

Lean
six
sigma
integrated

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Topics

- Background
- Some Thoughts
- Assumptions
- Selection
- Linkages
- Application
- Summary

Background

- Lean Six Sigma is Usually Associated with the George Group
 - Michael F. George wrote “Lean Six Sigma: Combining Six Sigma Quality with Lean Speed” in 2002
 - Followed by “Lean Six Sigma for Service” in 2003
 - Followed in 2004 with “What is Lean Six Sigma” with Bill Kastle and Dave Rowlands
- A very specific approach to using both methodologies
 - Multiple equations and specific definitions for things such as “Net Present Value (NPV)”
 - The four keys of Lean Six Sigma etc.

Background

- Today Multiple Books and Approaches Available
 - Enter “Lean Six Sigma” in Google and you’ll get 1.2 million hits
 - Army Materiel Command (AMC) for one
- These Approaches Can’t All be Right or Wrong
 - Experience suggests a thorough understanding of each methodology and their “rightful application” is the best measurement of success

Some Thoughts

- It's Interesting that in the 2002 Book, One of the Subsets of Chapter 14 titled "Lean Six Sigma Logistics" is "Fundamental Logistics Cost Drivers"
- It's Equally Interesting that in the 2004 Book, There are Multiple References to "Delighting the Customer", to Dr. Deming's work and Other "Key Components" of Change

BOTTOM LINE: The Various Methodologies All Have Some Unique Aspects but Many More Similarities and Can be Integrated to Produce "Unique" Results -- as Long as.....

Some Thoughts

.....the Output was Pre-determined, Rather than Accidental



For That to Happen, A “Foundation” has to be in Place, or in the Process of Being Developed

- An Understanding of the Primacy of the Customer
- A Zeal for Improving the Process
- An Appreciation for the Power of Teams
- A Desire to Incorporate Stakeholder Requirements
- Decision by Fact
- Direct Involvement by Senior Leadership
- Positive Labor Management Relations
- A Detailed Strategic Plan with Accompanying Measures of Performance

Assumptions

- An Organization Accepts the Foundational Requirements as Valid
- An Organization is Willing to “Close the Gap” if One Exists in These Areas
- In Addition, an Organization will Also Accept the Need for Basic Components of Change Management to be in Place
 - Proper resourcing for the effort
 - Well-defined communications campaign
 - Clear goals and objectives
 - A detailed implementation plan
 - A leader dedicated to the effort

Is Organization Looking for an Approach or a Tool?

- An Approach

- Long-term/high investment
- Emphasis on “Principles” - the core philosophy
- All components of change management in place to be successful
- Multiple tools, on multiple processes at multiple times
- Outcome: a new operating style

- A Tool

- Short-term/low investment
- Emphasis on a particular tool, maybe two or three at the most
- Some degree of “local” buy-in required
- Specific to one process or component
- Outcome: pockets of improvement that may or may not be sustained

