

50
Years of Advancing Pressure Sensitive Tapes

Applying Six Sigma at 3M

David Osten

Copyright © 3M 2002-2003
Pressure Sensitive Tape Council

3M Company Vision & Values

*To be the most innovative enterprise
and the preferred supplier.*

Values

- Satisfy customers with superior quality, value and service.
- Provide investors an attractive return through sustained, quality growth.
- Respect our social and physical environment
- Be a company employees are proud to be part of.

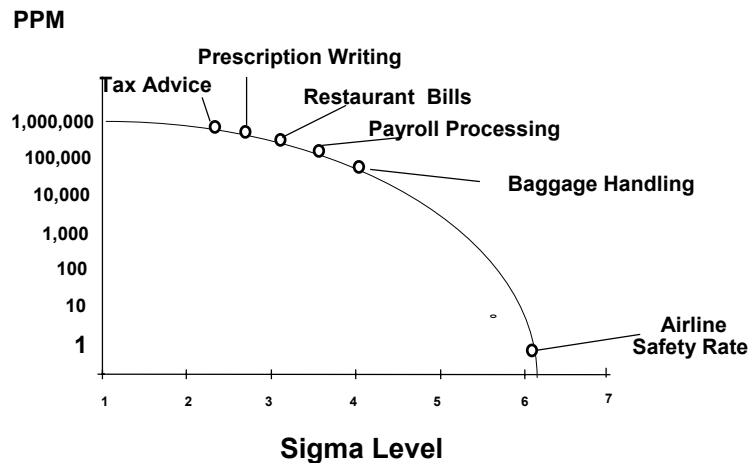
What is Six Sigma?

- A proactive means of achieving excellence in all business processes
- A measurement of performance or improvement in economic profit
- A data- and fact-driven approach versus a predominantly intuitive approach
- A methodology to promote continuous improvement, correct and prevent defects
- Goal: Growth, increased productivity, higher earnings

Copyright 3M 2002-2003

50 Years of Advancing Pressure Sensitive Tapes

What Does Six Sigma Mean In Your Daily Life ?



Copyright Sigma Breakthrough Technologies, Inc.
Used with SBTI permission

50 Years of Advancing Pressure Sensitive Tapes

Six Sigma Is ...

Initiative

- Improvement
- Breakthrough
- A Systematic, focused approach
- Right projects
 - Linked to business goals
- Right people
 - Selected and trained
- Project management
 - Management reviews
- Sustaining gains
- Right results
 - Process and financial (\$\$)

Methods and Tools

- Process thinking
- Process variation
- Facts, figures, data
- Define, Measure, Analyze, Improve, Control (DMAIC)
- Statistical tools
- Critical few variables

Copyright 3M 2002-2003

50 Years of Advancing Pressure Sensitive Tapes

Six Sigma Definition....

Six Sigma is a *methodology* for pursuing *continuous* quality *improvement* and reducing inherent *variability*. It requires a thorough *process and product understanding* and is clearly focused on *customer driven* expectations.

Copyright 3M 2002-2003

50 Years of Advancing Pressure Sensitive Tapes

Why Did 3M Embrace Six Sigma?

- Right Process for Business Decisions within 3M
- Provides Common Approach to Problem Solving
- Common Goals
- Institutes a common language throughout the corporation, with suppliers, and customers
- Develops transferable skills to all levels
- Provides Leadership Development throughout all disciplines within the corporation
- Most effective way to increase and accelerate our business performance and customer quality

Copyright 3M 2002-2003

50 Years of Advancing Pressure Sensitive Tapes

Six Sigma: Supporting 3M Company Goals

Customers

Better Products
Meet Needs
Responsiveness

Employees

Development of
Talent
Energizing
Organization

Shareholders

- Growth
- Productivity
- Cash

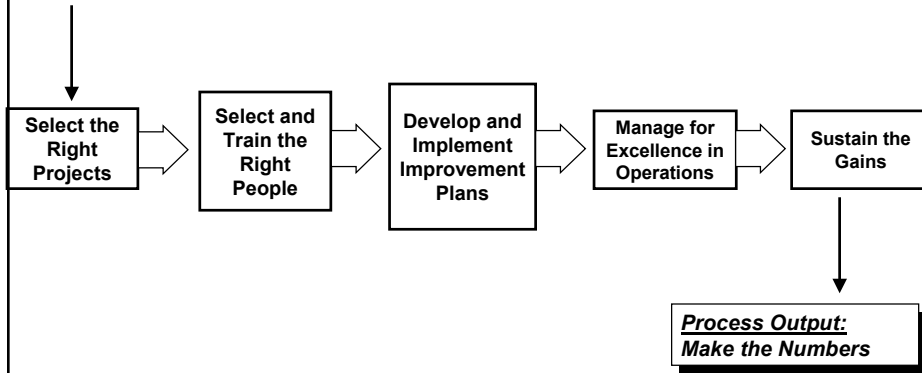
Driving 3Six Sigma to the Bottom Line

Copyright 3M 2002-2003

50 Years of Advancing Pressure Sensitive Tapes

A Simple Approach...

