

Process Improvement Proposals (PIPs) Organization, Team, Individual

AIS Experience Report

TSP Symposium
September 18-20, 2006

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PSP

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Capability Maturity Model, CMM, Capability Maturity Model
Integration, CMMI, CERT

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Topics

Issues

- ◆ Quality and Schedule
- ◆ Rational Management and Commitment
- ◆ Insanity and Malpractice

Three Improvement Perspectives

- ◆ Organization - CMM/CMMI
- ◆ Individual – PSP
- ◆ Team – TSP

Continuous Improvement Mechanism – Process Improvement Proposal

- ◆ AIS Experience

Lessons Learned

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Quality Is More Important Than Schedule

“In today’s software marketplace, the principal focus is on cost, schedule, and function; quality is lost in the noise. This is unfortunate since poor quality performance is the root cause of most software cost and schedule problems.”

Watts Humphrey

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Rational Management - Developers

When pressed for early deliveries, the responsible team members say

“I understand your requirements, I will do my utmost to meet it, but until I make a plan, I can not responsibly commit to a date”

Rational Management - Managers

When pressed for early deliveries, the responsible managers say

“I trust you to create an aggressive and realistic plan, I will review the plan, but I will not commit you to a date that you can not meet”

Insanity or Malpractice?

Insanity

Doing the same thing over and over and expecting a different result

Malpractice

An organization which does not have a top-management-sponsored continuous improvement initiative in place

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Organization Improvement Capability Maturity Model

Level	Focus	Key Process Areas (KPA)
5 Optimizing	Continuous process improvement	Defect prevention Technology change management Process change management
4 Managed	Product and process quality	Quantitative process management Software quality management
3 Defined	Engineering process	Organization process focus Organization process definition Training program Integrated software management Software product engineering Intergroup coordination Peer reviews
2 Repeatable	Project management	Requirements management Software project planning Software project tracking Software quality assurance Software configuration management Software subcontract management

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Issues Addressed by CMM

Getting management attention

Maintaining long-term improvement focus

Guiding the improvement work



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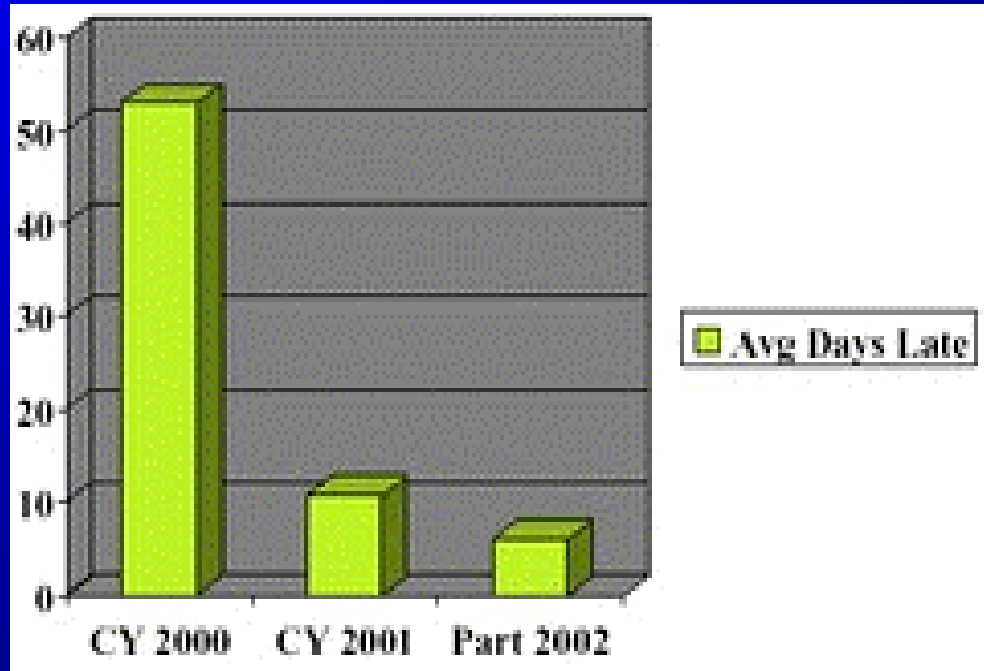
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CMM Results – Schedule

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Average number of days late in meeting milestones declined from over 50 days to fewer than 10 following organization focus on CMMI



