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Clear Signal for Action Program Addresses Locomotive Cab Safety Related to Constraining Signals

SUMMARY

Union Pacific Railroad (UP), the Brotherhood of Locomotive Engineers and Trainmen (BLET), and the United Transportation Union (UTU) are collaborating with the Federal Railroad Administration (FRA) Human Factors Research and Development (R&D) Program to conduct a Clear Signal for Action (CSA) demonstration project. CSA is a proactive safety risk management method that combines behavior-based safety (BBS) and continuous improvement (CI). This project, involving road crews from UP's San Antonio Service Unit (SASU), is underway to determine whether CSA can improve safety in the railroad industry as it has in other industries.[1] In this project, workers from road crews provide each other with confidential, nonconfrontational feedback to reduce the probability of derailments and other accidents when they are operating under constraining signals. In addition, data compiled by peers is used to identify and implement corrective actions to lower the risk of future derailments and accidents. Training in how to effectively support the process is also provided for managers.

In addition to sponsoring CSA implementation, FRA is sponsoring a lessons learned team (LLT) to examine what it takes to implement CSA successfully, the impact CSA has on safety, and what factors are needed to sustain CSA in the long term. One early LLT activity was to meet with project stakeholders to develop a logic model that describes how the CSA method works, what results are expected from it, and how it can be measured. Figure 1 shows part of this logic model.

Data collected so far indicate that CSA implementation in the SASU is viable. A joint BLET/UTU steering committee developed and validated a checklist of 35 safety practices to be tracked. More than 180 employees have received training in conducting peer-to-peer observation-feedback sessions, and over 700 observation-feedback sessions have taken place. Key managers have also received training in how to effectively support the CSA process. During interviews and project meetings, many SASU employees indicated that improvements have occurred since the CSA process was implemented. As the project continues, additional data will be collected to determine whether the changes shown in the other boxes in the logic model occur as anticipated.

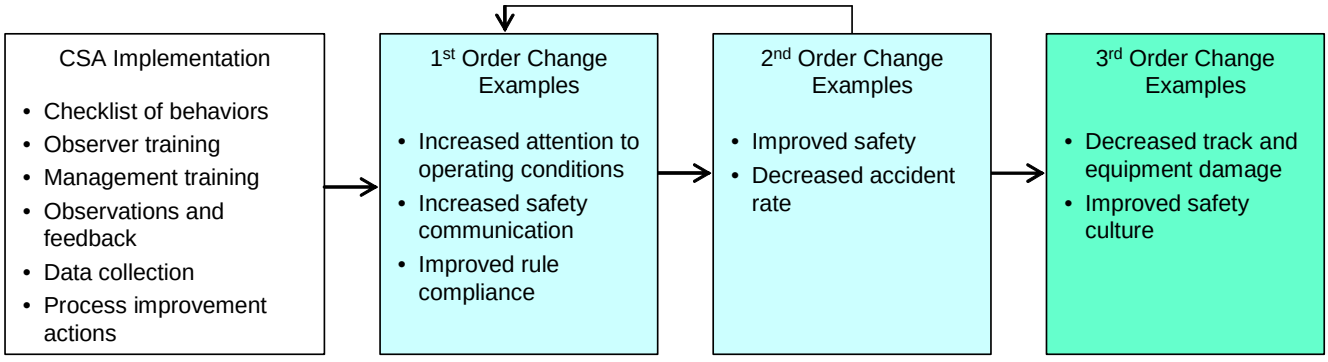

Figure 1. Part of Logic Model with Examples of Changes Expected to Result from CSA Implementation

[1] Behavioral Science Technology Inc. is providing the consulting services for this demonstration project.

BACKGROUND

Responding to a string of serious accidents, UP management and labor (BLET and UTU) engaged in safety initiatives in the SASU to reduce the risk of collisions, derailments, and other accidents when operating under restricting signals. In this, their largest initiative to date, they teamed with FRA to conduct a CSA demonstration project using BBS, CI, and management training techniques.

A CSA intervention typically requires a steering committee composed of workers (and sometimes management) to execute the CSA method in a particular location. The steering committee develops a site-specific checklist of safe and at-risk behaviors by identifying common behaviors and conditions contributing to injuries from past injury reports. Employees then use the checklist to conduct anonymous, peer-to-peer observations and provide confidential coaching feedback about at-risk behavior, encouraging communication about and enhancing personal awareness of safety. The steering committee analyzes resulting data to identify systemic barriers to safety, which are addressed through corrective actions, such as alterations to policies, procedures, and training. This process seeks to provide labor and management with information on removing hazards before they actually cause injuries.

FRA is sponsoring this and other CSA demonstration projects to determine if CSA can improve safety in the railroad industry, as it has in other industries. To succeed, these CSA interventions must overcome the railroad industry's unique organizational culture, regulatory environment, labor relations, and penalty structure for rule violations. In the first CSA intervention sponsored by FRA involving Amtrak baggage handlers, the number of worker-hours between injuries tended to increase as the cumulative number of CSA observation-feedback sessions increased. In addition, the monthly injury rate tended to be lower when the monthly observation-feedback rate was greater. These results suggest that CSA can be effective for railroads; however, CSA has never been tried with road crews working in dispersed locations like in the SASU.[2]

The CSA intervention in the SASU is entitled Changing At-risk Behavior (CAB) with Behavioral Science Technology, Inc. (BST), a company that has implemented CSA-like programs in a broad range of industries, providing consulting services for the project. The LLT (the Volpe National Transportation System's Center and NewVectors) is evaluating the effectiveness of this intervention for FRA.