Process Input:
Strategic and Annual Business Objectives and Targets



Copyright Sigma Breakthrough Technologies, Inc.
Used with SBTI permission

50 Years of Advancing Pressure Sensitive Tapes

Our Six Sigma Areas Of Focus

Growth

- Commercialization Cycle Times
- Sales & Marketing Effectiveness
- Customer

Cost (Operating Margin)

- Manufacturing
- Supplier

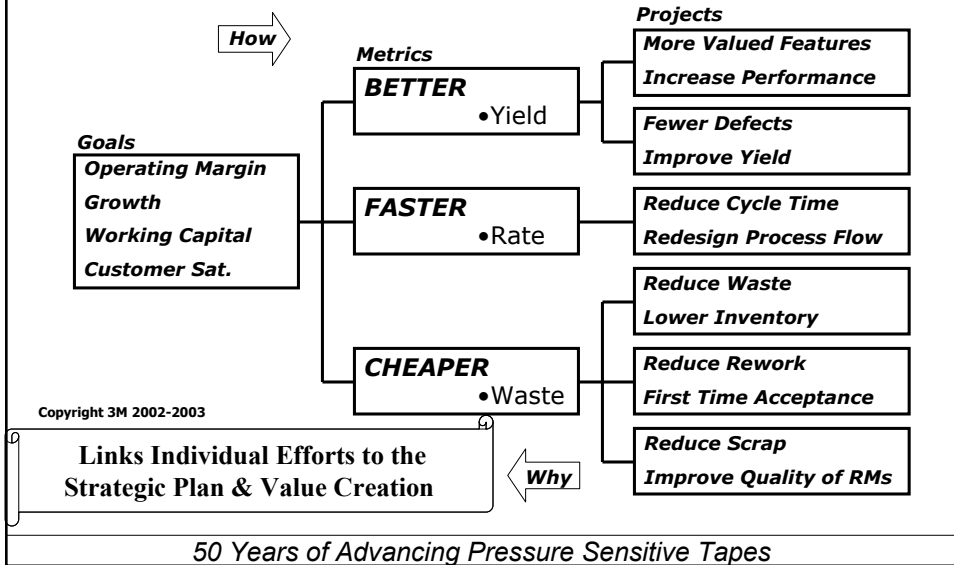
Cash

- Receivables
- Inventory

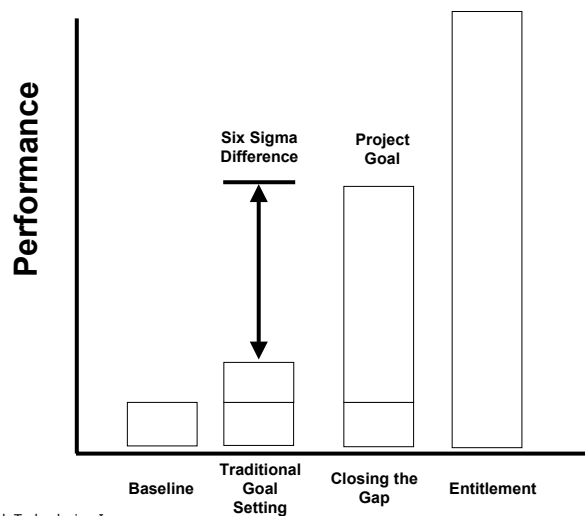
Copyright 3M 2002-2003

50 Years of Advancing Pressure Sensitive Tapes

Goal Tree Alignment & Project Selection



Pursuing Entitlement....



The Funneling Effect.....