An Approach

Lean

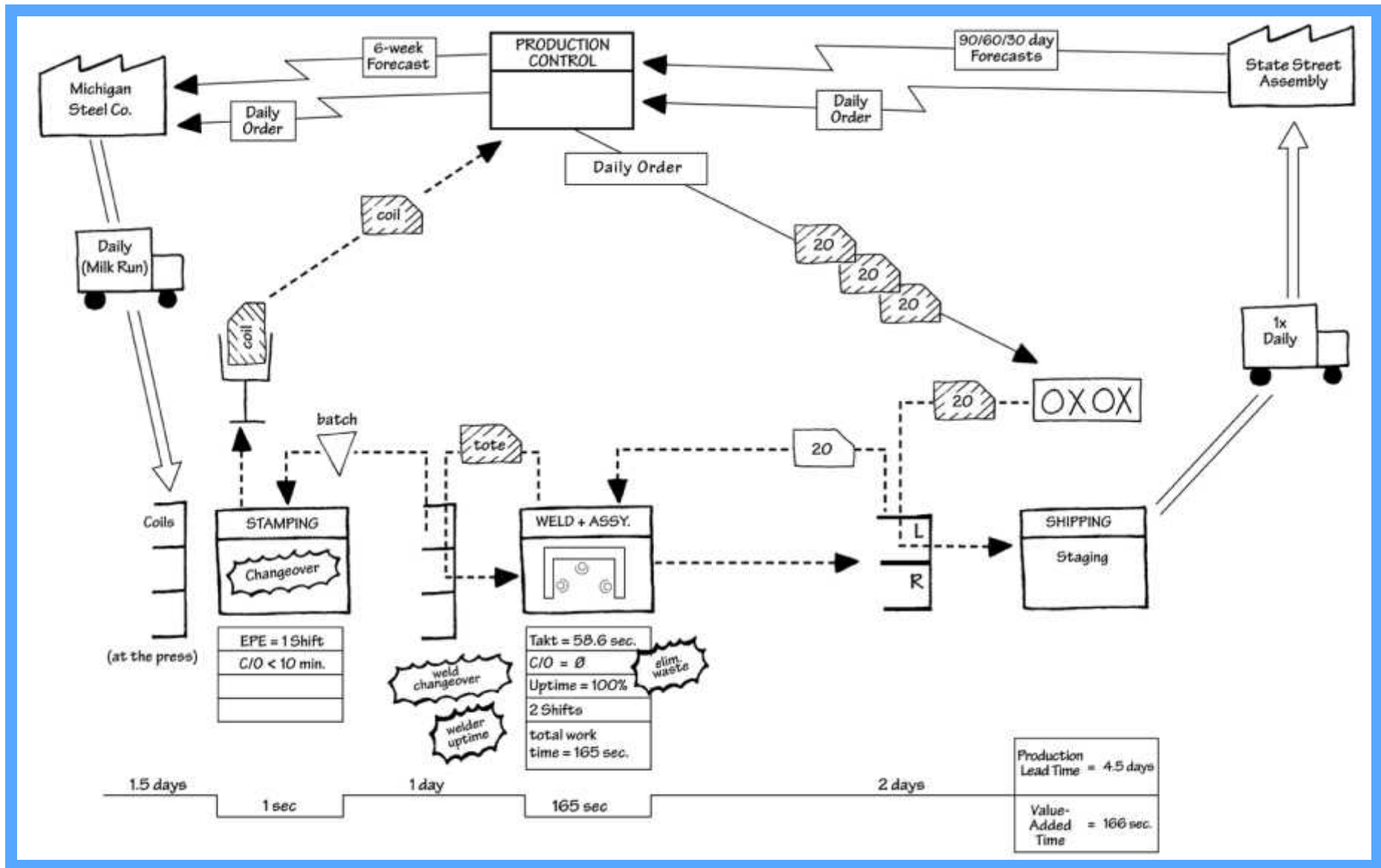
- Value
- Value Stream
- Flow
- Pull
- Perfection

Six Sigma

- Define
- Measure
- Analyze
- Improve
- Control

- (Cost):** The CUSTOMER expects to pay the negotiated/budgeted amount for any Warfighting support
- (Quality):** The CUSTOMER expects a safe, functional product or service. Does standard work meet their expectations?
- (Delivery):** The CUSTOMER expects us to meet the delivery schedule. Every day beyond the promised delivery date jeopardizes the performance of their mission