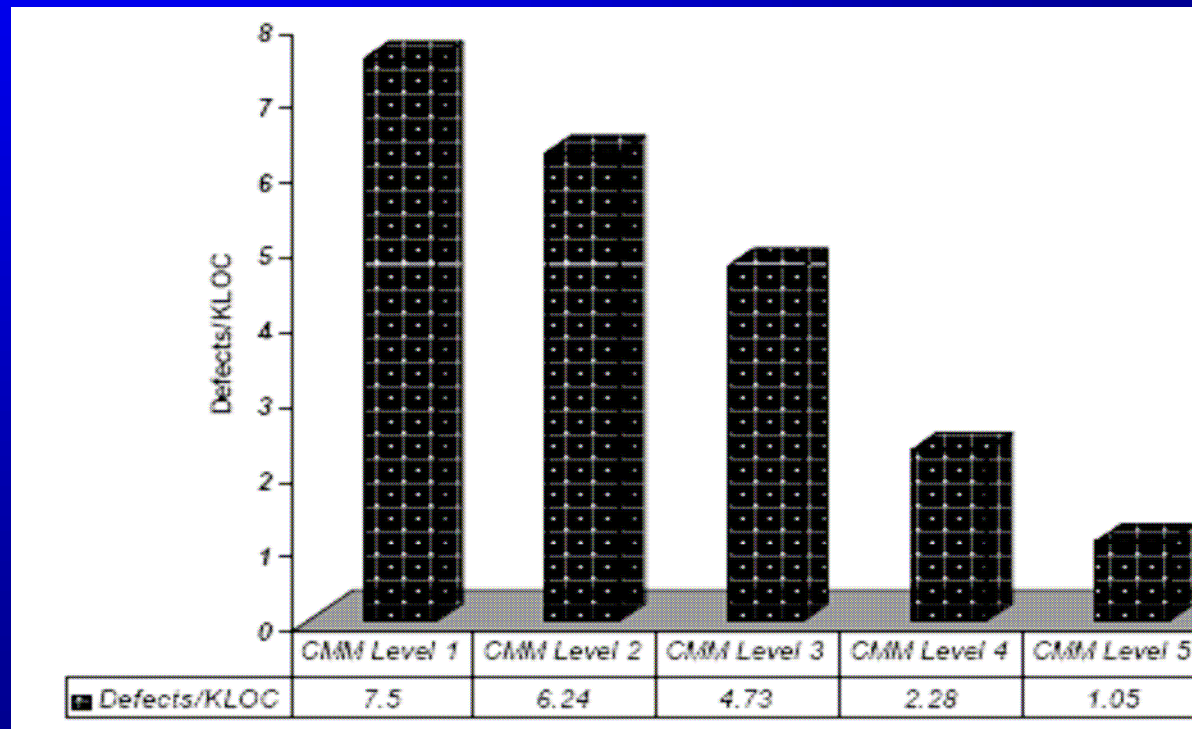
General Motors Presentation, SEPG, Boston, MA, 2003

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CMM Results – Defects



CMM Problems

No simple model could precisely measure process maturity and complex models are not useful in guiding improvement

CMM consciously focused on *what* organization should do, not on *how* they should do it

The teamwork practices and personal disciplines required for quality software work are almost entirely issues of *how*, and not just *what*

Because engineers will not change the way they work without very specific guidance, the CMM does not change engineering behavior