Y's = Key Process Output Variables

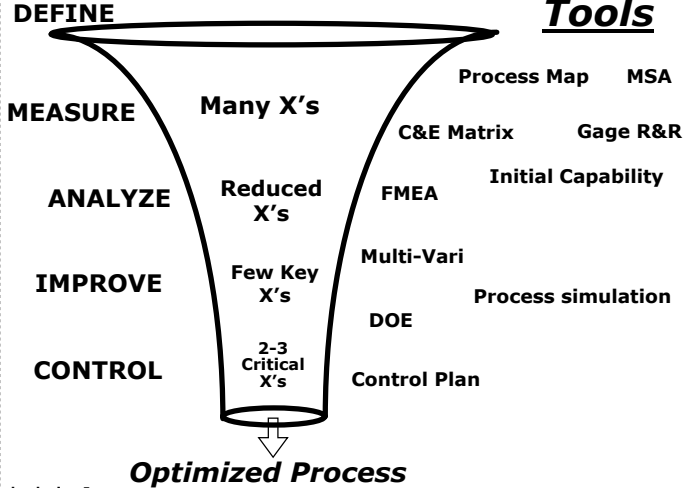
X's = Key Process Input Variables

Tools

- Yield
- Rate
- Waste

- Effectiveness
- Efficiency

$$Y=f(X)$$



Copyright Sigma Breakthrough Technologies, Inc.
Used with SBTI permission

50 Years of Advancing Pressure Sensitive Tapes

The Roadmap...

$$Y = f(x_1, x_2, x_3, x_4, \dots, x_n)$$

Performance of the output over Time
Variation of the output

Measurement Variability + Initial Capability Assessment

Process Map

Prioritization Matrix

The Roadmap Reduces the inputs from the trivial many to a "vital few"

Risk assessment

FMEA reduces variation and effects for "inputs gone wrong"

Key inputs

Multi-Vari identifies Noise variables and reduces the inputs for Real Experiments

Experiments identify the Critical x's and their relationship to the Y

$$Y = f(x_7, x_{22}, x_{57})$$

Controls in place for Critical inputs

Copyright Sigma Breakthrough Technologies, Inc.
Used with SBTI permission

50 Years of Advancing Pressure Sensitive Tapes

What Does this Mean to 3M?...

- ***A roadmap to breakthrough performance...***
 - Entitlement thinking and goal setting
 - A disciplined methodology to drive value creation
 - Links the strategic plan to business critical Y's

Copyright 3M 2002-2003

50 Years of Advancing Pressure Sensitive Tapes

Six Sigma and Leadership at 3M

Copyright 3M 2002-2003

50 Years of Advancing Pressure Sensitive Tapes

LEADERSHIP IS THE KEY TO SIX SIGMA.....

Leaders Must:

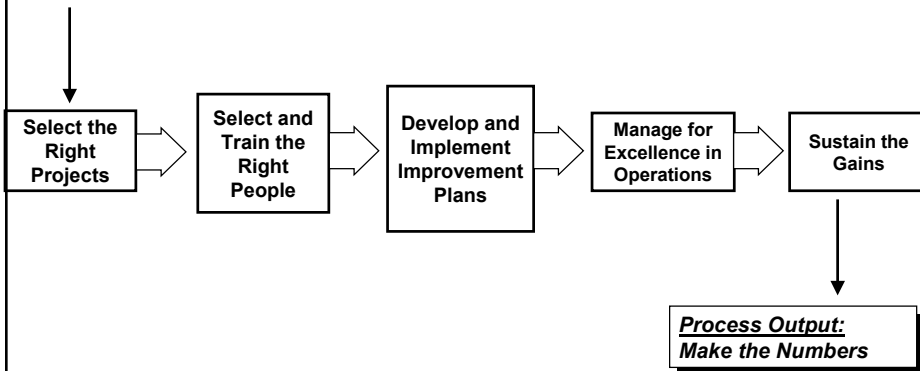
- . Understand It***
- . Use It***
- . Demand It***
- . Resource It***
- . Spend Time on It***
- . Measure It***
- . Reward It***
- . Teach It***

Copyright 3M 2002-2003

50 Years of Advancing Pressure Sensitive Tapes

A Simple Approach....

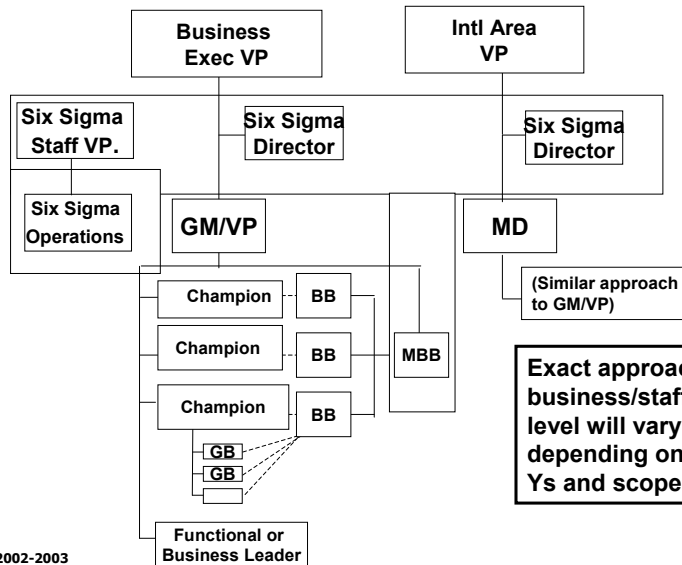
Process Input:
*Strategic and Annual Business
Objectives and Targets*



