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Another C^{3}RS Site Improves Safety at Midterm

SUMMARY

The Federal Railroad Administration's (FRA) Office of Railroad Policy and Development believes that, in addition to process and technology innovations, human factors-based solutions can make a significant contribution to improving safety in the railroad industry. This belief led FRA to implement the Confidential Close-Call Reporting System (C^{3}RS), which includes voluntary confidential reporting of near-miss events to a neutral third party; root-cause-problem solving by a Peer Review Team (PRT) composed of labor, management, and FRA representatives; implementation of corrective actions; tracking of the results of change; and reporting of the results of change to employees. Demonstration pilot projects are underway at Union Pacific Railroad (UP), Canadian Pacific Railway (CP), New Jersey Transit (NJT), and Amtrak. C^{3}RS also embodies the risk reduction and system safety principles espoused by FRA's Office of Railroad Safety that supplement conventional regulatory oversight and enforcement activities.

FRA is also sponsoring a rigorous evaluation of three important aspects of C^{3}RS functioning:

(1) What conditions are necessary to implement C^{3}RS successfully?
(2) What is the impact of C^{3}RS on safety and safety culture?
(3) What factors help to sustain C^{3}RS over time?

This report is part of a series of *Research Results* published to provide the public and goverment and industry decision makers with the evaluation's findings. The findings here cover the midterm analysis of C^{3}RS at one demonstration site (Site "A") and are based on data collected and analyzed using five data sources: interviews with workers, managers, and other stakeholders; railroad newsletters; corporate safety data; corrective action data; and redacted Multiple Cause Incident Analysis (MCIA) results from a third party.

Midterm findings: Site "A" implemented C^{3}RS successfully. Employees submitted reports for 2 years, the PRT met regularly, and the railroad implemented many corrective actions.

"Run-through switch" was the most frequent type of close call reported to C^{3}RS. Interviewees indicated that protection from discipline led employees to report more run-through switches to their managers, thus allowing immediate repairs. The PRT also worked on multiple corrective actions to help prevent future run-through switches. As a result, there was a significant reduction in derailments caused by run-through switches (see Figure 1).

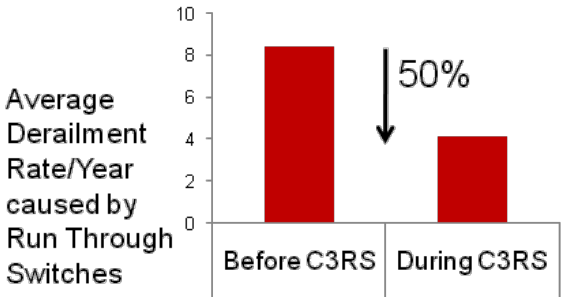

Figure 1. Derailment Rate Caused by Run-Through Switches Decrease 50 Percent at Midterm

BACKGROUND

C^{3}RS contains two critical elements designed to help it succeed in railroad settings. First, employees' voluntary reports of close calls are routed through a neutral third party, the Research and Innovative Technology Administration's (RITA) Bureau of Transportation Statistics (BTS), or the National Aeronautics and Space Administration (NASA), that removes identifiers and personal information.

Second, sanitized information from BTS or NASA is sent to a joint labor-management-FRA PRT whose members have been trained in collaborative root-cause analysis problem solving. FRA is conducting C^{3}RS demonstration projects on four railroads: UP, CP, Amtrak, and NJT. A team from the Volpe National Transportation Systems Center implemented C^{3}RS.

The process flow for a C^{3}RS report contains six steps: (1) a worker experiences or observes a close-call event and reports it to the third party; (2) BTS or NASA interviews the worker, sanitizes identifying data, and forwards the report to the PRT; (3) PRT determines root causes by using the Multiple Cause Incident Analysis (MCIA) tool and suggests corrective actions to a management support team; (4) corrective actions are reviewed, evaluated, and, if appropriate, implemented; (5) implementation progress is tracked, and the results of the change are determined; and (6) results are reported. Additional information is available on FRA's Close-Calls Web site [1].

OBJECTIVES

The evaluation is intended to provide knowledge about how C^{3}RS can be implemented successfully, its impact on safety performance and safety culture, and the conditions necessary for its long-term viability. Previous *Research Results* summarized earlier evaluation findings [2, 3, 4].

METHODS

Worker, Manager, and Other Stakeholder Interviews

Two types of interviews were conducted.

1) "Phased interviews" at the start ("baseline") and about halfway through the pilot ("midterm") involved railroad employees and managers, both inside and outside the C^{3}RS program. Interviewers asked about the impact of C^{3}RS on safety, safety culture, and C^{3}RS program operations, among other areas. These interviews took place in person at the C^{3}RS pilot project sites.
2) "Implementation interviews" at both baseline and midterm involved key stakeholders such as PRT members, senior managers, labor officials, FRA, the Volpe Implementation Team, BTS, and NASA. The interviews asked about key events related to the functioning and sustainability of C^{3}RS. These were mostly telephone interviews.

C^{3}RS Program Data

The evaluation team examined: (1) newsletters; (2) corporate safety data; (3) corrective action data; and (4) redacted MCIA results from the third party.