The Real Need

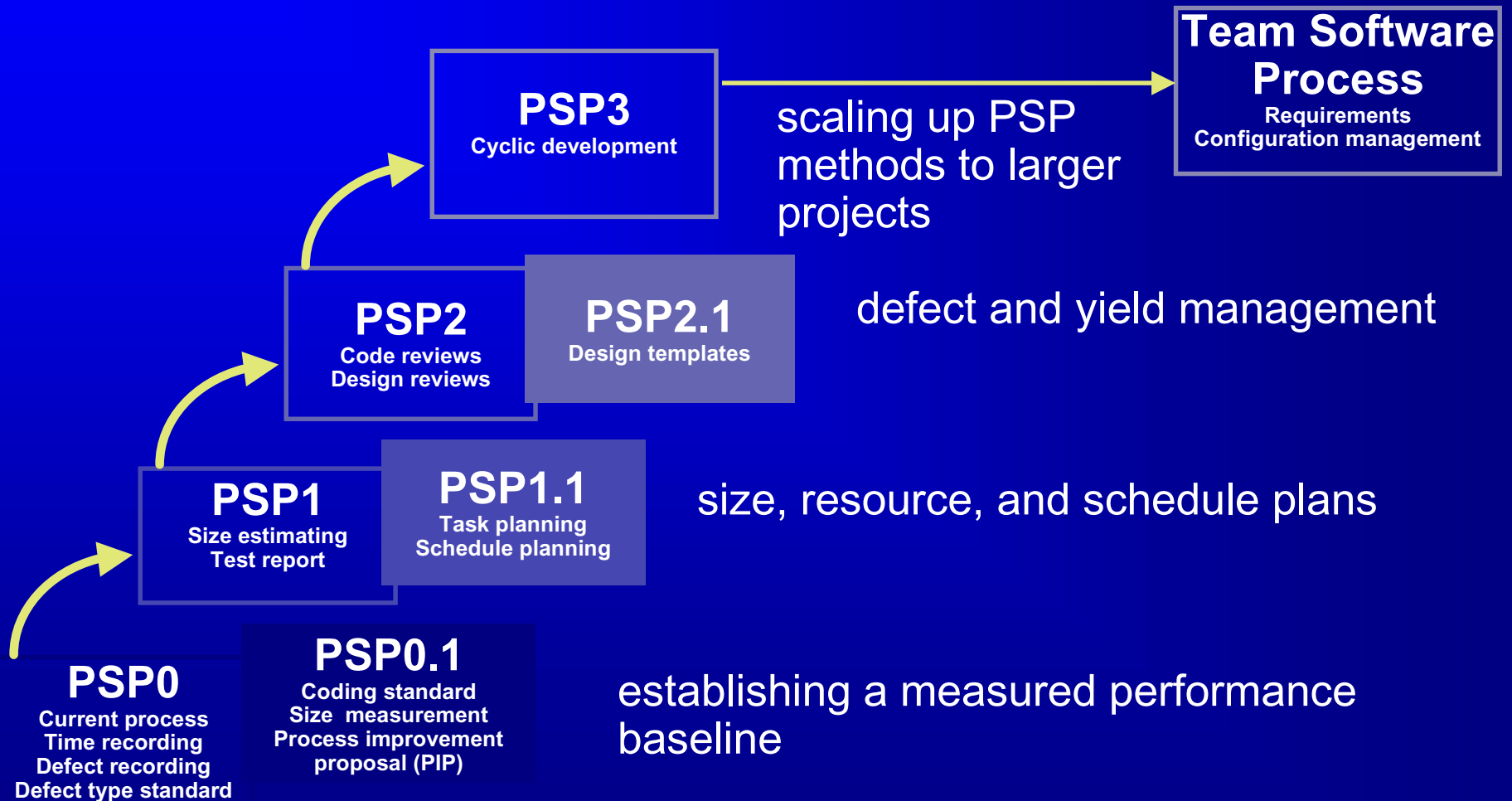
The need is not for lots of process data but for engineers who gather and use that data

What would happen if software professionals used sound engineering practices?

- made and followed detailed plans
- gathered and used historical data
- measured and managed quality
- analyzed and improved their processes

The need is for a Level 5 Process at the individual level

Self Improvement Personal Software Process - 1



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Source: Software Engineering Institute

