



Canadian Pacific Railway Mechanical Services' 5-Alive Safety Program Shows Promise in Reducing Injuries

SUMMARY

The Federal Railroad Administration (FRA) Human Factors Research and Development (R&D) Program is sponsoring an Alternative Safety Measures Program to explore alternative methods for evaluating whether safety programs improve safety outcomes and the underlying safety culture, and to conduct implementation and impact evaluations of promising safety programs in the railroad industry. The Canadian Auto Workers Union (CAW) and Canadian Pacific Railway (CPR) are interested in learning more about the effectiveness of their safety programs and have provided data for this evaluation. Early findings from this evaluation, scheduled to continue into 2008, suggest that the 5-Alive safety program at CPR has lowered injury rates, and many employees consider it helpful.

The 5-Alive program in CPR Mechanical Services focuses on increasing awareness of and compliance with certain safety rules, which, when violated, have the potential to lead to fatalities and serious injuries. CPR's 5-Alive program is a component of the Mechanical Services Department's overall safety program. Since 5-Alive was implemented in late 2002, the average monthly FRA-reportable injury rate for all Mechanical Services employees in Canada dropped (Figure 1), and an upward trend in non-FRA-reportable injury rates for the same group of employees leveled off (Figure 2). In interviews and focus groups with CPR management and non-management employees in three Canadian locations, 5-Alive was frequently mentioned as a program that had impacted safety. While some people felt that penalties for violating 5-Alive rules were too harsh and that factors outside 5-Alive rules had a stronger impact on injuries, many felt that 5-Alive practices led to fewer injuries at the railroad.

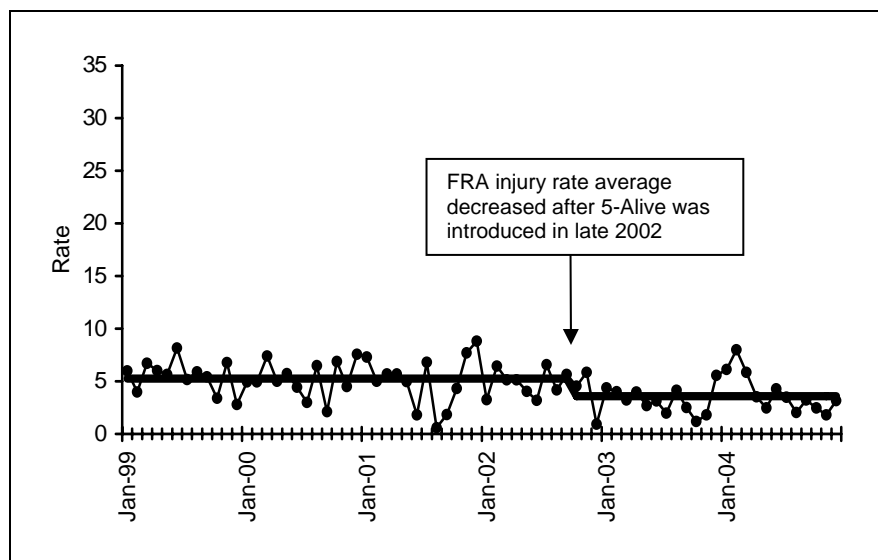


Figure 1. FRA Injury Rates for CPR Mechanical Services Sites in Canada, 1999-2004, with Mean Trend Shown with Heavy Line

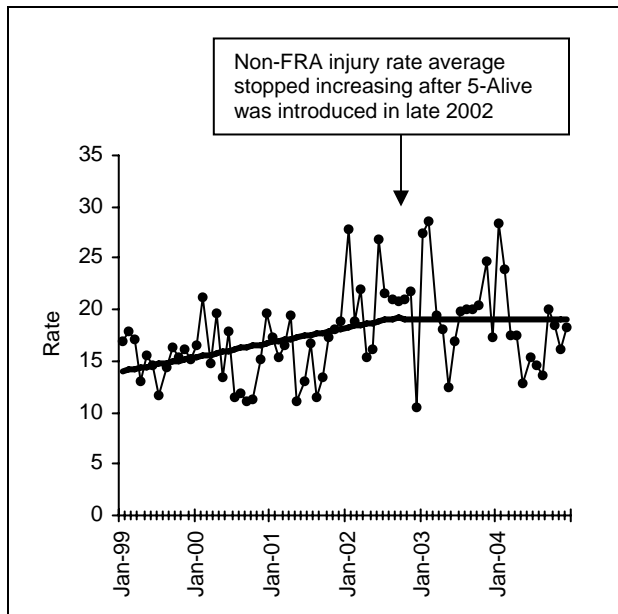


Figure 2. Non-FRA Injury Rates for CPR Mechanical Services Sites in Canada, 1999-2004, with Mean Trend Shown with Heavy Line

BACKGROUND

Current measures of organizational safety performance in the U.S. railroad industry focus almost exclusively on statistics, such as worker injuries and train accidents, but as these rates decrease across the industry, they are less sensitive in detecting the impact of safety interventions, especially short-term impacts. FRA’s Human Factors R&D program is identifying alternative ways to measure safety, such as operating and safety culture indicators that have been used successfully in other industries. The CPR Mechanical Services department and CAW are interested in learning more about the effectiveness of their safety programs and have provided data for this study.

The 5-Alive program was implemented in CPR Mechanical Services around October 2002 to prevent serious accidents and injuries by increasing awareness of and compliance with certain safety rules, policies, procedures, and regulations linked to fatalities and accidents.

- 5-Alive focuses on:**
- Applying blue flags/signals
 - Using derails
 - Using fall protection
 - Applying lockout/tagout
 - Protecting the point

When 5-Alive training was presented to Mechanical Services employees across the railroad, individual locks were distributed so that employees would have locks that only they would be able to remove. Employees face severe repercussions for violating 5-Alive, and some (including managers) have been fired as a result. Posters are prominently displayed to maintain 5-Alive awareness.

