



Office of the Chief Information Officer/G6

***U.S. Army Aviation and Missile Command
(AMCOM)***

Redstone Arsenal, Alabama

***An Investigation of the Viability of
Using SCAMPI as a
Shingo Benchmarking Mechanism***

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Agenda

- **Organizational Background**
- **Introduction to the Shingo Model**
- **Integration of CMMI and Shingo/Lean**
- **SCAMPI Shingo Benchmarking**
- **CMMI/Shingo Mapping**
- **SCAMPI Appraisal Planning**



Organization Background

- **Small, Federal organization (140 civilian/contractor)**
- **Achieved SW-CMM Level 2, August 2002**
- **Lean approach implemented, Feb 2005**
- **Achieved CMMI Maturity Level 2 and Capability Level 3 in 9 Process Areas rated, May 2007**
- **Achieved CMMI Maturity Level 3, May 2008 (w/IPPD)**



Our Journey

- **Conducted VSM in Jan 2005 which completely changed our direction**
- **Focused on Lean initiatives**
- **Allowed CMMI to earn it's way back via Kaizen events**
- **Investigated application of the Shingo Model**
- **Continued process improvement through integration of Lean, Shingo, and CMMI**



The Shingo Model

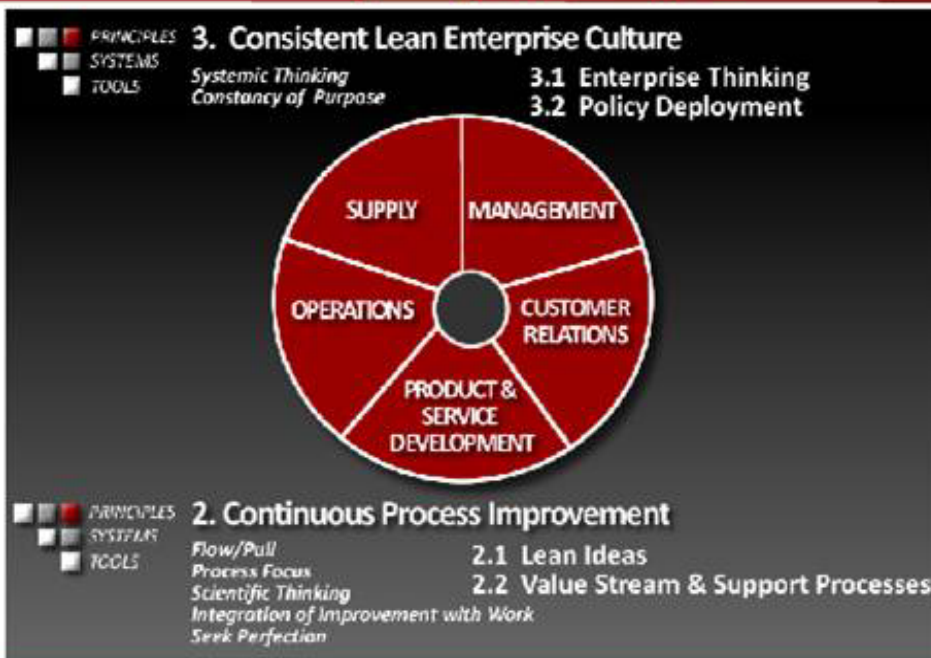
- www.shingoprize.org
- Established in 1988 to promote awareness of Lean manufacturing concepts
- Recognizes companies and Government organizations in the U.S., Canada, and Mexico that achieve world-class status
- In 2008, Shingo Prize was extended outside manufacturing to include software development and other white collar organizations
- Administered by Utah State University
- Businesses may challenge in small, medium, or large categories
- Expect 3 years of metrics
- Achievement Report and Site Visit