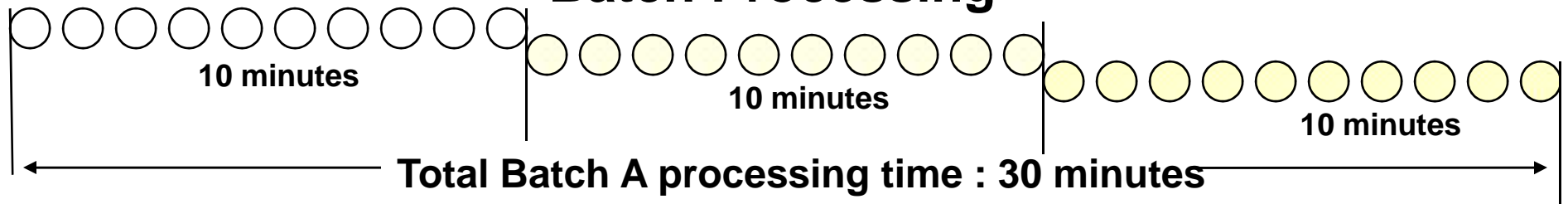
Value Stream



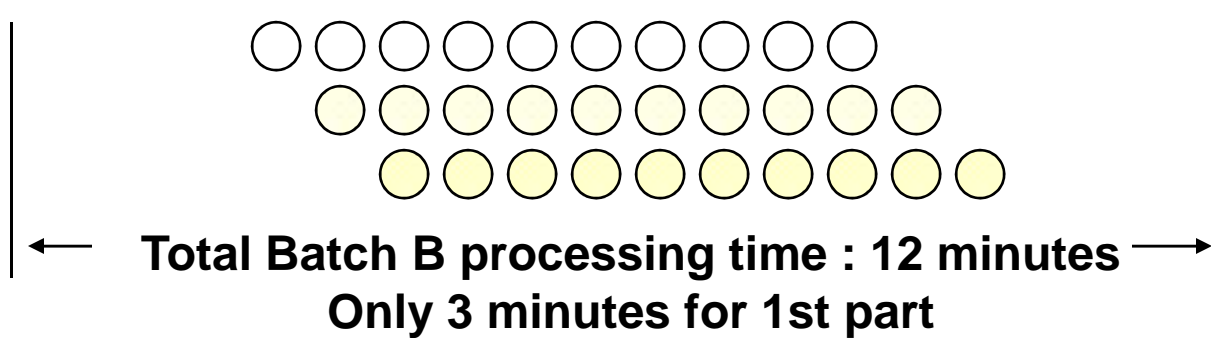
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- Value - Hands-on activity that delivers a product or service to a customer for which they are willing to pay
 - Non-Value Added - Activities which consume more than the least amount of resources required to perform work which is essential for the business, its products, or customers.
 - Waste – Any activity that consumes resources but creates no value
 - Can be Type I: Necessary and Can't Be Eliminated
 - Or Type II: Developed Internally and Can Be Eliminated

