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CMMI • TSP



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Advanced Information Services Inc.

TSP and Causal Analysis and Resolution

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“A computer lets you make more mistakes faster than any invention in human history – with the possible exceptions of handguns and tequila.”

Mitch Ratliffe

What is Causal Analysis and Resolution (CAR)?

- CMMI Maturity Level 5 Process
- Systematic Approach to Reduce Defect Injection / Duration
- Common to all Industries
- Common Sense

Why Do Causal Analysis and Resolution?

- Analyze Known Defects in a Structured Way
- Identify Preventive Action
- Verify Actions are Implemented and Assessed

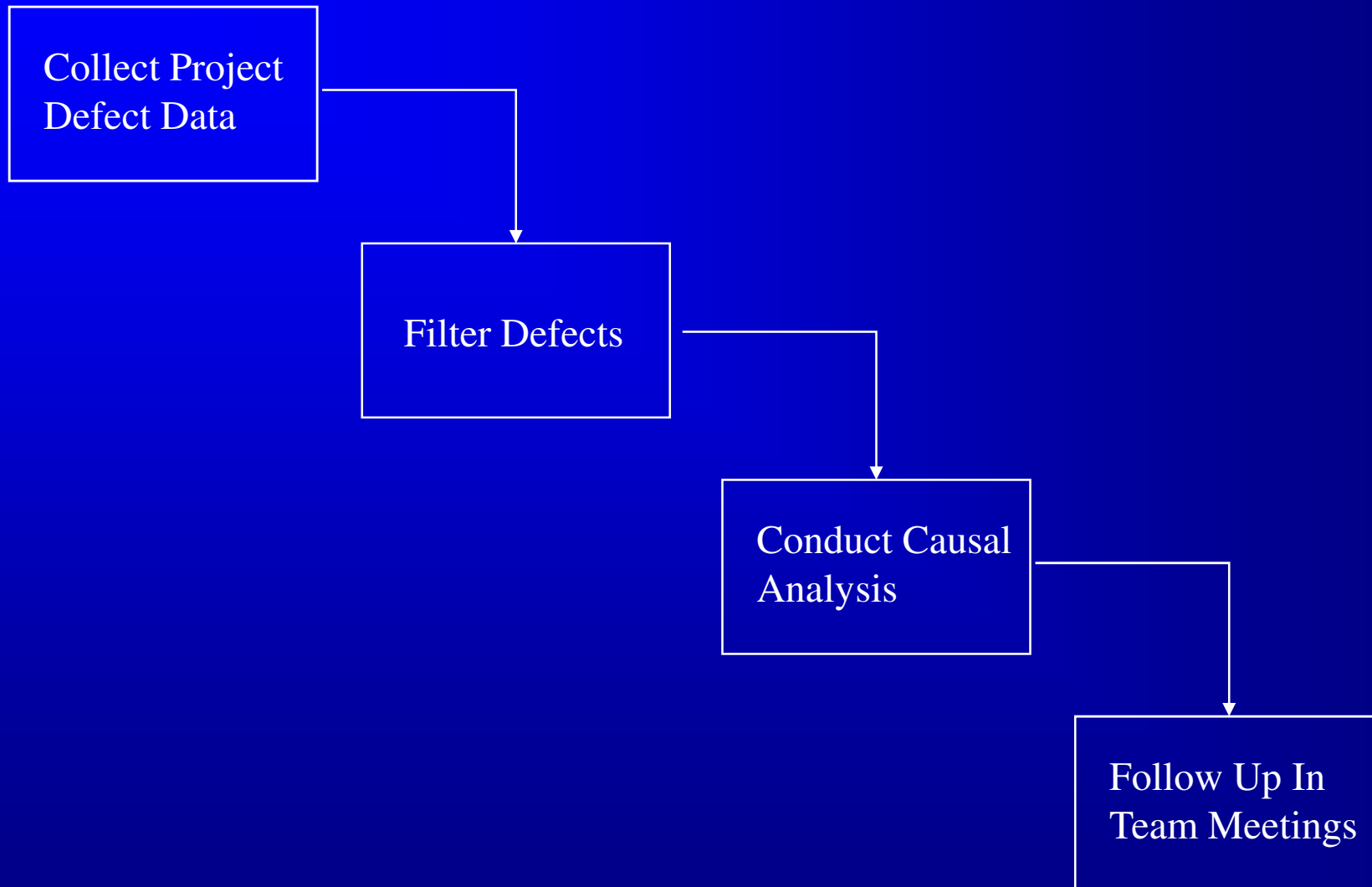
Organizational Level CAR

- Too Late
- Too Broad
- Too General

Team / Individual Level CAR

- Just in Time
- At the Right Level
- Focused

Causal Analysis Roadmap



Simplified Team Level CAR Process

- Meeting 1 – Determine the Defects for Analysis
- Meeting 2 – Analyze the Defects

