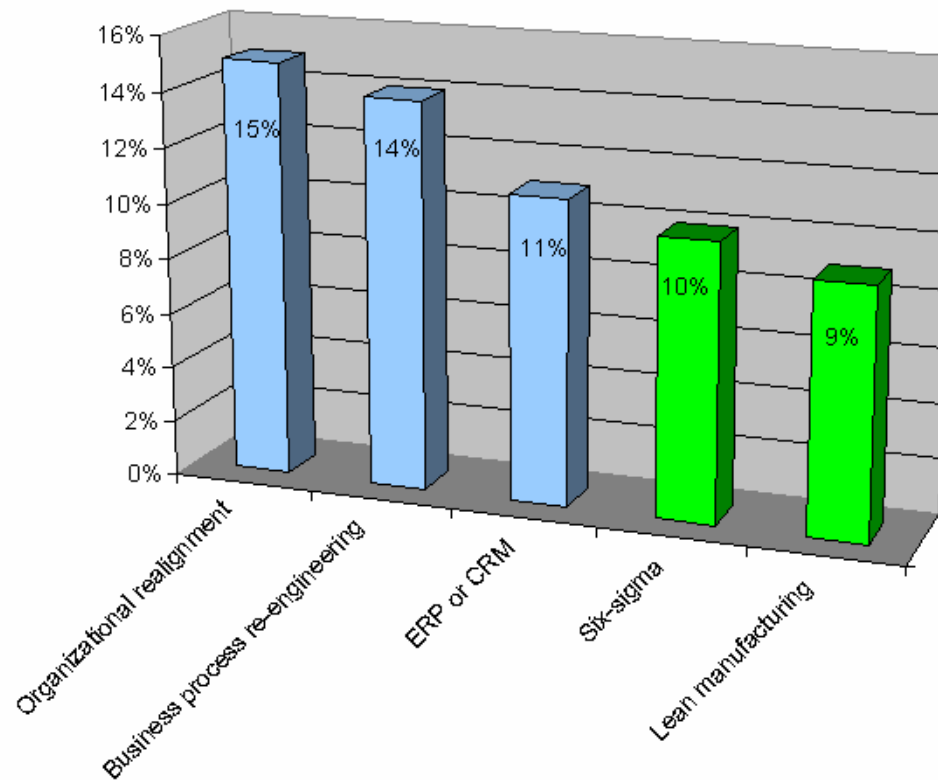
Objectives achieved



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The Need—Study³ in Nov 2004

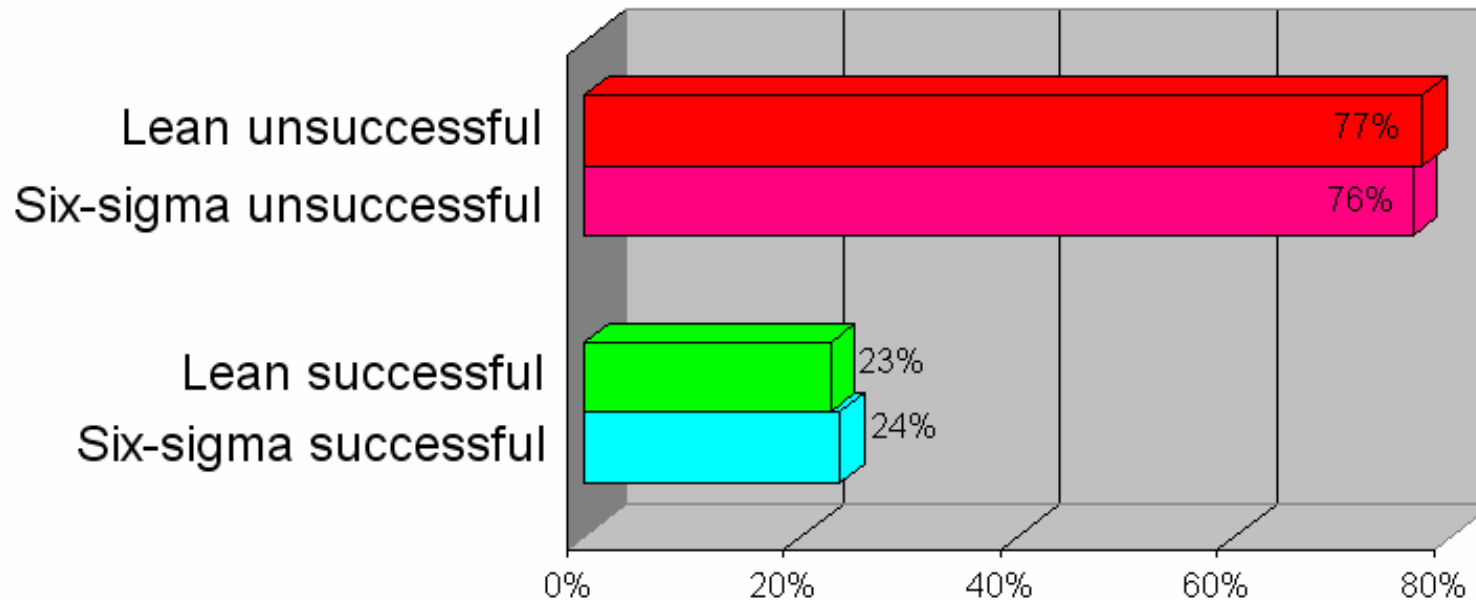
Top five expected initiatives to be launched



