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Applying CMMI High Maturity Practices and Leveraging LEAN Six Sigma

October 2008

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BAE Systems, Land & Armaments Grounds Systems

History

- April 02
  - We achieved CMM level 4 rating
- January 03
  - We achieved CMM Level 5
- June 04
  - We achieved CMMI Level 5

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Wow weren’t we something?

Moving to CMMI Level 4

- At Level 3 we began gathering lots of data
  - Cost
  - Schedule
  - Estimation
  - Defect…
- At Level 3 we began using control charts
- At Level 3 we began using and building models built on industry and project data

We are Process Improvement Professionals

We have lots of experience

- Creating process documentation
- Developing flow-charts
- Developing IDEF charts
- Conducting process evaluations
- Software and Systems Engineering

We Have Support

- Senior Management backs activities and decision making
- SE and SW Functional managers are proponents and participants
- We have several years worth of data
- We have consulting support

What's Wrong With This Picture?

We are dissatisfied with our efforts

"…I see the data but I don't know what it means…"

"…I can't ask a project to change behavior when we only have a few data-points..."

We Could Do Things Different

- Six Sigma and the Lean Enterprise
  - Value Stream Mapping
    - Current and future states
    - Instrumented
    - Provides simple model of process

What is Value Stream Mapping (VSM)

- Identify steps in process selected for improvement
- Understand process flow
- Understand bottlenecks
- Brainstorm ways to reduce bottlenecks
- Make process change

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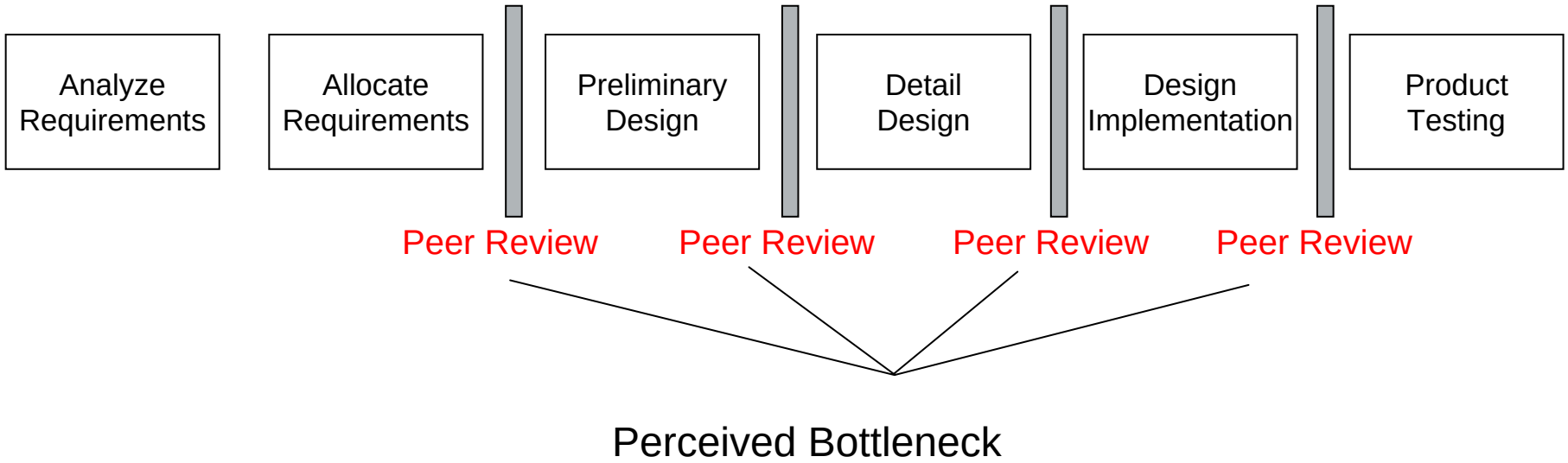
Consider Engineering Process

High-Level Engineering VSM Current State



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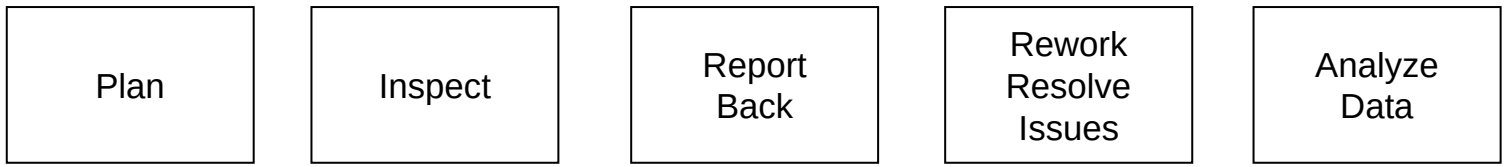
Analyze Perceived Bottleneck

High-Level Peer Review VSM



Plan	Inspect	Report Back	Rework Resolve Issues	Analyze Data
Measure:	Measure:	Measure:	Measure:	QPM
Time Spent	Time Spent	Time Spent	Time Spent	OPP
	Defects	Defects		
	Count	Count		
	Class	Class		
	Category	Category		

Understand Process

- Measurement and Analysis
  - VSM current process
    - Document time spent
    - Document # of individuals involved
    - Document size of product reviewed…
- Quantitative Management
  - Six Sigma/Statistical Analysis
    - Control Charts
    - Pareto and Histogram
    - Regression Analysis…