Self Improvement

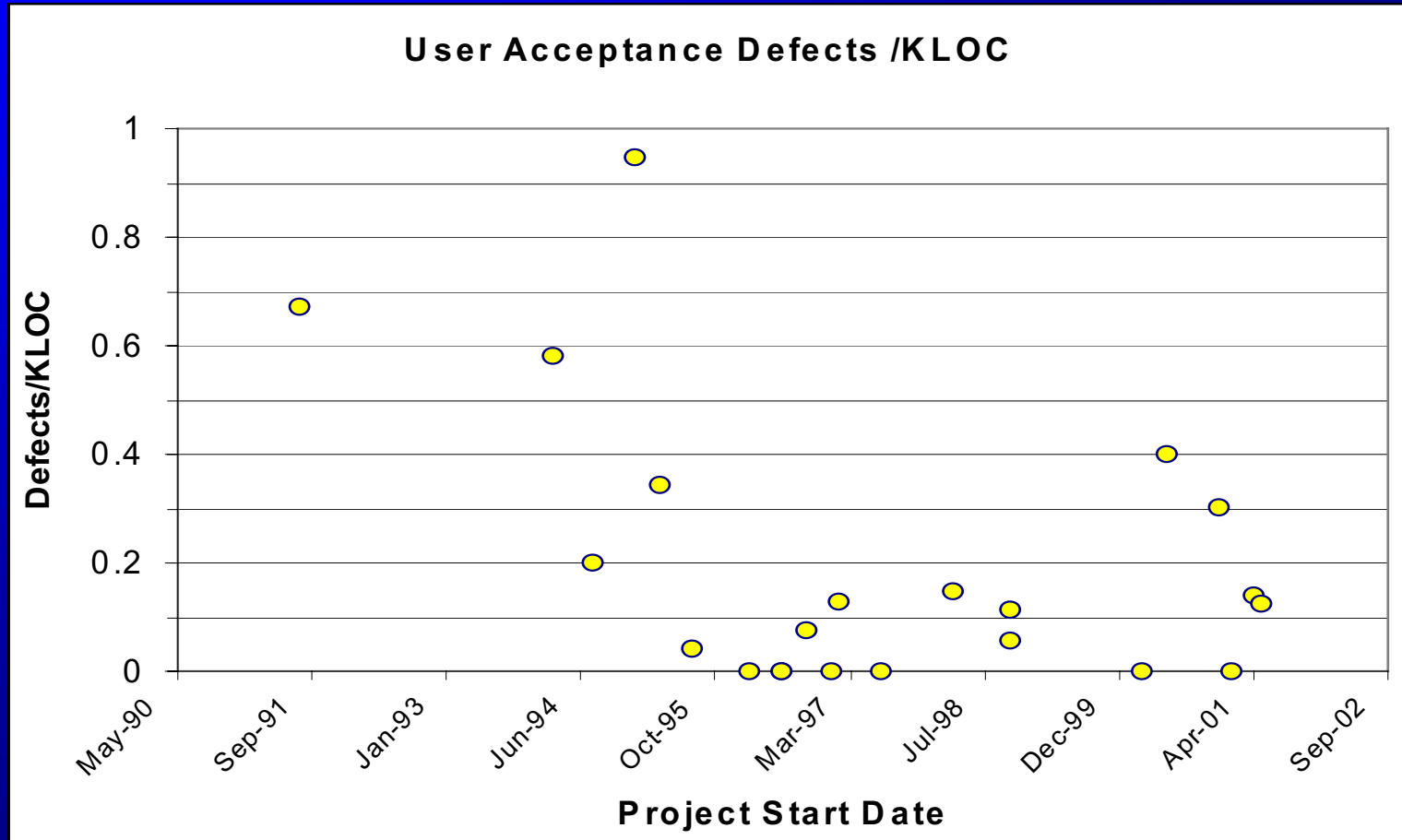
Personal Software Process -2

At the end of the PSP training, developers know how to:

- ◆ Consistently gather size, time, and defect data
- ◆ Make commitments based on historical data
- ◆ Analyze personal data to answer questions
 - Where am I spending my time?
 - What are my common defects?
 - Where do I inject the defects?
 - What goals do I need to set to improve?

PSP Results – Defects

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PSP Problems

To do quality work, engineers need a detailed plan and a defined process

Without the process, they cannot make detailed plans, take consistent measurements, or track their work against the plan

However, when engineers have a project to deliver, they are rarely willing to take the time to define a complex process, even when they know how

The Real Need

Need a mechanism to guide teams through defining their processes and making complete, precise, and detailed plans

Need a vehicle to help organizations capitalize on the potential benefits of disciplined teamwork