Flow

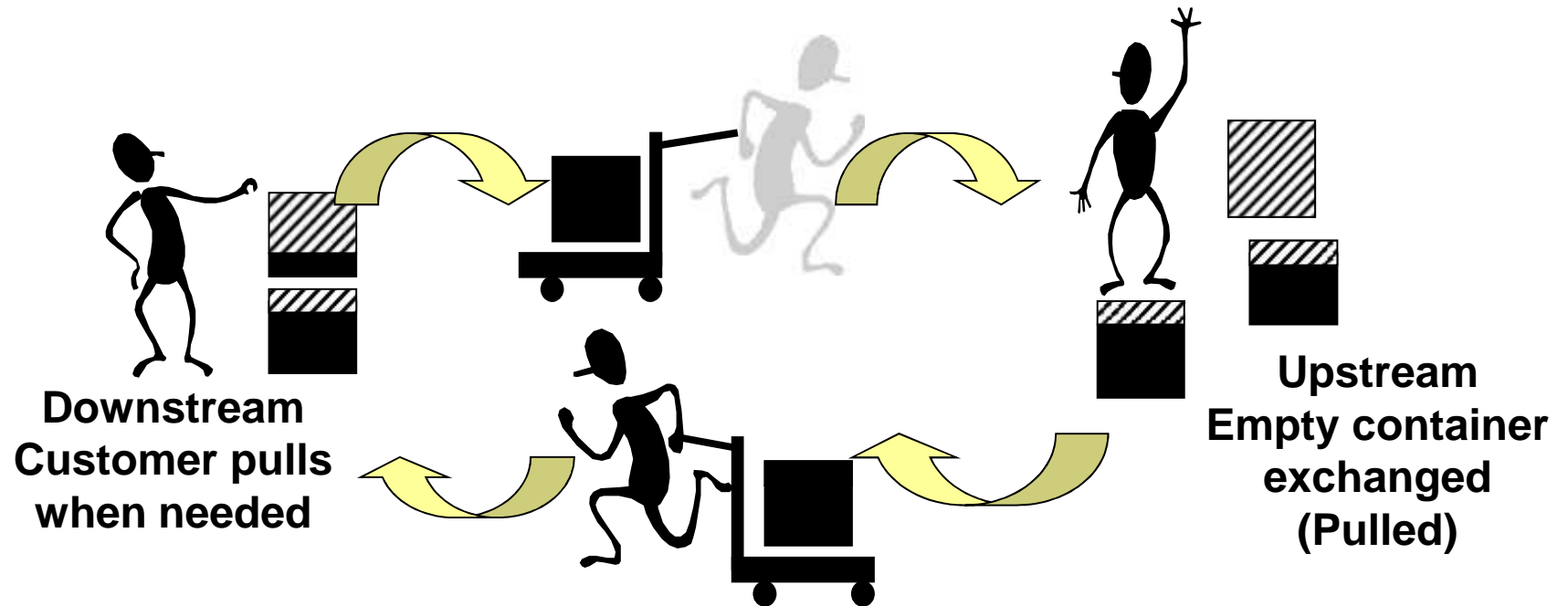
Batch Processing



Continuous Flow Processing



Pull



Trigger (empty container) informs
downstream (what, when, where, how many)

**Institute a system where production/program management
at each station is triggered by demand from the customer.**

Perfection

**Perfection by lean definition is the complete elimination of waste.....
And is surely impossible.**

“Lean Thinking”

Womack and Roos, 1996

But Six Sigma Comes Awfully Close



Six Steps To Six Sigma

Step 1: Identify the product you create or the service you provide

Step 2: Identify the Customer(s) for the product or service and determine what they consider important

Step 3: Identify your needs (to provide product/service so that it satisfies the Customer).

Step 4: Define the process for doing the work

Step 5: Mistake-proof the process and eliminate wasted effort.

Step 6: Ensure continuous improvement by measuring, analyzing and controlling the improved process

Six Steps To Six Sigma

Visualize

- Identify need for change
- Describe current state
- Define goals / objectives
- Create a vision of the future

Commit

- Accept the need for change
- Understand / buy-in to goal
- Defined roles (team, individual)
- Commit

Prioritize

- Perform an assessment
- Estimate results
- Identify / prioritize opportunities

Characterize

- Document current performance
 - › Metrics
 - › Process flow
 - › Critical factors
- Translate opportunities into a plan for improvement

Improve

- Design and implement improvements and control systems

Achieve

- Deliver measurable results
- Build momentum for change
- Celebrate success!

Lean

- Value Stream Mapping
- Visual Management
- Standard Work
- Cellular Design
- Six S
- Set up Reduction
- Mistake Proofing
- Takt Time Determination
- TPM

Six Sigma

- Control Charts
- Design of Experiments
- FM&EA
- Simulation & Software Modeling
- Process Flowchart
- Matrices
- Pareto Analysis
- Ishikawa Diagrams

Factors Which Impact Organizational Decisions

- Previous Experience with the Approach
- Level of Maturity
- How Much of the Platform is Burning?
- What Are The Driving Factors?



Lean as Part of Six Sigma

- Utilize Value Stream Mapping as Part of the “Define” Phase
- Kaizen Events as Part of the “Analyze” and “Improve” Phases
- Develop Standard Work as Part of the “Control” Phase
- Implement Visual Management as Part of the “Improve” and “Control” Phases

Lean as Part of Six Sigma

- Incorporate the Seven Wastes as Part of the “Analyze” Phase
- Implement a Five S Program as Part of the “Improve” Phase
- Utilize Mistake Proofing as Part of the “Control” Phase

Six Sigma as Part of Lean

- Use of Statistical Control Tools Prior to Establishing Standard Work
- Use Data Analysis to Validate the Current State Value Stream Map
- Use Analysis Tools to Validate the Future State Value Stream Map