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The Need—Study³ in Nov 2004

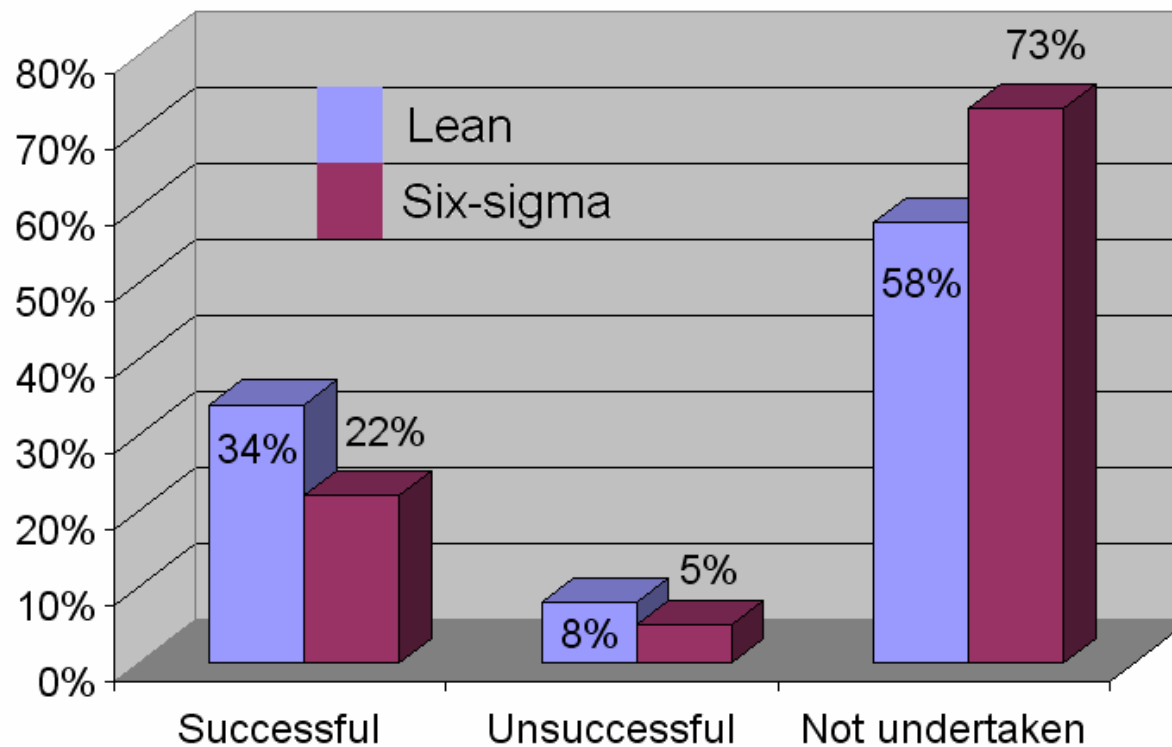
Percentage of companies successful that embarked on lean six-sigma initiatives