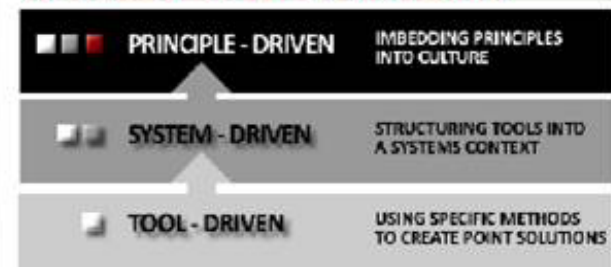
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THE SHINGO PRIZE MODEL



SHINGO LEVELS OF TRANSFORMATION





Shingo Prize

DR. SHIGEO SHINGO

The Prize is named for Japanese industrial engineer Shigeo Shingo who distinguished himself as one of the world's leading experts in improving manufacturing processes. Dr. Shingo has been described as an "engineering genius" who helped create and write about many aspects of the revolutionary manufacturing practices which comprise the renowned Toyota Production System.

Dr. Shingo is the author of numerous books including *A Study of the Toyota Production System*; *Revolution in Manufacturing: The SMED System*; *Zero Quality Control: Source Inspection and the Poka-yoke System*; *The Sayings of Shigeo Shingo: Key Strategies for Plant Improvement*; *Non-Stock Production: The Shingo System for Continuous Improvement*; and *The Shingo Production Management System: Improving Process Functions*. He was a genius at understanding exactly why products are manufactured the way they are, and then transforming that understanding into a workable system for low-cost, high-quality production.

In 1988, Utah State University recognized Dr. Shingo for his lifetime accomplishments with an Honorary Doctorate in Business. The Shingo Prize Model was developed as a world-class manufacturing model that incorporates many of Dr. Shingo's practices as well as exemplary practices from other sources. The Shingo Prize Model, however, is not just a production model. It is an overall systems model that incorporates all aspects of business operations and processes. The model was developed to promote Lean/worldclass business practices that result in world-class performance and the ability to compete globally.





The Prize





Lean Thinking

- **Focus on CUSTOMER VALUE**
 - Next customer
 - Cost, Schedule, Quality
- **Increase System FLOW**
- **Reduce LEAD-TIME**
- **Remove DEFECTS at point of origin**
- **Develop METRICS and VISUAL controls**
- **Work toward an IDEAL STATE**
- **Improve something DAILY**
- **Be Relentless and Continuous!**



Lean Thinking

Value Added Activities:

Activities that add features, attributes or benefits the customer perceives as valued (worth paying for).

Non-Value Added Activities:

Activities/delays customers do not want to pay for.

Traditional Focus

- Work longer-harder-faster
- Add people or equipment

Lean Focus

- Eliminate waste to improve workflow
- Reduce burdens



The CMMI Fixes Problems with Lean

- **“Nearly” complete sets of domain-specific best practices**
 - CMMI-Development
 - CMMI-Acquisition
 - CMMI-Services*
- **Excellent framework for improvement**
 - Generic Goals
 - Generic Practices
- **Robust appraisal method**
 - Standard CMMI Appraisal Method for Process Improvement (SCAMPI)
 - Other performance attributes may be added
- **Widely accepted standard for process improvement**



Lean CMMI Benefits

- Repeatabile, standard process for the organization
- Reduction of defects through Peer Reviews
- Improved planning activities
- Improved testing activities
- Better management insight into products
- Improved communication through Process Configuration Control Board – Peer Groups
- Adherence to process with improved PPQA process
- Improved metrics – data driven decision making
- Visual Dashboard
- OPF driven (at CL4/CL5) by Shingo Requirements

Mapping to Shingo Requirements (CMMI-DEV example)

	OPF	OPD	OT	OPP	OID	PP	PMC	SAM	IPM	RSKM	QPM	REQM	RD	TS	PI	VER	VAL	CM	PPOA	MA	DAR	CAR
DIMENSION 1 - CULTURAL ENABLERS (A visionary management team, respect for the individual, humility)																						
1.1 Leadership & Ethics (Enlightened leadership that champions lean concepts)																						
1.2 People Development																						
1.2.1 Education, Training, and Coaching (Leaders' commitment to developing people, Mechanisms for sustainment of improvements)																						
1.2.2 Empowerment and Involvement (Empower employee ownership of lean transformation)																						