Prepare for Meeting 1

- Determine Participants
 - Team Lead
 - Quality Manager
 - Test Manager
 - SEPG Representative

Prepare for Meeting 1

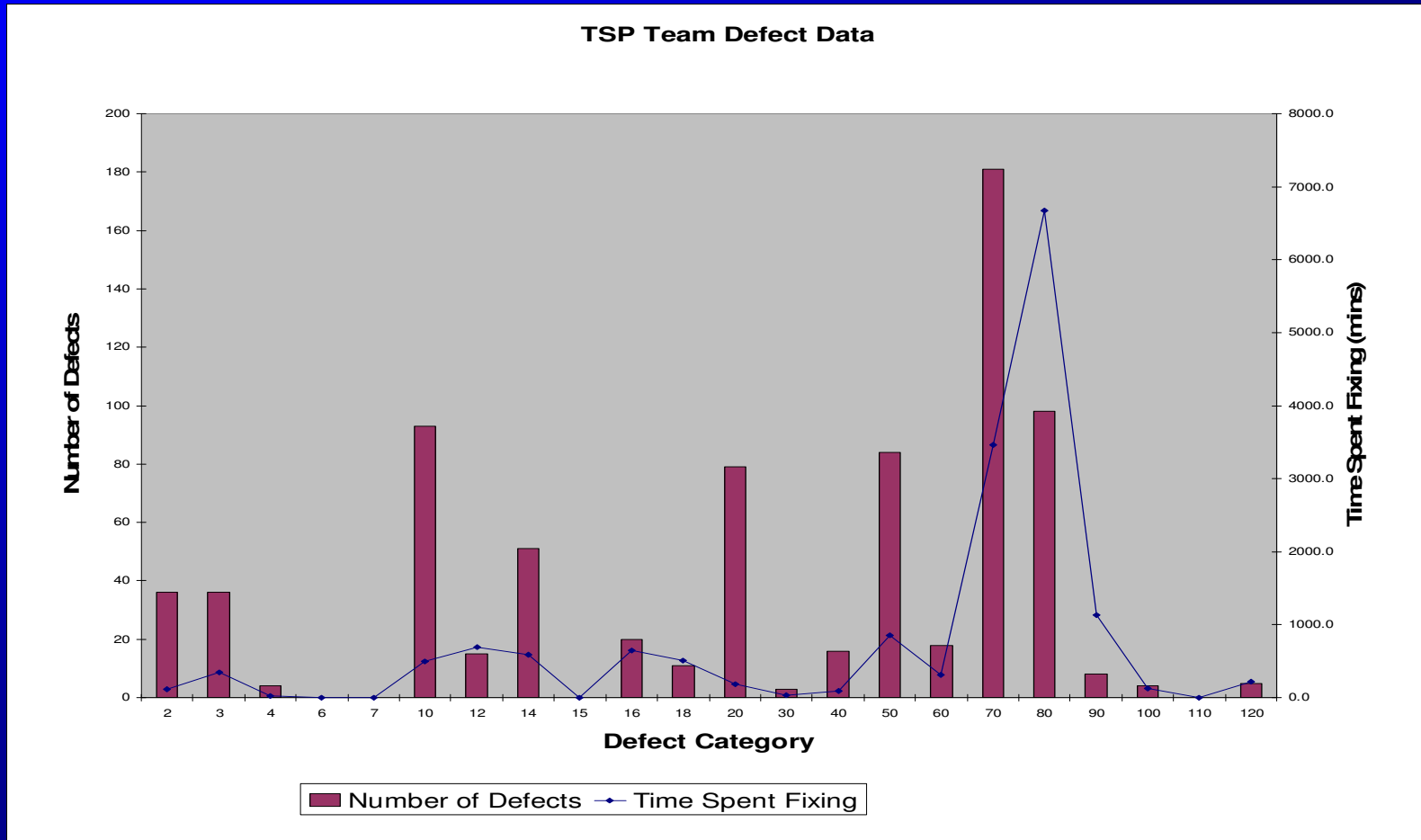
- Gather Defect Data
 - LogD
 - Defect Databases
 - End-user Trouble Reports