Continued

The Need—Study³ in Nov 2004

Majority have not undertaken any lean or six-sigma initiatives



Conclusion of the Study

- A tremendous push in the implementation of lean six-sigma philosophies is coming in North America
- Conclusion
 - A definite path to achieve success in lean six-sigma is needed

Misplaced Beliefs

- Implementation of lean and six-sigma
 - Provide training to the employees
 - Let them lose to improve processes utilizing the tools
- Lean and six-sigma are philosophies
 - Lean and six-sigma call for a cultural change
 - A paradigm shift thinking is needed
 - Goes counter to human character
- Cultural change takes time
 - Forcing it upon employees causes resentment
 - Wait with hopes of “this too shall pass”

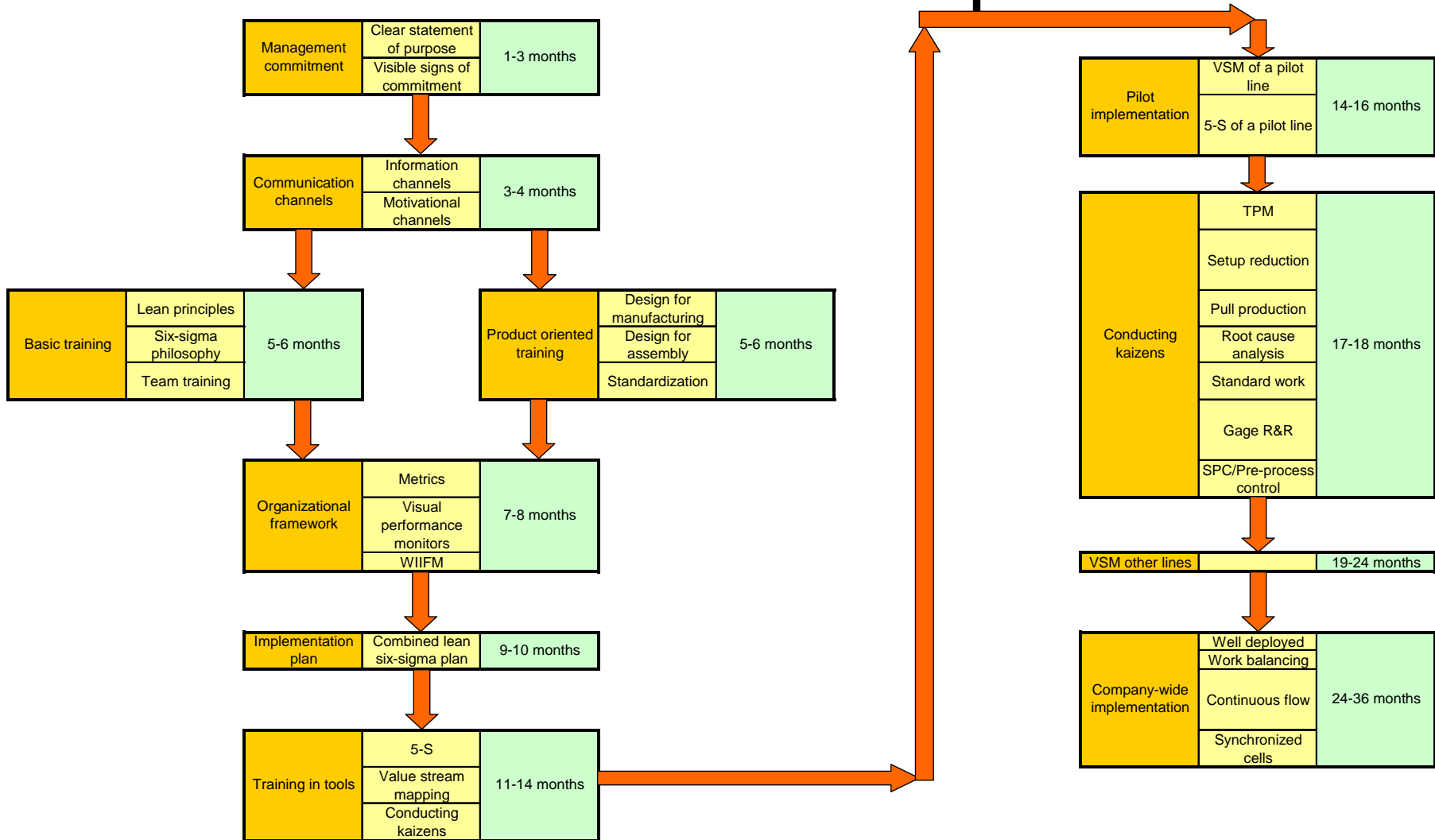
The Phases of the Lean Six-sigma Roadmap

