

Problem Management: Facing Challenges and Advocating for Success

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Background

The vision and mission statements for Fermilab:

Our vision is to inspire the world and enable its scientists to solve the mysteries of matter, energy, space and time for the benefit of all.

Our mission is to drive discovery in particle physics by: building and operating world-leading accelerator and detector facilities; performing pioneering research with global partners; transforming technologies for science and industry.

We provide IT support to both the scientific and business activities necessary to fulfill the mission of the laboratory. Our Problem Management Process went live in July of 2009 covering core IT services with an opt-in for scientific IT services. In the coming year or two we hope to move the scientific IT services from an opt-in basis to being onboard for Problem Management. While we have come a long way over the years, our Problem Management process is still evolving and ServiceNow has proven to be an enabling technology for us.

Outline

- This talk will focus on the challenges of Problem Management, advocating for success, and how we are using this knowledge to enhance our ability to support the needs of the organization.
 - Human Performance Improvement and Problem Management
 - Social Barriers to investigating problems
 - Technical Barriers to investigating problems
 - Blame prevents real understanding
 - Challenge of terminology
 - Graded approach for when and how to investigate
 - Success Advocacy: Advocating for success and advocating success
 - Conclusions
 - Questions/Comments?

Human Performance Improvement and Problem Management

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- Human performance can be thought of as a series of behaviors carried out to achieve a desired outcome. The goal of improving performance is to reduce the risk of undesired results.
 - Roughly 80% of safety related events are attributed to human performance, and people perform no better than their supporting organization.
 - The remaining ~20% of the safety related events are attributed to equipment failures.
 - 70% of the 80% human errors stem from organizational weaknesses (56% of total), so organizational weaknesses matter (largest single source).
 - Use a holistic approach and look at technical, social, and process factors.

Human Performance Improvement and Problem Management

(2 of 2)

- A few equivalent key concepts to highlight
 - Incident aligns with HPI event (undesired situation).
 - Direct Cause is similar in concept to an HPI initiating action, although the latter is closer to a trigger than the former sometimes.
 - Root Cause is very similar to a latent condition. Both can be considered underlying flaws in the infrastructure. These are typically what problem investigations seek at a minimum.
 - Contributing factors are essentially error precursors. These pre-existing conditions matter. Think about how often you hear “The conditions were right for...”
- Human Performance Improvement tells us a holistic approach matters and this aligns well with Problem Management.

Social Barriers to Investigating Problems

- A few key organizational Barriers
 - Organizational structures or management behaviors explicitly or implicitly discourage identifying and analyzing failures.
 - Policies or procedures inhibit identifying and analyzing failures.
 - Punish or fail to reward identifying and analyzing failures.
- A few key Individual barriers
 - Instinctive tendency to deny, distort, ignore, or disassociate ourselves from our own failures
 - Acknowledgement of one's failures may undermine confidence and impression of the individual by peers.
 - Most individuals experience strong negative feelings in response to their own failures (human nature, social conventions).

Technical Barriers to Investigating Problems

- Inability to properly use rigorous methodologies
 - Inability to understand or engage in scientific method.
 - Inability to understand or engage in rigorous quantitative or qualitative analysis.
- Individuals or Management may not understand complexities or lack specific domain knowledge for cross-disciplinary work.
 - Ability to grasp new concepts quickly.
- Inability to understand or engage in problem diagnosis.
 - Inability to define the problem, isolate key factors, define tests, etc.
- Task design and process steps can obscure failures.
 - Cumbersome or ill-defined steps.
 - Out of date steps and information.
 - Overly complex.

Blame Prevents Real Understanding

(1 of 2)

- When something goes wrong, the person initiating the action almost always has the most important information.
 - What exactly happened in what order?
 - When did things happen? Timing?
 - What did you notice? Anything odd?
 - Did you follow the procedures? If not, why?
 - Have you seen something like this before?
 - Were there any distractions? If so, who, what, when and do you understand why?

Blame Prevents Real Understanding

(2 of 2)

- Even the perception of potential blame becomes a roadblock to knowledge
 - “Blame is the enemy of understanding.” – A. Hopkins, *Failure to Learn: BP Texas City Refinery Disaster*
 - People withhold information if they think it might implicate them, sometimes unintentionally
 - People withhold information if they think they are being judged
- Culpability is a line management issue, out of scope for problem management
 - Assume management enforces a just culture and has already acted
 - Do not gather information to feed to line management for possible disciplinary action
 - If a wrong action was taken, there was a reason it was thought right at the time. This can be key to preventing future issues in many areas.

Challenge of Terminology

(1 of 2)

- Terminology and concepts can be challenging as some ITIL terms have other meanings in common usage.
- The 'Cause' Name Game: Root Cause; Direct Cause; Contributing Factors.
 - There can be arguments over whether something is a root cause or contributing factor
 - Generally less concern over the direct cause unless someone feels that should be the root cause
 - Causes and factors may span multiple services in a complex situation
 - If you identify recommendations to address all the causes and contributing factors, I would argue the names do not matter. If you can fix them all, then you win regardless of name.