Mapping to Shingo Requirements (CMMI-DEV example)

	OPF	OPD	OT	OPP	OID	PP	PMC	SAM	IPM	RSKM	QPM	REQM	RD	TS	PI	VER	VAL	CM	PPOA	MA	DAR	CAR
DIMENSION 3 - CONSISTENT LEAN ENTERPRISE CULTURE (Application of Lean to all levels of the organization, systemic thinking – [holistic thinking, dynamic thinking, and closed-loop thinking], constancy of purpose)																						
3.1 Enterprise Thinking (lean financial reporting, lean business development, lean Leadership development)																						
3.2 Policy Deployment (Scientific thinking as a philosophy and as a management process)																						

Mapping to Shingo Requirements

	OPF	OPD	OT	OPP	OID	PP	PMC	SAM	IPM	RSKM	QPM	REQM	RD	TS	PI	VER	VAL	CM	PPOA	MA	DAR	CAR
DIMENSION 4 - BUSINESS RESULTS (Business must create and flow value, operational excellence at the micro level, measurement is vital to scientific thinking)																						
4.1 People Development (Voluntary participation, employee safety, environmental health)	█	█		█																█		
4.2 Quality (No errors passed downstream, designs that meet customer needs)							█				█	█				█	█		█	█		█
4.3 Delivery (Flexible responsiveness, measurement and improvement of cycle time, and customer ratings)	█			█	█		█		█				█	█						█		
4.4 Cost (Reduction in cost structure, improvements in productivity)	█			█	█		█		█											█		
4.5 Financial Impact (Revenue, cash flow, market share)	█			█	█		█		█											█		
4.6 Competitive Impact (Flexibility, ease of doing business, and linked/ synchronized processes)	█			█	█		█		█											█		



Shingo Benchmark Appraisal Planning

(SCAMPI V1.2)

- **Section 1.1.1: Determine appraisal objectives**
 - “Provide Shingo benchmark of organization’s processes, tools, and culture”
 - Map Shingo Model elements to SP and GPs (extension to PIIDs)
 - Conduct gap/sufficiency analysis of PIID mapping
- **Section 1.1.3: Determine appraisal scope**
 - Ensure full organizational scope (to include financial functions)
 - Consider multi-model implementation to ensure broad organizational scope
- **Section 1.1.4: Determine outputs**
 - Non-CMMI findings: Satisfaction of Shingo Model elements
 - Shingo Evaluation Forms (Percentages)
- **Section 1.3.3: Prepare team**
 - Ensure appraisal team has been exposed to content and context of Shingo Model



Benefits of SCAMPI A Shingo Benchmarking

- **SCAMPI A is accepted Benchmark for comparison of organizations**
- **Clear definition of organizational unit in context of Shingo requirements**
- **Mapping of Shingo (lean) requirements to CMMI practices ensures lean implementation**
- **Institutionalization of Shingo (lean) processes can be fairly asserted and demonstrated**
 - **Consistent use of processes**
 - **Implementing technologies**
 - **Knowledge/training implementation**
- **Benchmarking/measurement of improvements over time**
- **Appraisal output supports Shingo Achievement Report generation**



Questions?



Backup



Lean Improvement Benefits

- **VSM Conducted Feb 2005 resulting in 14 Kaizen events and many tasks**
- **Kaizen improvements yielded new Software Engineering Process (SEP) iterations**
- **Improved metrics – data driven management**
- **Eliminated unnecessary steps identified as wastes**
- **Provided customer's first critical needs faster**
- **Test driven approach focused on FTQ**
- **Improved workload/workflow management/staffing**
- **Better communication through teaming**
- **Reduced backload**





CMMI

- **Focus on improving quality of products and deliverables**
- **Reduce defects and risks**
- **Increase efficiency**
- **Collect metrics**