Derailments Caused by Run-Through Switches

After reviewing the C^{3}RS program data and interview data, the evaluation team chose to concentrate on run-through switch events because they were most frequently reported and because they were immediate causes of derailments. Outcomes were assessed using corporate statistics on run-through switches that caused derailments. Both incidents with damages above the FRA reporting accident/incident threshold and smaller non-reportables incidents were included [5]. "Baseline" (pre-C^{3}RS implementation) data comprised incidents from 4 years prior to C^{3}RS. "Midterm" constituted the time from the start of C^{3}RS to the present (approximately 2 years).

MIDTERM RESULTS

Multiple Sources Confirm C^{3}RS Implemented Successfully

Analysis of several data sources confirmed that C^{3}RS was implemented successfully (i.e., that employees were submitting reports, that the PRT was analyzing cases, and that corrective actions were taking place). These sources include interviews with railroad personnel, observations by the implementation and lessons-learned teams, the contents of newsletters, reports submitted to the neutral third party (137 at midterm), and documentation of corrective actions (see Figure 2). 80 percent of the cases are in the top five categories.

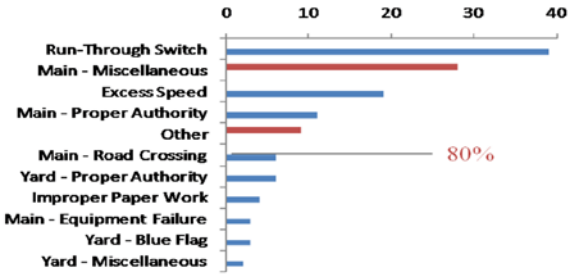

Figure 2. Types of Close Calls Reported by Employees

A critical indicator of successful C^{3}RS implementation was whether PRTs were able to effectively engage in creative problem solving (i.e., to look at a problem from many different points of view). One indicator of whether such problem solving was taking place was the range of possible underlying causes that were considered when cases were analyzed. Inspection of the multiple causes generated by PRTs shows a broad scope, including behavior by craft labor and supervisors; the condition of tools and equipment; workspace design; and organizational process. Notable implemented corrective actions flowing from these multiple-cause analyses were:

- Create a job safety briefing checklist card.
- Modify paperwork requirements: limit daily restriction bulletin updates to one page.
- Design change in cab: keep paperwork in sightline.
- Install "squawk box": to improve communication between yardmaster and dispatching.
- Implement mentoring for new conductors.
- Work with mechanical employees to ensure uninterrupted radio communication.

Interviewees Positive about C^{3}RS and Identified Operational Difficulties

Overall, interviewees reported that C^{3}RS had a positive impact on safety culture and on labor-management relationships at participating railroads and locations. However, they also reported that three operational challenges posed by C^{3}RS were: (1) Administrative burden was too high to consistently document how cases were analyzed and to track the progress of corrective actions; (2) Communication to, and feedback from, the support team needed improvement; (3) When formulating remedial recommendations for the support team, it was difficult to estimate benefits and to formulate cost-benefit analyses to demonstrate effective use of resources (similar problems were also reported in other participating railroads).

How C^{3}RS Minimizes Damage Due to Run-Through Switches and Reduces Derailments

Analysis of sanitized data received from BTS revealed that run-through switches were the single most frequent type of incident reported, comprising 28 percent of all cases. C^{3}RS helped minimize damage caused by run-through switches in two ways:

1. By providing protection from discipline, C^{3}RS increased employee willingness to report run-through switches to management. (Previous to C3RS, going through and reporting a run through was a rule violation subject to disciplinary action.) Immediately notifying management of a run-through switch led to timely repairs and prevented derailments and related service disruptions and repair costs.
2. Second, analysis of run-through switches identified multiple factors contributing to these events and multiple corrective actions to address the problems. Corrective actions included:

- Instructing train crews on how to back out of the yard
- Improvement in yard communication
- Painting problem switches to make them more visible
- Increased focus on job safety briefings

Site "A" experienced a 50 percent decrease in derailments caused by run-through switches (see Figure 1) as a result of (1) more complete

reporting of run-through switches and related switch repairs, as well as (2) effective implementation of corrective actions. The average rate of derailments in the 4 years prior to C^{3}RS decreased by 50 percent during the approximately 2 years of C^{3}RS (one tailed p-value = 0.045). A second analysis normalized the data by worker hours and found similar results: 49 percent decrease from before to during use of C^{3}RS (one-tailed p-value = 0.052).

CONCLUSIONS

Site "A" is the second location that has seen safety improvements from successful implementation of C^{3}RS. At site "A" the PRT focused on run-through switches and saw a significant decrease in derailments caused by them.

FUTURE DIRECTIONS FOR C^{3}RS EVALUATION

This summary focuses on midterm evaluation results at one of the four C^{3}RS demonstration pilot sites. As data become available, future reports will present additional findings for all participating railroads and will include formative, summative, and sustainability evaluation findings.

REFERENCES

[1] C^{3}RS Web site www.closecallsrail.org
[2] *Confidential Close Call Reporting System: Preliminary Evaluation Findings.* December 2008. DOT/FRA/RR08-33.
[3] *Derailments Decrease at a C^{3}RS Site at Midterm*. FRA Research Results, April 2012. DOT/FRA/ORD RR12-04.
[4]*Senior Cross-Functional Support – Essential for Implementing Corrective Actions at C^{3}RS Sites*. FRA Research Results, August 2012. DOT/FRA/ORD RR12-09.
[5] 2010 FRA Guide for Preparing Accident/Incident Reports. safetydata.fra.dot.gov/officeofsafety/

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KEYWORDS

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