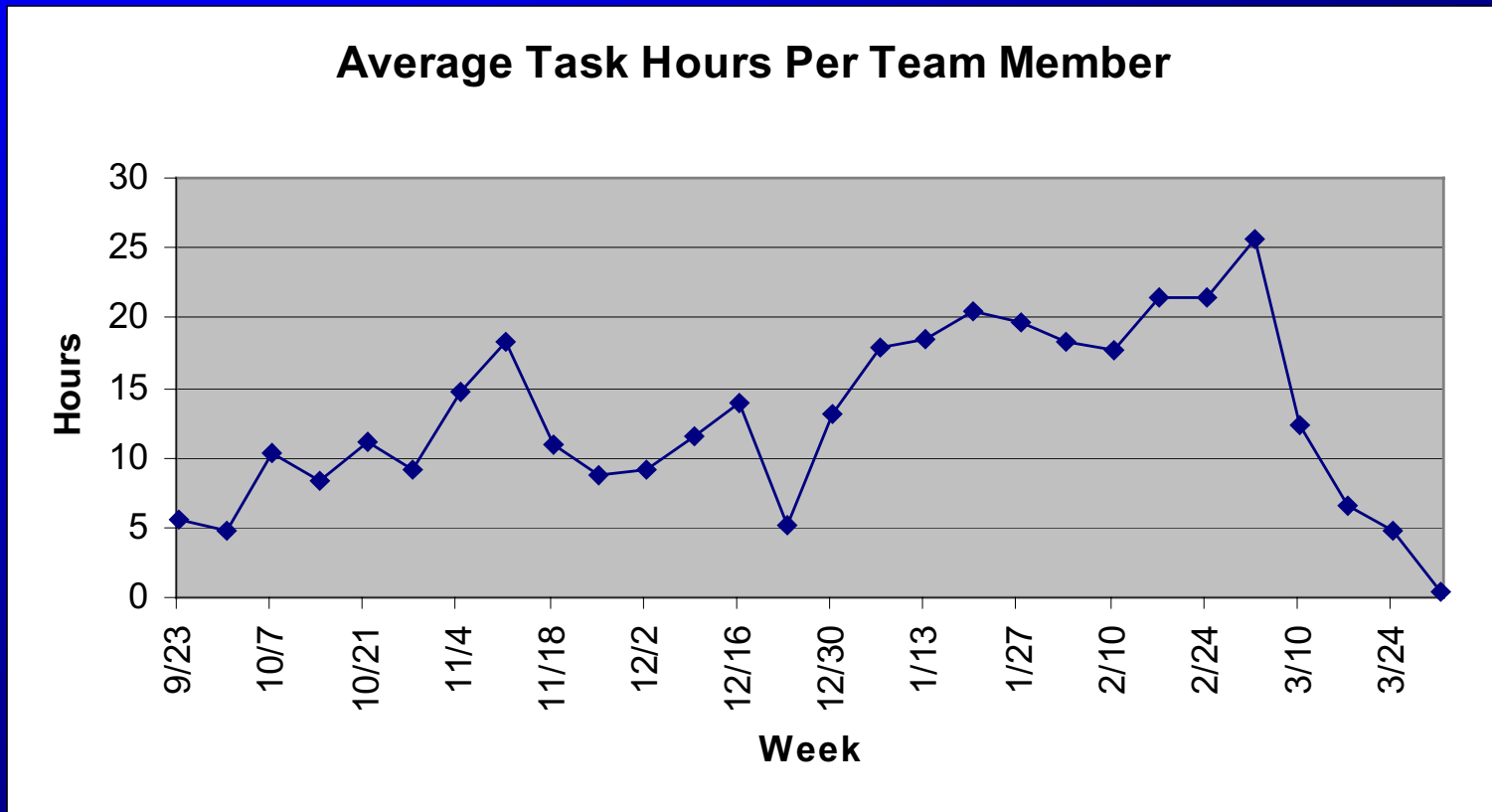
Team Improvement

Self-directed Teams

Characteristics of self-directed teams

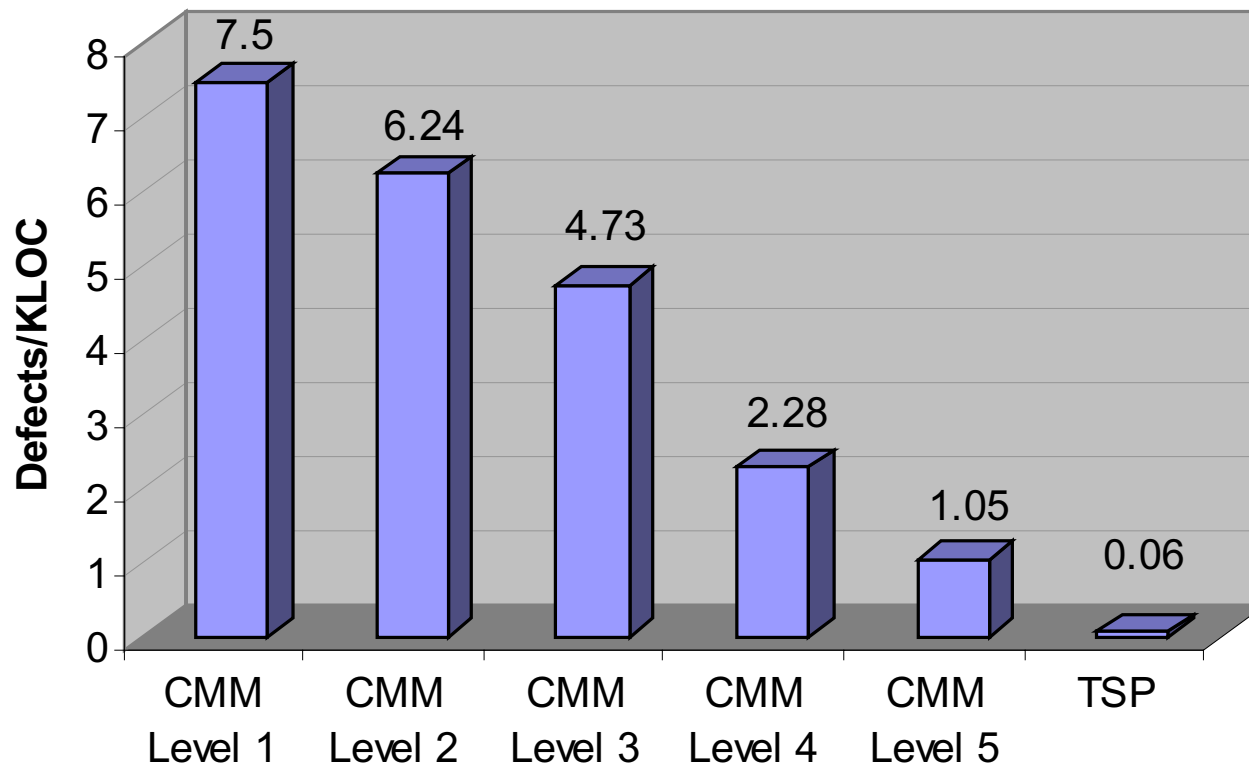
- Sense of membership and belonging
- Commitment to a common team goal
- Ownership of the process and plan
- The skill to make a plan, the conviction to defend it, and the discipline to follow it
- Dedication to excellence