Analyze Outcome of Process Implementation

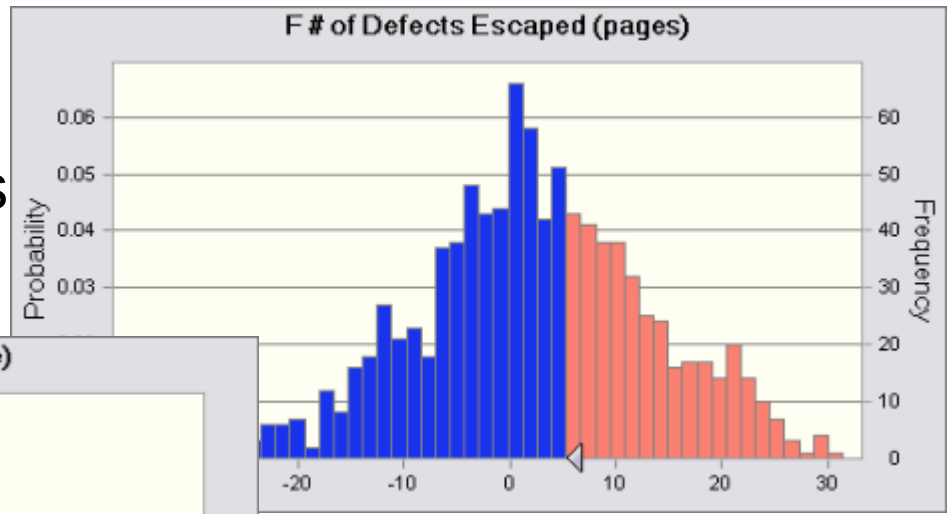
Organization Process Performance

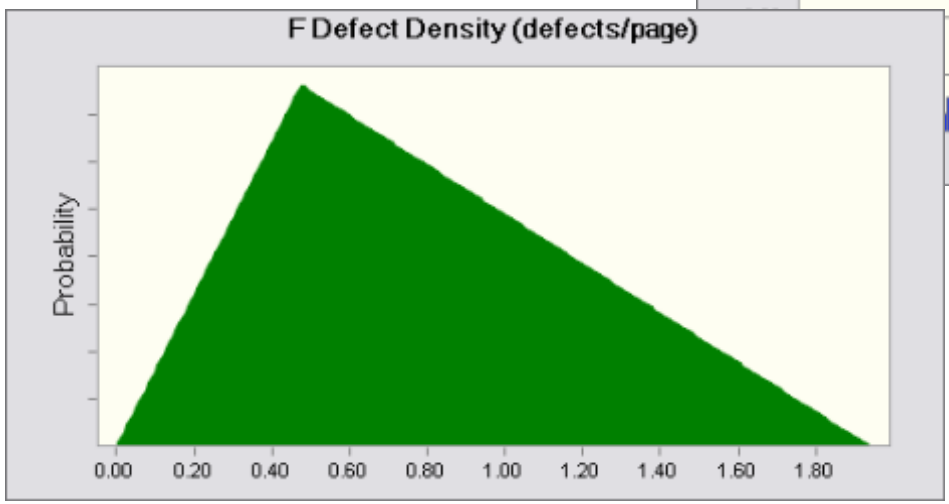
- More Six Sigma
  - Regression analysis
  - Monte Carlo simulation
  - Histogram

PR Data Modeled

Control Factors/User Input
- Product type and size
- # Reviewers

Model Output
- Predicted Defect Escapes
- Predicted Defect Density





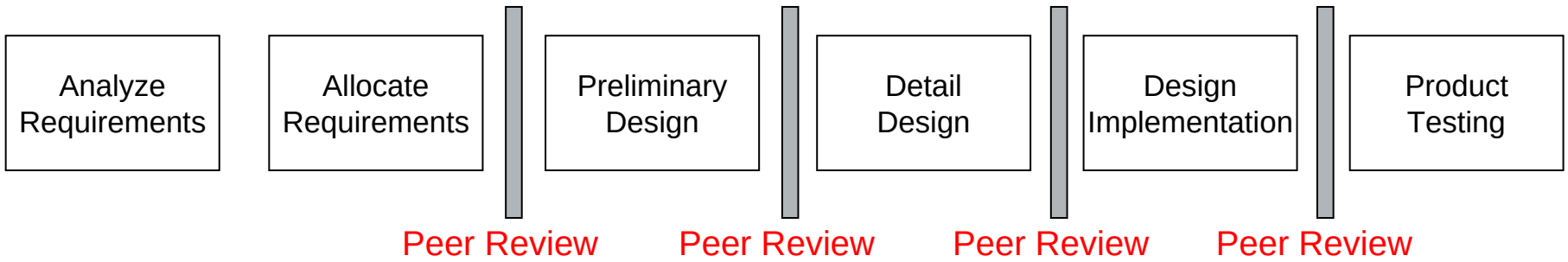
Project Application of Resulting Model

Establish parameters for application of peer reviews based on available resources, schedule and willingness to accept risk

- defects escaped is less than or equal to ‘x’, y% of the time
- expected cost of peer reviews

High-Level Engineering VSM Future State

- Organization Process Performance
  - Model of what will happen if changes are made
- VSM stays the same but time and cost can be altered
- Peer reviews necessary but time and effort can be modified to increase flow or meet quality needs



Analyze New Current State

- Project collects same measures
- Organization analyzes actual results
- Modeling helps to identify areas for improvement

Different Views

- OPP stuff is big and scary, requires lots of knowledge about data analysis and statistics
- Model to monitor and react
  - Identify areas for process improvement
- Model to test possible changes

We're Beginning to Get it

- Six Sigma and Lean Enterprise pair well with CMMI
  - Help understand current process implementation and identify areas for improvement
- KISS
  - Keep it simple silly
- Don't let the theory get in the way of the implementation
- The more we know the more we need to do