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What I am going to be talking about . . .

- The evolution of Lean and Six Sigma concepts
  ~20 minutes

- The increasing focus on Supply Chain Management
  ~5 minutes

- How Lean Six Sigma can help
  ~15 minutes
How many of you work in quality control?
Origins of Quality

In the good old days . . .
Need for Quality Control

Production Innovations + Management Innovations → Lack of Ownership

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The Inspection Approach to Quality Control

Defect free

SCRAP
Exhorting People to ‘do better’
Deming’s Red Bead Experiment
A Focus on Process

Brilliant process management is our strategy. We get brilliant results from average people managing brilliant processes. [Others] get average results from brilliant people managing broken processes.

Toyota’s Philosophy for Manufacturing Excellence
The Six Sigma Approach to Quality Control

Define

Measure

Analyze

Improve

Control
How many pieces at your table setting?
How many pieces at your table setting?

<table>
<thead>
<tr>
<th>Pieces</th>
<th>People</th>
<th>Opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>140</td>
<td>980</td>
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<table>
<thead>
<tr>
<th>Defect</th>
<th>Sigma</th>
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<tbody>
<tr>
<td>1</td>
<td>4.59</td>
</tr>
<tr>
<td>5</td>
<td>4.08</td>
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<tr>
<td>10</td>
<td>3.83</td>
</tr>
<tr>
<td>15</td>
<td>3.67</td>
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What is Six Sigma?
The Evolution of Six Sigma

1980s
American companies face competition from Japan

1987
Motorola launches Six Sigma

1987
The US government introduces the Malcolm Baldrige National Quality Award

1988
Motorola receives first Malcolm Baldrige National Quality Award

1996
Jack Welch introduces Six Sigma at General Electric
LEAN
What is Lean?

A set of concepts and tools to maximize value while reducing costs and eliminating waste in

- the production process
- the utilization of labor
- producing and carrying inventory
The Evolution of Lean

1950s
Post World War II
Reconstruction in Japan

Late 1970s
- Oil Embargo
- Japan in Recession
- Impact of TPS

1980s
Toyota joint venture with GM
New United Motor Manufacturing Inc

1990
“The Machine That Changed the World”,
James Womack & Daniel Jones

1996
“Lean Thinking”,
James Womack & Daniel Jones

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A Focus on Waste - Waiting
A Focus on Waste - Overproduction

The (Whirlpool) distribution system often had to soak up excess inventory, using as many as 15 temporary buildings for stockpiles of dishwashers, dryers and stoves.

Whirlpool Cleans Up Its Delivery Act
By Joe Barrett
23 September 2009
The Wall Street Journal
The Samurai warrior was trained to draw his sword and wield it – in one smooth motion
Supply Chain Management

Managing the flow of information, materials, and finances as they move between suppliers, manufacturers and consumers
Why is Supply Chain Management Important?

- Supply chain as a competitive advantage
- Advances in information technology
- Dynamic markets
- ~10% of GDP spent on supply chain activities
How Can Lean and Six Sigma Help?

- Root Cause Analysis
- Poke Yoke
- Failure Modes Effects Analysis
- A Focus on Data and Metrics
Root-Cause Analysis

Worker slipped on the shop floor

Why?

Worker did not see puddle of oil on the floor

Why?

No sign was posted

Why?

No sign is available

Why?

Obtain signs and ensure sign is posted to warn of oil spills, wet floors, etc

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Worker slipped on the shop floor

Why?

Oil is leaking from machine

Why?

Seal has worn out

Why?

We obtained seals of poor quality

Why?

Introduce process to audit quality of procured materials and parts
How Can Lean and Six Sigma Help?

- Root Cause Analysis
- Poke Yoke
- Failure Modes Effects Analysis
- A Focus on Data and Metrics
Which dial turns on the burner?
Which dial turns on the burner?
Diesel or Gas?
Login

12345678 & 1234

or

1234 & 12345678

Poke Yoke Solution

12345678

1234

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How Can Lean and Six Sigma Help?

- Root Cause Analysis
- Poke Yoke
- Failure Modes Effects Analysis
- A Focus on Data and Metrics
Failure Modes Effects Analysis

• Severity
Failure Modes Effects Analysis

• Occurrence

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Failure Modes Effects Analysis

• Detectability
How Can Lean and Six Sigma Help?

- Root Cause Analysis
- Poke Yoke
- Failure Modes Effects Analysis
- A Focus on Data and Metrics
How do you know your supply chain is doing a good job?

“In God we trust, everyone else must bring data”

.... W. Edwards Deming
The Importance of Data
On Counting . . .

1, 2, and 3?
Some Supplier Assessment Metrics

- Lead Time
- Flexibility
- On-Time Performance
- Delivery Frequency
- Delivery Lot Size
What does it take to Implement Six Sigma?


http://www.videosift.com/video/Hyper-efficient-Lunch-Delivery-in-Bombay-India


Lunch Delivery in Mumbai
Question

How many of you work in quality control?
The Missing Link in the Supply Chain

The Auditor
Thank You