TSP Results – Task Hours

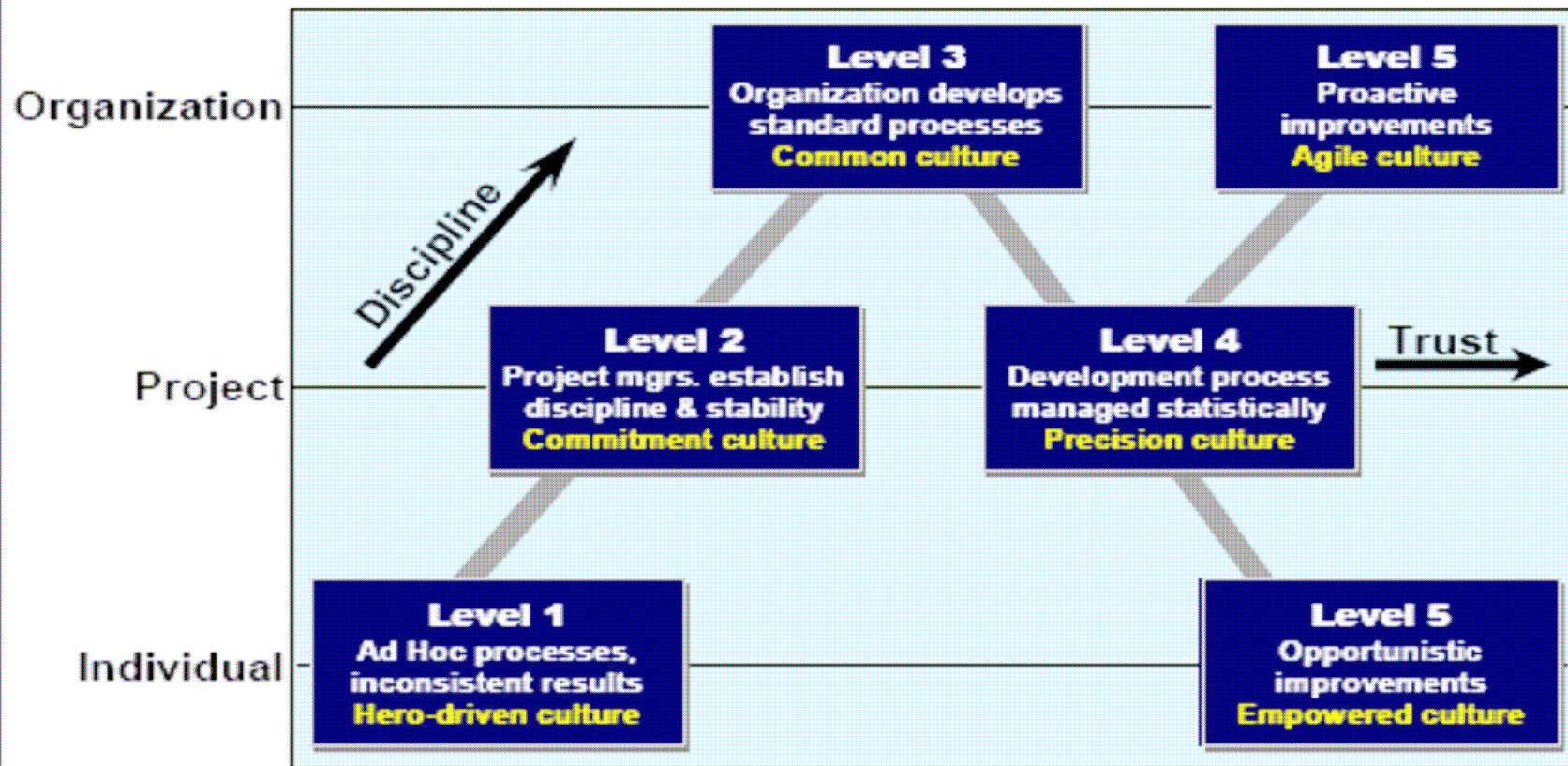


TSP Results - Defects

Defect Density of Delivered Software



Transforming the Culture



Borland®

Source: "From MCC to CMM", Dr. Bill Curtis, DC SPIN, April 2006

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Process Improvement Principles

It takes time, skill, and money to improve the software process

To improve the software process, someone must work on it

Unplanned process improvement is wishful thinking

Automation of a poorly defined process will produce poorly defined results

Improvements should be made in small steps

Train, train, train!