Prepare for Meeting 1

- Determine Criteria for Analysis
 - High Fix Times
 - Duration (Injection to Removal)
 - Maximum Learning Opportunity
 - Escapes from Quality Phases
 - Escapes to Test Phases

Conduct Meeting 1

➤ Review Defect Data



Conduct Meeting 1

➤ Filter Defects

Type	Number of Defects	Time Spent Fixing	% of Total Defects	% of Total Fix Time	Fix Time Per Defect	Defect Type Description
2	36	117.4	4.72%	0.71%	3.3	Typo
3	36	348.8	4.72%	2.11%	9.7	Format
4	4	18.2	0.52%	0.11%	4.6	Comment Only
6	0	0.0	0.00%	0.00%	#DIV/0!	Old Minor Defect
7	0	0.0	0.00%	0.00%	#DIV/0!	Duplicate Defect
10	93	495.6	12.20%	3.00%	5.3	Documentation
12	15	691.4	1.97%	4.19%	46.1	Misleading Information
14	51	587.2	6.69%	3.56%	11.5	Wasted Resources
15	0	0.0	0.00%	0.00%	#DIV/0!	Old Major Defect
16	20	646.8	2.62%	3.92%	32.3	Incorrect Functionality
18	11	513.1	1.44%	3.11%	46.6	Missing Functionality
20	79	183.0	10.37%	1.11%	2.3	Syntax
30	3	29.0	0.39%	0.18%	9.7	Build, Package
40	16	92.0	2.10%	0.56%	5.8	Assignment
50	84	852.7	11.02%	5.17%	10.2	Interface
60	18	312.3	2.36%	1.89%	17.4	Checking
70	181	3460.5	23.75%	20.97%	19.1	Data
80	98	6671.4	12.86%	40.43%	68.1	Function
90	8	1128.3	1.05%	6.84%	141.0	System
100	4	131.6	0.52%	0.80%	32.9	Environment
110	0	0.0	0.00%	0.00%	#DIV/0!	User I/F Specification
120	5	223.3	0.66%	1.35%	44.7	Architecture

Conduct Meeting 1

➤ Filter Defects

Removal Phase	Number of Defects	Time Spent Fixing	% of Total Defects	% of Total Fix Time
DLD	5	390.0	0.66%	2.36%
DLDR	96	1444.9	12.60%	8.76%
DLDINSP	115	3683.3	15.09%	22.32%
CODE	8	274.1	1.05%	1.66%
CR	172	961.3	22.57%	5.83%
COMPILE	145	2086.9	19.03%	12.65%
CODEINSP	182	1856.5	23.88%	11.25%
UT	39	5805.6	5.12%	35.18%
Totals	762	16502.6	100.00%	100.00%

Conduct Meeting 1

➤ Filter Defects

Type	Assembl	Injecte	Remov	Fix Tir	Fix Re	Description
80		HLD	UT	816.00	EC05	
80		DLD	UT	357.10	EC06	
80		DLD	UT	92.50	EC11	
80		DLD	UT	60.00	EC20	
80		CODE	UT	25.00	EC21	
80		CODEINSP	UT	30.00	EC23	
80		DLD	UT	45.0	EC27	
80		CODE	UT	115.0	EC28	
80		DLD	UT	90.0	EC29	
80		DLD	UT	150.0	EC32	
80		DLD	UT	90.0	EC33	
80		DLD	UT	80.0	EC30	
80		DLD	UT	210.0	EC35	
80		DLD	UT	35.0	EC07	
80		DLD	UT	633.4	EC12	
80		DLD	UT	149.5	EC13	