1. Management commitment
2. Establishment of communication channels
3. Basic training: lean, six-sigma & product attributes
4. Creation of an organizational framework
5. Development of an implementation plan
6. In-depth training: lean & six-sigma
7. Pilot implementation: 5-S & value stream mapping
8. Pilot kaizen implementation
9. Value stream analysis of company-wide processes
10. Company-wide deployment of lean six-sigma

The Need for Phases in the Roadmap

- Do not proceed to next phase until the previous requirements have been satisfactorily fulfilled
- Adopt a disciplined approach
- Do not cherry-pick simple tools that will come short on lean six-sigma expectations

The Roadmap



Phase 1—Management Commitment

- Single most important thing
- Being involved in weekly or monthly review meetings is not enough
- Leadership cannot be delegated
- Irreversible top management commitment
 - Open signed letter
 - What the company believes are lean six-sigma principles
 - How the company intends to stick on the path
 - Displayed at prominent sites
 - Read before meetings

Continued

Phase 1—Management Commitment

- Front-line visible involvement
- Without a firm commitment companies are better off not embarking on the lean six-sigma journey
 - Employees believe that if management is not serious the first time around, they cannot surely be serious the second time
- Be completely familiar with the principles through self-study or outside training programs
- No opposition once training of the employees has begun

Continued

Phase 1—Management Commitment

- Improve and strengthen relations with the employees
- Commit to set things right which have been wronged in the past
 - Broken promises, unfair incentive plans, lack of fairness, etc.
 - Seek forgiveness for past lapses
- Phase takes 1-2 months after the initial intent to embark on a lean six-sigma path



Phase 2—Communication Channels



- Convey future plans and aspirations of the company
- Let employees know how well the company performed every day
 - No sporting event exists where score is not kept
 - We expect the best from employees without letting them know how the company did on a daily basis

Continued

Phase 2—Communication Channels

- A three light pole with green, amber and red
 - Bulletin board placed beside it
 - A run chart for the month or year
- Monthly meetings are good but a daily update is invaluable
- Estimated completion: 3-4 months

Phase 3—Basic Training

- Hewlett Packard method
 - Top manager thoroughly trained
 - Trains his or her subordinates
 - In turn subordinates train their subordinates
- Consistent understanding
- Hands-on involvement
- Shows leadership commitment

Continued

Phase 3—Basic Training

- Training in lean, six-sigma and product design
- Product design
 - 23% of the total product cost locks in 70% of the manufacturing cost
 - Designing the product for ease of manufacturing (DFM) and ease of assembly (DFA)
 - Standardization of components or processes
- Estimated completion: 5-6 months