Source: *Managing the Software Process*, Watts Humphrey

Empowered Culture

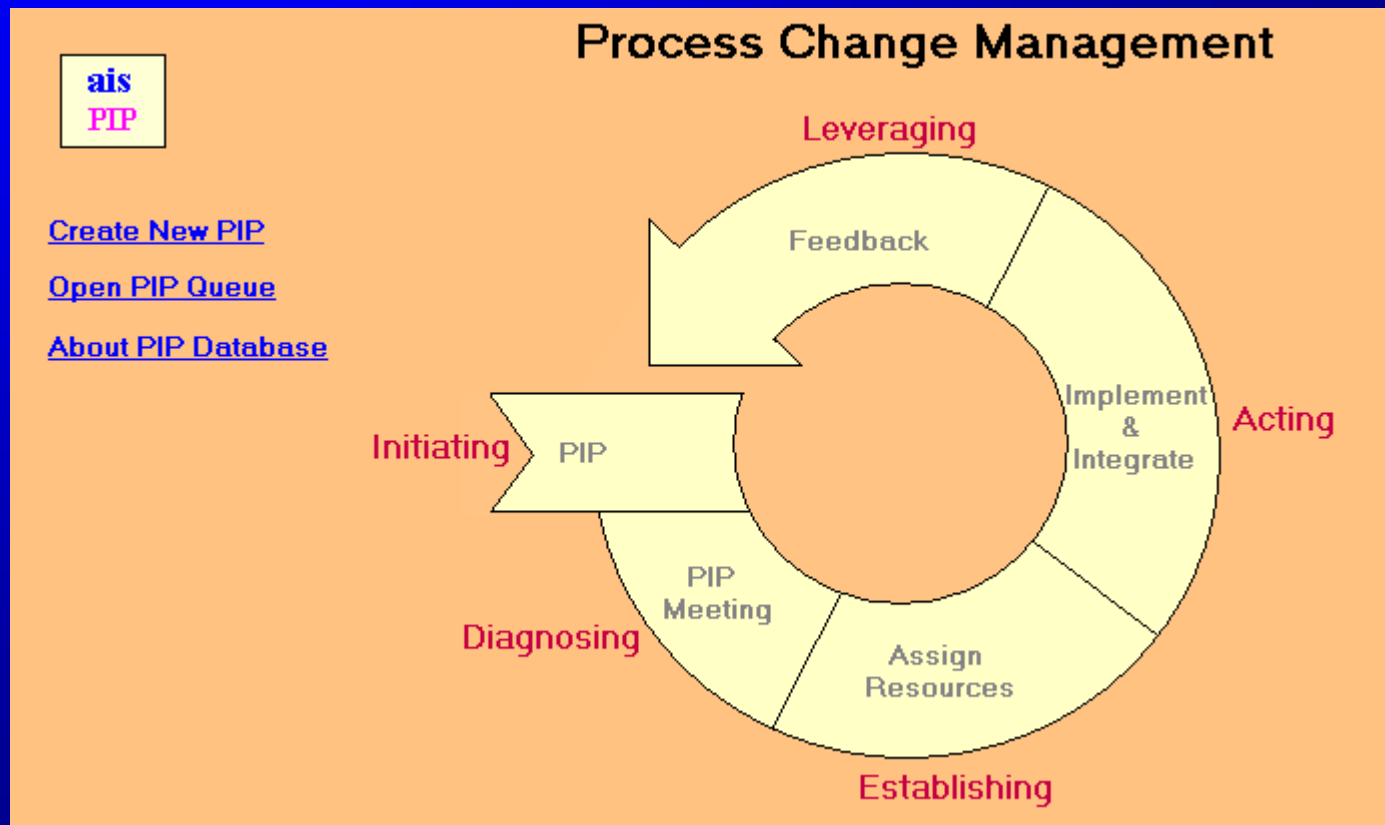
Process Improvement Proposals (PIPS)

PROCESS IMPROVEMENT PROPOSAL (PIP)

PIP# :
Written By:
Date : Author(s) : Project :
Process Name : Key Process Area :
Improvement Description :
Improvement Benefits (Check One) :
 Document Improvement Reduced Cycle Time
 Improved Quality Reduced Risk
Benefits Description (Quantify Where Possible) :
(Attach files if needed)
Attach the PIP Pilot Report here (if applicable):

▼ SEPG Evaluation

The AIS PIP Process



AIS PIPs Summary

Jan 22, 1992 – To date

No. of PIPs submitted	1502
No. of PIPs implemented:	972
No. of PIPs by improvement category:	
• Improved quality	232
• Reduced cycle time	86
• Reduced risk	63
• Improved documentation	161
• Not categorized	410

PIP – Organization Process

Incorporate the TSP into the AIS CPIW as suggested by the attached work products (ProjectCommitmentProcess.zip) which reflect the current practice

Change Launch meeting 9A so that review is held, not only by management, but also peer Project Managers. Accordingly, these same individuals may need to be present in meeting 1B

PIP – Team Process

For UI component enhancements, change process to do Design Inspection, Test Case Inspections and Code Inspections after Compile

For components where performance requirement is critical, execute two rounds of unit test

- Unit test of performance test cases before code inspection
- Unit test of features after code inspection

PIP – Personal Process

Reduce phase distribution % for Design Review for UI Components

Update Personal Review Checklist

Batch process E Mail three times a day

Move end of day post mortem to start of day to process and analyze previous day's data

Lessons Learned - 1

While models are useful to indicate where improvements are needed, only committed people can make the improvements

A supportive management environment that rewards disciplined behavior is absolutely essential

Timely feedback on the status and disposition of the PIPs is important to sustain the PIP mechanism and feeling of empowerment

Do not need to wait till level 5 to start implementing process change management

Lessons Learned - 2

While CMM is necessary as an organizational capability improvement model, it is not sufficient to change engineering behavior; the PSP provides the detailed “how to” for improvement at the individual level

The TSP provides the management framework for continuously improving self directed teams. The PIP mechanism is key for team ownership of the project’s process and commitment to improve

CMM, TSP, and PSP all three are needed for an integrated approach to model based improvement at the organization, team, and individual levels without the risk of sub-optimization

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