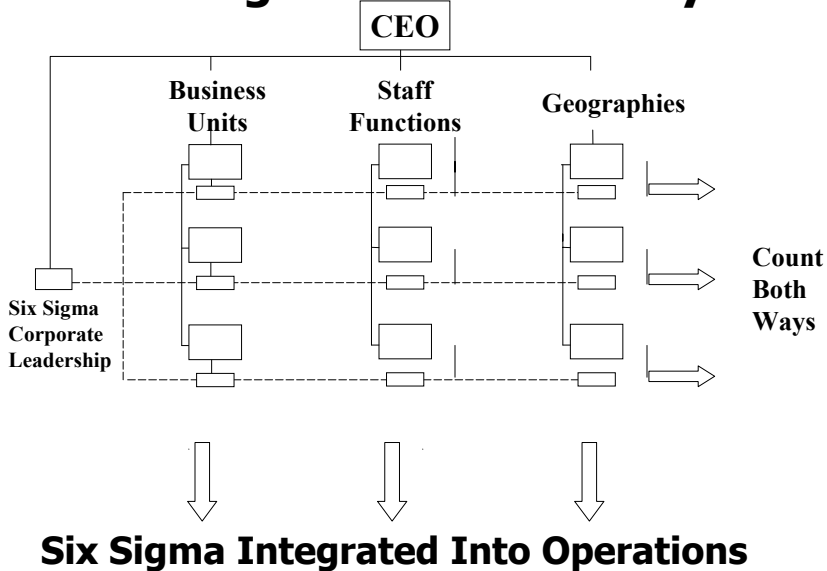
Copyright Sigma Breakthrough Technologies, Inc.
Used with SBTI permission

50 Years of Advancing Pressure Sensitive Tapes

Structure of the 3M Six Sigma Organization



Six Sigma Accountability



3M's Six Sigma Journey and Goals...

- Initial Launch – Feb. 2001 with 3M senior leadership
- Build on 3M's history of improvement
- Training is focused on results/projects
- 4,000 people were trained by year end 2001, over 10,000 in 2002.
- Goals in place to have all global salaried personnel "belt" trained by year end 2004.

Copyright 3M 2002-2003

50 Years of Advancing Pressure Sensitive Tapes

The State of Six Sigma at 3M

- Strong support!
 - 2001 – a year of launching, training
 - 2002 – a year of results
 - 2003 – becoming part of the 3M culture
- Over 3,000 projects underway globally
 - Essential to meeting improvement goals (\$\$)
- The top priority at 3M
 - A tool to help everyone perform better
- DFSS deployment underway

Copyright 3M 2002-2003

50 Years of Advancing Pressure Sensitive Tapes

Lessons Learned.....

- Projects must be aligned with business goals
- Full time Black Belts and Master Black Belts are required
- Six Sigma is the way we work at 3M – Value of a common language
- Train the organization, share best practices
- Scoping of projects is absolutely critical
- Involve key operators, customers, suppliers, etc.
- Controller involvement to validate financials

Copyright 3M 2002-2003

50 Years of Advancing Pressure Sensitive Tapes

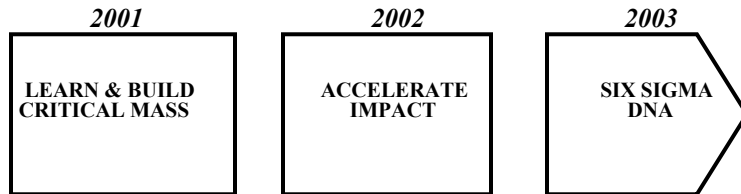
THOUGHTS TO TAKE-AWAY

- Entitlement Thinking is KEY
- Follow the Priorities - Goal Trees
- Process Owners
- Management Ownership
- Communicate! Communicate!

Copyright 3M 2002-2003

50 Years of Advancing Pressure Sensitive Tapes

3M Road To Six Sigma ...



Copyright 3M 2002-2003

50 Years of Advancing Pressure Sensitive Tapes