Challenge of Terminology

(2 of 2)

- Even service providers sometimes have trouble with Incident versus Problem
 - Incident is a disruption or degradation of a service
 - Problem is an underlying flaw
 - Fortunately this been asymptotically going away over time
- Escalation versus Declaration
 - Incidents are not escalated to Problems, Problems are declared separately.
 - Seems to be a hard concept
 - Explain why or why not you are declaring a problem and move on
- In the end it is about communications. Do not focus on the words, focus on the intent of the message. Some people will never get past the common meanings of some words, so when necessary use different terms.

Graded Approach for When and How to Investigate

(1 of 2)

- A graded approach on when to declare a problem
 - Cost versus benefit of investigating or not investigating: financial; reputation.
 - Impact, urgency, priority
 - Availability of resources to investigate matters
 - Number and pattern of incidents
 - Probability of at least a desired, if not good, outcome (small factor)
 - Not investigating today does not preclude future consideration

Graded Approach for When and How to Investigate

(2 of 2)

- A graded approach to deciding on the level of the investigation
 - Finding the right level of resources and time for the issue at hand
 - Basic investigation by experts in most cases
 - Root cause analysis committee and formal report for special cases:
 - Always for critical incidents (our choice)
 - Non-critical incident based but complex technically
 - Non-critical incident based but complex socially

Success Advocacy: Advocating for Success and Advocating Success

(1 of 6)

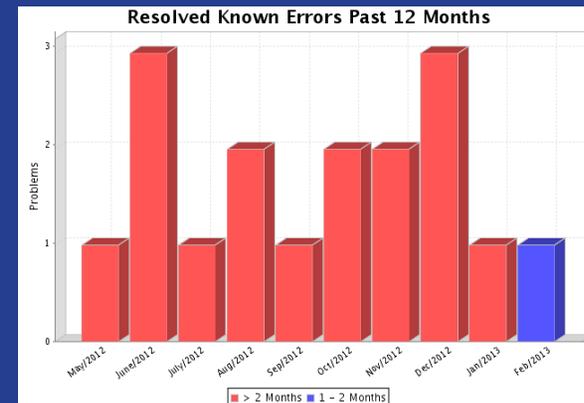
- For Problem Management to be successful it needs to show it provides value to the organization
- Problem Management needs commitment from line management at all levels for
 - Personnel and system resources
 - Time
- Problem Management also needs technical experts to
 - Be engaged and cooperative
 - Share all information that might be relevant
 - Spend the time necessary to work the problem
- Needs to be seen as an opportunity not as a judgment
- Advocating successes is not always enough, sometimes you need to advocate for the commitment from others for the chance to succeed.
- Fortunately demonstrating prior successes helps to advocate for future success.

Success Advocacy: Advocating for Success and Advocating Success

(2 of 6)

- Resolved Known Errors
 - Flaws removed from the infrastructure (latent conditions)
 - These are what people typically expect, the one-to-one correspondence between a fault and a cause (root cause)
 - Typically other factors come into play but are not captured in this statistic
 - Enhanced ServiceNow for status reason for closure

Number:	PBI000000000033
Problem state:	Closed/Resolved
Problem Status Reason:	Resolved
Configuration item:	
Urgency:	3 - Low
Impact:	2 - Significant/Large
Priority:	3 - Moderate
Reproducible:	Yes
Investigation Type:	Reactive

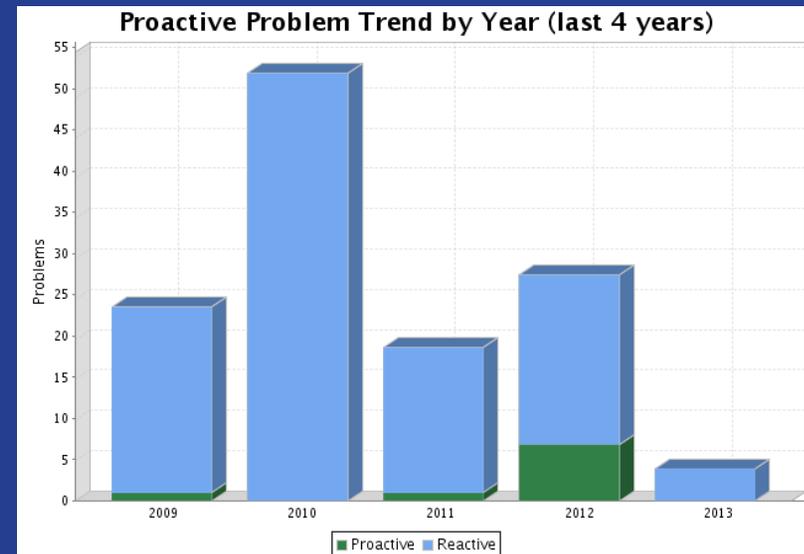


Success Advocacy: Advocating for Success and Advocating Success

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- Proactive versus reactive investigations
 - Getting ahead of the curve when you can (before customers/users notice)
 - Watch list helps highlight proactive approach (things we may investigate)
 - Enhancement in ServiceNow to track proactive versus reactive