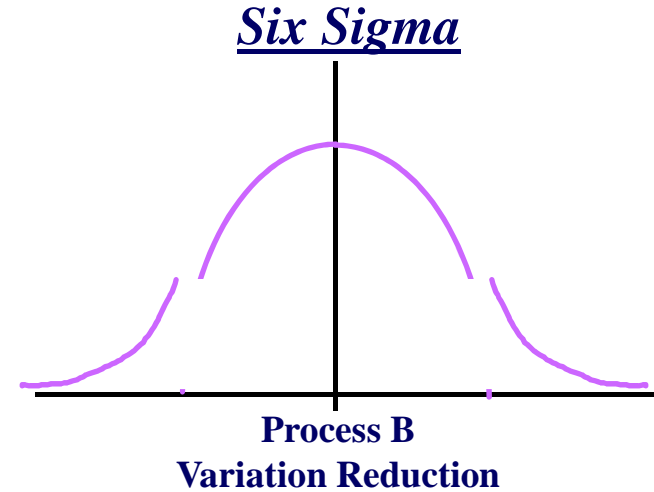
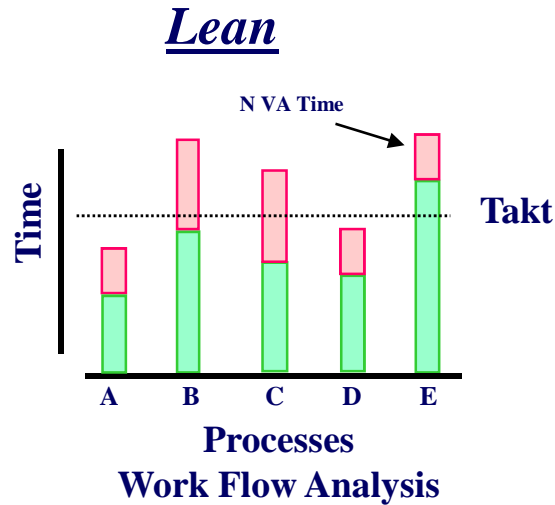
In Either Case

- Without Knowing the Costs Associated with Each Activity How Can Anyone Determine What is Value vs. Non-Value Added? And...
- If the Role of Each Activity as it Relates to Other Activities is not Clearly Understood -- How Can the True Impact (Value) of That Activity be Determined?

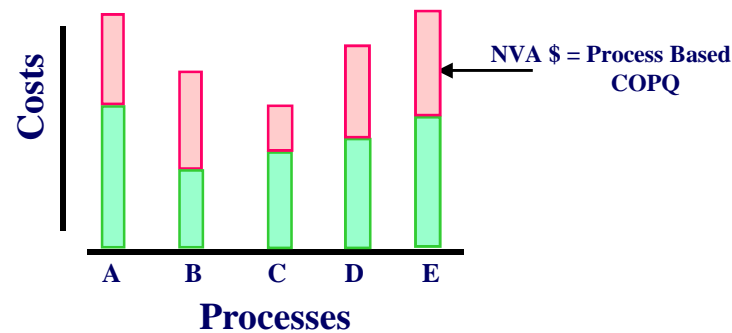
The Synergy Created by the Integration of These Approaches Answers the Questions

- To Which Process Steps do we First Apply the Appropriate Tools?
- In What Order and What Degree?
- How do we Maximize Improvement Opportunities in Cost, Quality and Lead Time and do it Quickly?

Application



Process Based Cost Data (ABM)