Phase 4—Organizational Framework

- Champions from top management
 - Form the steering committee
 - Sponsor projects
 - Establish objectives to be achieved
- Lean six-sigma players
 - Lean six-sigma coordinators
 - Black-belts
 - Green-belts
- Role descriptions

Continued

Phase 4—Organizational Framework

- Metrics to track progress of lean six-sigma initiatives
 - Suspend old generic metrics except the ones directly tied in with overall business goals
- Active and visible involvement of top managers in metrics
- Vision of “what’s in it for me” (WIIFM)
 - New leaf on fairness and equity
 - “Burr in their saddle” issues
- Estimated completion: 7-8 months

Phase 5—Implementation Plan

- Charter to develop a lean six-sigma implementation plan
- Avoid generic templates
- Implementation plan
 - Scheduled events
 - Method to monitor progress
 - Specific goals and deliverables
- Estimated completion: 9-10 month time frame

Phase 6—In-depth Training

- Training and hands-on implementation of concepts
 - 5-S
 - Organize and maintain a well designed work place
 - Value stream mapping
 - Product flow to add value in the eyes of the customer
 - Plan for the initial implementation of lean six-sigma
 - Conducting of kaizens
 - Systematic conducting of condensed improvement activities
- Estimated completion: 11-13 month time frame

Phase 7—Pilot Implementation

- Deployment of 5-S and value stream mapping for a pilot line
 - Team building
 - Root cause analysis
 - Activity charts
- How lean six-sigma can function as a whole
- Estimated completion: 14-16 months

Phase 8—Pilot Kaizens

- Kaizens
 - The most productive employees are always busy
 - Concentrate full attention only on specific problem
- Kaizen activities conducted over a 3-5 day period
- Ad-hoc teams
- Brainstorm solutions
- Implement the outcomes
- Stress implementation of initial solution

Continued

Phase 8—Pilot Kaizens

- Kaizens
 - Setup reduction
 - Creation of a pull line through deployment of kanbans
 - Implementation of standard work
 - Evaluating the robustness of a measuring system through GR&R
 - Statistical process control (SPC)
 - Pre-process control
- Estimated completion: 17-18 months



Phase 9—Company-wide Value Stream Analysis



- Deploy multiple teams
 - 5-S
 - Value stream mapping
 - Identification of kaizens
- Understand merging value streams within the plant
- Implement in the rest of the plant
- Pilot line acts as a model

Continued



Phase 9—Company-wide Value Stream Analysis



- Other tasks
 - Establishment of bulletin boards
 - Metrics for monitoring progress
 - Procedures for the creation, organization and disbandment of teams
- Lean mentors and champions should be available during this phase to encourage and guide new teams
- Estimate: 19–24 months

Phase 10—Company-wide Deployment

- Deploy multiple teams in the rest of the plant
 - 5-S followed
 - Value stream mapping, and
 - Kaizens
- Establishment of bulletin boards
- Metrics for monitoring progress
- Procedures for the creation organization and disbandment of teams
- Lean mentor and champions should be easily available during this phase to encourage and guide new teams
- Estimated completion: 25-36 months

The Lean Six-Sigma Assessment

- Reflects the ten phases of the lean roadmap
- Companies should have a satisfactory score of 6 out of 7 before moving on from one phase to another
- Avoid haphazard implementation of lean six-sigma tools