Number:	PBI0000000000033
Problem state:	Closed/Resolved
Problem Status Reason:	Resolved
Configuration item:	
Urgency:	3 - Low
Impact:	2 - Significant/Large
Priority:	3 - Moderate
Reproducible:	Yes
Investigation Type:	Reactive



Success Advocacy: Advocating for Success and Advocating Success

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- Status of Recommendations from Root Cause Analysis documents
 - Awareness of suggested improvements
 - Progress on removing error precursors
 - Enhancement to ServiceNow to track recommendations

Number	Friendly Number	Created	Status	Owner
PRBRC00477	33.1	2009-08-17 16:43:56	Completed	
PRBRC00478	33.2	2009-08-17 16:43:56	Completed	
PRBRC00479	33.3	2009-08-17 16:43:56	No Action	

Problem Recommendation - Required field

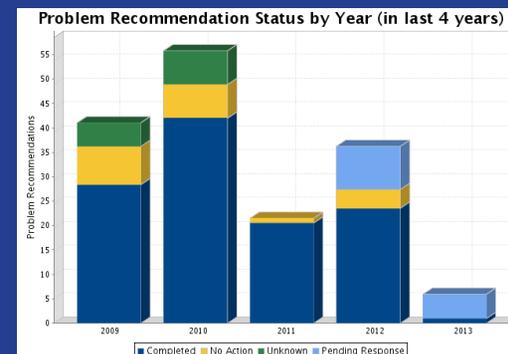
Number: PRBRC00477
Friendly Number: 33.1
Created: 2009-08-17 16:43:56
Year Created: 2009
Closed:

Status: Completed
Owner:
Problem: PBI000000000033
RCA document:

Recommendation:
DBAs please update their scripts for a timeout of 900 seconds

Action:
Timeout to 900sec instead of 350sec.

Notes:

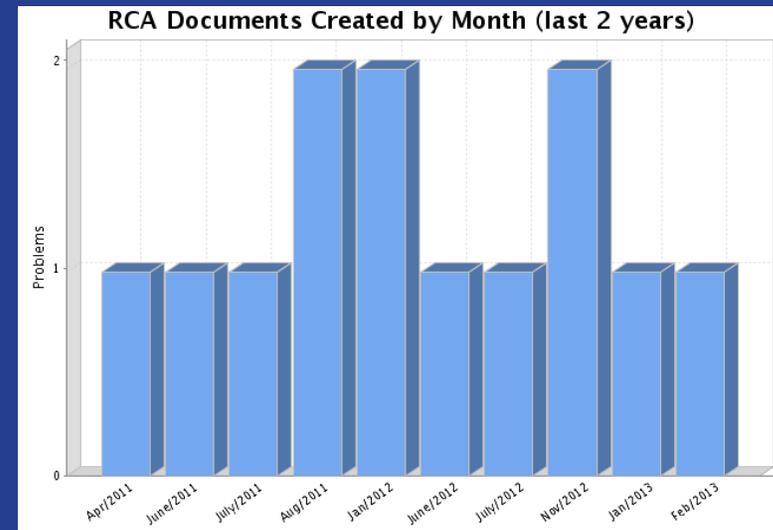


Success Advocacy: Advocating for Success and Advocating Success

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- Root cause analysis documents
 - Critical incidents, complex incidents, incidents that span multiple service providers
 - Enhanced ServiceNow to include URLs for formal Root Cause Analysis documents

Root Cause Identified:	2011-10-17 22:10:36
Time to RCI (days):	0
RCA document:	https://cd-docdb.fnal.gov:440/cgi-bin/ShowDocument?docid=3284
RCA document created:	2009-08-07
Root cause category:	Process Error
Root cause:	Error in process
Workaround:	REC



Success Advocacy: Advocating for Success and Advocating Success

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- Problem investigations are opportunities
 - Credit for improving service reliability or performance
 - Advocacy to management for resources to improve (issues no longer out of sight)
 - Long term reduction in support load from recurring issues
- Dispelling fears through experience
 - Emphasizing goal is understanding and not blaming (key to success)
 - Helping to make progress (arrange meetings, advocacy, outside experts)
 - Shielding experts from attack
 - A good outcome (success can speak loudly and feel good)

Conclusions

(1 of 2)

- Human Performance Improvement concepts are compatible and useful for Problem Management
 - Contributing factors (error precursors) are important
 - Social barriers, technical barriers and perception of blame are roadblocks to understanding
- Terminology can be an ongoing challenge
 - Escalation versus declaration
 - Incident versus problem
 - Root cause, direct cause, contributing factors, etc.
- Graded approach for when and how to investigate helps to manage resources appropriately
 - Investigate or pass for now
 - Small team versus large team
 - Formal committee and report or technical analysis only

Conclusions

(2 of 2)

- Culpability is a line management responsibility and out of scope for Problem Management.
- Advocating for success and advocating success both are important
 - Commitment at all levels
 - Demonstrating success is important and ServiceNow has allowed us to improve in this area
 - Opportunity rather than judgment
 - Dispelling fears

Questions/Comments?