OBJECTIVES

One objective of FRA’s Alternative Safety Measures Program is to determine the usefulness of alternative methods for evaluating the effects of safety programs on safety outcomes and the underlying safety culture in the railroad industry. Another objective is to analyze safety programs, such as CPR’s 5-Alive program, to evaluate their effectiveness and how they could be improved. A final objective is to distribute lessons learned from this research to promote improved safety measurement and performance across the entire railroad industry. The primary objective of this report is to present preliminary results from the evaluation of CPR’s 5-Alive program.

METHODS

Injury Rate Analysis. Researchers analyzed FRA-reportable and non-FRA-reportable injury rates (based on the number of injuries and number of man-hours worked) from all Mechanical Services sites in Canada, since 5-Alive was implemented across all locations at approximately the same time. Average monthly injury rates from before 5-Alive was introduced (January 1999 to September 2002) were compared to average monthly injury rates after 5-Alive was implemented (October 2002 to December 2004). Injury rate trends, as indicated by Pearson correlation coefficients (*r*), were also compared for the same time periods. To confirm that the changes in rates occurred around the time 5-Alive was implemented, the analyses were also performed with other month ranges both before and after October 2002.

Interviews and Focus Groups. Interviews and focus groups on a range of safety-related topics were conducted with 83 management and non-management employees at three of the largest Canadian Mechanical Services sites from December 2004 through February 2005. Multiple researchers reviewed the data and identified the most common themes through a consensus process.



RESULTS

Injury Rate Analysis. Findings suggest that 5-Alive may have significantly reduced injury rates in Mechanical Services at CPR. The analysis showed a drop in the average FRA-reportable injury rate after 5-Alive was introduced, with the average FRA-reportable injury rate decreasing from 5.27 (per number of full-time equivalent workers per year) to 3.58, as shown in Figure 1 ($t(61) = 3.53, p < .01$). Although non-FRA-reportable injuries had on average been increasing since January 1999 ($r = 0.41$), the trend in rates leveled off after September 2002 ($r = -0.27, z = 2.77, p < .05$), as shown in Figure 2.

When the same tests were run with other month ranges, results indicated that observed changes in injury rate patterns were most pronounced shortly after 5-Alive was introduced.

Interviews and Focus Groups. Although no specific questions about 5-Alive were in the interview and focus group protocols, many people brought up the topic anyway. For example, one manager said:

“5-Alive seems to have taken care of the real major safety issues. People used to not use flags and locks. They took shortcuts. The people who weren’t doing it are gone now. It has dropped to zero, since it is monitored continuously.”

Many people thought that the personal locks distributed when 5-Alive was launched were helpful (Figure 3). A non-management employee said the following about 5-Alive:

“It sounded heavy-handed, but it was good for compliance. Good for eliminating catastrophes. You can’t have a train move while you are under it or you could get killed. The personal lock is great; you’re safe.”

Some people complained that 5-Alive is not enforced consistently, saying things like:

“I’ve heard there have been people fired for 5-Alive violations, but when supervisory staff violates 5-Alive, there seems to be a double standard for discipline.”

Others mentioned that 5-Alive does not solve other important safety issues, such as communications problems or cars jumping the tracks. For example, one non-management employee said:

“The only thing I don’t agree with is people think they are still safe if they do the 5-

Alive issues, but they aren’t. A car can still come down and jump the track.... With 5-Alive you are protected, but not 100 percent. We have incidences on the follow up of cars that have jumped the track.... It did occur to me one time.”



Figure 3. 5-Alive Requires Derails to be Positioned and Locked (This Derail has a Device to Keep the Lock Out of the Snow)

CONCLUSIONS

Many Mechanical Services managers and non-managers at CPR believe that the 5-Alive



program has increased awareness of and compliance with certain safety rules, which, when violated, have the potential to lead to fatalities and serious injuries. The average monthly FRA-reportable injury rate dropped, and the upward trend for non-FRA-reportable injury rates leveled off after 5-Alive was introduced. One explanation for the observed results is that 5-Alive reduced all injuries, even though its rules were primarily intended to address only the most serious injuries. Another possible explanation is that injuries were underreported after introducing 5-Alive due to employee fears of harsh penalties. Employees mentioned 5-Alive without prompting two years after it was launched, which suggests that although the available data do not conclusively rule out other explanations, it is likely that the widespread promotion of 5-Alive influenced injury rates.

FUTURE DIRECTION AND ACTIVITIES

Additional data will be collected and analyzed during this study to determine the usefulness of alternative techniques for measuring safety, as well as the effectiveness of CPR safety programs such as 5-Alive. This project is scheduled to continue into 2008, so the analyses presented in this paper will be performed again as more data become available. Efforts are also underway to collect a variety of CPR operating data to determine if any leading indicators of safety, which provide preliminary evidence of changes in safety outcomes, can be identified. Results from surveys administered by CPR were collected to learn about the safety culture in the study sites, and results from more of these surveys will be collected near the end of the study to determine if changes have occurred. Additional interviews and focus groups will also be conducted to gather information on employee perceptions about safety program effectiveness at CPR.

WANT MORE INFORMATION?

Findings from another CPR safety program analyzed in this study, the Investigation of Safety-Related Occurrences Protocol (ISROP), can be found in the following Research Results report:

Canadian Pacific Railway Investigation of Safety-Related Occurrences Protocol Considered Helpful by Both Labor and Management, March 2006, Research Results RR 06-13.

This report is available on the FRA Web site (<http://www.fra.dot.gov>).

ISROP is a standardized process CPR developed for conducting thorough and systematic incident investigations.

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