The Lean Six-Sigma Assessment

Phases	Overall Description of Phase	Detail milestones to be achieved in the phase	Scale						
			1	2	3	4	5	6	7
Phase 1 Management commitment	Clear statement of purpose	Management is very familiar with lean six-sigma philosophies and knows the extent of commitment that would be necessary to embark on the lean path.							
		Management has made a commitment through a open letter prominently displayed, declaring its intent of pursue and stick to the lean six-sigma path							
		Management has shown a commitment to improve and strengthen relationships with employees							
	Visible signs of commitment	Management reads the open letter at the beginning of each lean six-sigma meeting							
		Management has clear visible involvement in all lean six-sigma meetings							
Phase 2 Communication channels	Information channels	The employees know each day how well the company did Bulletin boards in strategic places to disseminate information							
	Motivational channels	Management conducts weekly/monthly meeting to inform employees and motivate them							
Phase 3 Basic training	Company trainers available	The company has home-grown trainers who will be able to train the employees							
	Lean principles	Training has been conducted in basic lean principles for all the employees							
	Six-sigma philosophy	Training has been conducted in basic six-sigma philosophy for all the employees							
	Team training	Training has been conducted in team building amongst all the employees							
	Product oriented training	Training has been conducted in design for manufacturing, design for assembly and standardization							
Phase 4 Organizational framework	Lean six-sigma organization created	Lean six-sigma steering committee established							
		Lean six-sigma champions identified							
		Lean six-sigma coordinators (black-belts) identified							
		Role descriptions for champions and coordinators created							
	Metrics	Lean six-sigma initial metrics identified							
		Metrics articulated and published							
	WIIFM	Visible involvement of top management in creating and monitoring metrics							
		"What is in it for me" explained to the employees							
		Incentive and gainsharing plans considered and implemented							

The Lean Six-Sigma Assessment

Phases	Overall Description of Phase	Detail milestones to be achieved in the phase	Scale								
			1	2	3	4	5	6	7		
Phase 5 Implementation plan	Combined lean six-sigma plan	A comprehensive combined lean six-sigma has been developed									
Phase 6 Training in tools	5-S	Training for the relevant teams has been carried out in 5-S housekeeping									
	Value stream mapping	Training for the relevant teams has been carried out in value stream mapping of processes									
	Conducting kaizens	Training for the relevant teams has been carried out in the conducting of kaizens									
Phase 7 Pilot implementation	5-S of a pilot line	Pilot implementation of 5-S for a production unit has been completed									
	VSM of a pilot line	Pilot implementation of a value stream mapping session for a production unit has been completed									
Phase 8 Conducting kaizens	TPM	Based on the results of the value stream mapping session of the pilot line kaizen activities to demonstrate the following within the company have been carried out to act as a model for the others following the lean six-sigma journey to emulate									
	Setup reduction										
	Pull production										
	Root cause analysis										
	Standard work										
	Gage R&R										
Phase 9 VSM other lines	SPC/Pre-process control	VSM of other lines after creation of teams for lean six-sigma implementation in other parts of the company have been carried out									
	Well deployed cells										
Phase 10 Company-wide implementation	Work balancing	Company-wide deployment of lean six-sigma with special significance to the deployment of cells, work balancing amongst the various cells and employees, the continuous flow of product using pull systems and synchronized cells to optimize flow have been deployed									
	Continuous flow										
	Synchronized cells										

Conclusions

- Companies embarking on lean six-sigma should not skimp on the preliminary requirements
- Cultural change takes time
- Prevent lean six-sigma becoming another “flavor of the month” program
- Avoid “lay low below the management radar until the lean six-sigma storm has passed over” attitude
- Adopt the roadmap for a systematic approach
- Promote it as a way of life from now onwards

References

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- [3] Strategy Execution: Achieving Operational Excellence, Economist Intelligence Unit Study,
http://graphics.eiu.com/files/ad_pdfs/Celeran_EIU_WP.pdf
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Author's Biographical Sketch

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- **Current Activities:** Teach courses in lean manufacturing, six-sigma, plant layout, capital investment analysis, and product and process design. Research interests include product and process flow improvement through lean systems, application of six-sigma principles, research into world-class manufacturing concepts, design of experiments for improved product and process performance, and product design for rapid processing from concept to prototype.
- **Past experience:** Involved with the manufacturing industry since 1981. Worked as a design engineer designing special purpose machines, automated pallet systems, jigs, fixtures and tooling; worked as a manufacturing engineer involved in the building of jigs, fixtures, tooling and dies; and worked in several management positions for large and small manufacturing companies, including some with ownership.