Conduct Meeting 1

➤ Filter Defects

Type	Assemb	Injecte	Remov	Fix Tir	Fix Re	Description
80		DLD	UT	357.10	EC06	
80		DLD	UT	92.50	EC11	
80		DLD	UT	60.00	EC20	
80		DLD	UT	45.0	EC27	
80		DLD	UT	90.0	EC29	
80		DLD	UT	150.0	EC32	
80		DLD	UT	90.0	EC33	
80		DLD	UT	80.0	EC30	
80		DLD	UT	210.0	EC35	
80		DLD	UT	35.0	EC07	
80		DLD	UT	633.4	EC12	
80		DLD	UT	149.5	EC13	

Prepare for Meeting 2

- Communicate Defects to Team
 - Review
 - Identify
 - Make Notes

Conduct Meeting 2

- Analyze each Defect
 - Record 'Date Discussed'
 - Assign Number to each Defect
 - Discuss the Defect
 - Cause Description
 - Cause Category

Conduct Meeting 2

- Analyze each Defect

- Total Waste of Time!

- UNLESS

- FOLLOW-UP!

- DID IT WORK?

- Write PIPs

Simplified Team Member CAR Process – Personal Review and Inspection Phases

Removal Phase	Number of Defects	Time Spent Fixing	% of Total Defects	% of Total Fix Time
DLD	0	0.0	0.00%	0.00%
DLDR	7	121.6	12.50%	6.44%
DLDINSP	3	34.9	5.36%	1.85%
CODE	0	0.0	0.00%	0.00%
CR	8	42.0	14.29%	2.22%
COMPILE	15	340.6	26.79%	18.04%
CODEINSP	17	118.1	30.36%	6.25%
UT	6	1230.9	10.71%	65.19%
Totals	56	1888.1	100.00%	100.00%

Simplified Team Member CAR Process – Personal Review and Inspection Phases

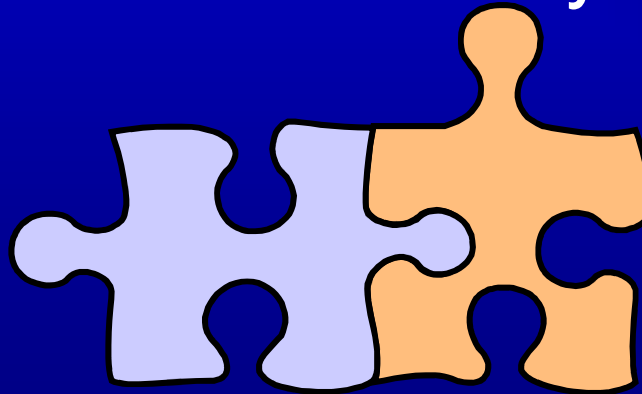
Type	Assemb	Inject	Remov	Fix Tir	Fix Re	Description
70		CODE	COMPILE	2.6		miss spelled a variable
50		CODE	COMPILE	7.5		Missed adding the quick_sort in the .h file
50		CODE	COMPILE	40.5		cueing error when calling the function
50		CODE	COMPILE	4.5		made the function public
70		CODE	COMPILE	3.6		error printing out log message
50		CODE	COMPILE	7.1		error no matching variable
50		CODE	COMPILE	11.0		error calling wrong parameter type
20		CODE	COMPILE	2.7		error missing a bracket
70		CODE	COMPILE	96.7		error with storing the string array
70		CODE	COMPILE	15.0		error printing cmeq_handle
50		CODE	COMPILE	135.0		error linking problem
70		CODE	COMPILE	9.7		error linking problem with strength_line_type
3		CODE	COMPILE	3.0		Missing Header for new handler added
20		CODE	COMPILE	0.9		missed "{}" in my if statement
20		CODE	COMPILE	0.8		missed ";" at the end of a line

Simplified Team Member CAR Process – Postmortem Phase

Type	Assemb	Inject	Remov	Fix Tim	Fix Re	Description
70		DLD	UT	163.0	EC08	
90		UT	UT	170.0		
80		DLD	UT	633.4	EC12	
80		DLD	UT	149.5	EC13	
100		CODE	UT	36.6	EC19	
14		DLD	UT	78.4	E18	

Summary

- Causal Analysis and Resolution Should Occur at the Team Level
- Team Members Should Conduct Their Own Causal Analysis and Resolution
- Resolutions Must be Tracked to Determine Their Efficacy



Questions?

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