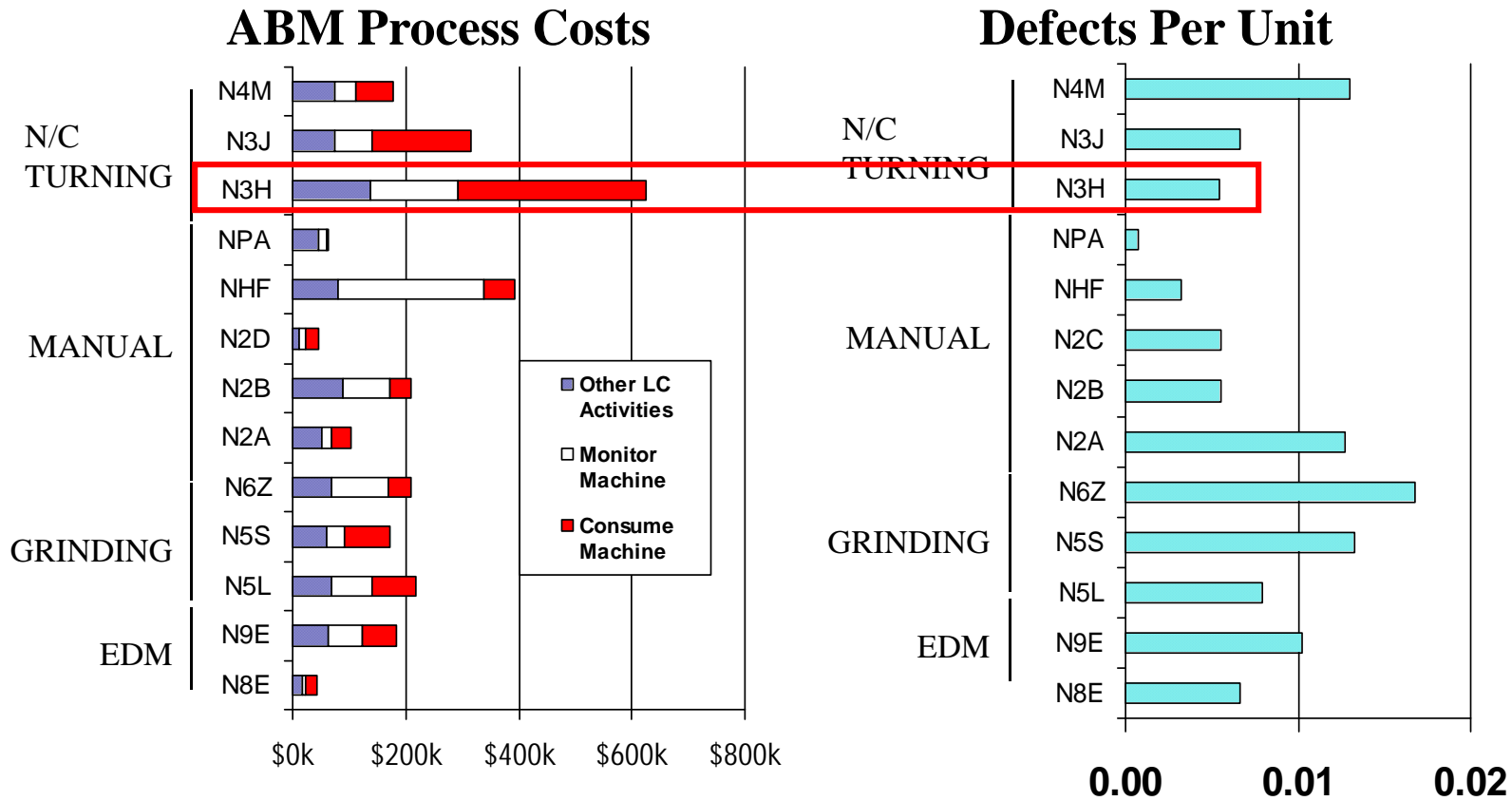


Prioritization, Measurement & Investment Justification

Three Concepts: No One Does it All

Application

ABC/M Provides Additional Data for Process Improvement Project Selection



Achieving significant cost reductions will require the use of data on both defects and process/activity costs

ABC/M as a Building Block and Contributor to Lean and Six Sigma Through...

- Chargebacks and Service Level Agreements
- Continuous Process Improvement
- Budgeting
- Balanced Scorecard
- Capacity Analysis
- Cost of Quality
- Target Costing
- Product Costing
- Change Management
- Performance Metrics/Benchmarks
- Outsourcing



Ground Systems Division

BAE SYSTEMS

Results in Engine and Test are significant



Hours Per Unit (Baseline Dec. 31, 2004)	Percent Improvement
Bradley Reman	21%
Bradley Reset	35%
AAV 7	24%
M109	6%

Ground Systems Division

Results on Bradley Turret Line are Significant !!!



Category (Baseline Dec. 31, 2002)	Percent Improvement
Hours Per Unit	30%
WIP Value	75%
W.O.'s/Year	95%
Turret Travel	67%
A3 Turret Cycle Days	67%

Integrates approximately 1900 Parts, 12 LRUs and Over One Million Lines of Code

Thoughts?
Comments?
Questions?



"Say... what's a mountain goat doing way up here in a cloud bank?"