METHODS

CAB Implementation in San Antonio

CAB implementation in the SASU began on August 1, 2005. A joint BLET/UTU steering committee developed a checklist of 35 safety practices to be tracked (see Figure 2 for examples).

2.0 CRZ SIGNAL
2.1 Crew member calls signal name
2.2 Radio communication-Conductor
2.3 All crew members acknowledge signal name
2.4 Conductor logs acknowledgement
2.5 Crew Communicates speed of train
2.6 Conductor transmits signal
2.7 Conductor logs signal
2.8 Engineer reduces speed
2.9 Crew complies with next signal

Figure 2. Examples from Checklist of Safety Behaviors

Out of 1,100 employees, more than 180 have been trained in performing peer-to-peer observation-feedback within the past 7 months. During the next 6 months, 100 more are expected to undergo training. The ultimate goal is to train all 1,100 employees. In addition, 50 managers at the SASU have each received 2 days of training in how to support the CAB project.

Over 700 confidential observation-feedback sessions have taken place to date. The pace is expected to accelerate as more people are trained. The plan is to eventually conduct 1,100 observation-feedback sessions per month—one per employee. Accomplishing this will be a challenge because the workforce is widely dispersed.

Evaluation of the CAB Project

The methodology for identifying lessons learned has involved four activities. One was the development of a logic model (part of which Figure 1 shows), which is a pictorial representation of relationships between the implementation process, the immediate outcomes called 1st Order Changes, and more distant consequences. The elements and their related measures that can be observed early in the implementation are in the box labeled 1st Order

[2] A third CSA demonstration project is also underway with switching crews on UP's Livonia Service Unit.

Change Examples; those that will be observed later are in the boxes further to the right. As shown in Figure 1, implementation of CSA is expected to lead to increased operator attention to operating conditions, which should then lead to a lower accident rate and less track and equipment damage.

The second lessons learned activity was a search for metrics that would serve as valid indicators for each element of the logic model. For instance, while some indicators are obvious, such as the cost of track and equipment damage, others need special measures, such as questionnaires to measure safety culture. Data sources for the measures on the logic model include operational data, data on corrective actions, safety culture surveys, and data on the implementation process.

The third lessons learned activity involved determining how to conduct the analysis. For instance, knowing the cost of track and equipment damage is only useful if changes can be compared over time at the SASU or between the SASU and other UP service units.

The fourth lessons learned activity involved conducting interviews with 19 SASU employees in fall 2005. Some of the interviewees were involved with CAB, and some were outside of the project. Those interviewed described which CAB activities were occurring and how they would measure CAB success. Their responses helped confirm the validity of the logic model developed for this program.

These four activities interact with each other, revealing changes that may be needed in the others.

EARLY INDICATIONS OF SUCCESS

It is too early to determine whether the program is having its intended impact. The first step in assessing impact, however, is to determine whether the program was implemented correctly. Data collected so far indicate that the implementation is viable. Several indicators suggest its potential to improve safety:

- Corporate and SASU management are providing strong support by paying the two steering committee facilitators' salaries, paying for 2 days of process training for observers, and providing space and materials for 2 training programs per month at the terminal.
- Local and divisional union officials have shown support for the process with letters and testimonials. For example, the Texas State Legislative Board "fully supports and endorses …the concept of behavior-based safety improvement" as implemented in the SASU.
- The joint BLET/UTU steering committee responsible for driving the effort in San Antonio has begun to distribute a regular newsletter about CAB activities.
- Steering committee members have reacted quickly and effectively to frequently (and not unexpectedly) voiced skepticism.
- Unexpected turnover of one steering committee member has not deterred the committee from its work or the process from its implementation schedule.
- Ratings for observation-feedback sessions have averaged 4.5 on a 5-point rating quality scale (5 being the best).
- UP management and the steering committee have worked diligently and well with the LLT in their efforts to obtain data on events, such as derailments and decertifications, to measure the impact of the effort.
- Though early in the process, most interviewees stated that they had observed safety improvements since CAB implementation, with many saying that locomotive engineers and conductors were more aware of safety and engaged in more safety communications.
- Records from project meetings corroborate these perceptions, with individuals reporting improved manager-worker relations, safety communication, and personal awareness. Specifically targeted practices and procedures are now performed safely more often.

FUTURE ACTIVITIES TO ASSESS OUTCOMES

As data are collected, the impact of CAB on safety will be assessed using three types of comparisons. First, corrective actions will be tracked to see if they were implemented and if any observed changes could be related to safety. For instance, if many people report issues with track conditions, the analyses could determine whether effective corrective actions were taken to improve track conditions. Second, historical comparisons will be made within the SASU. Finally, cross-service unit comparisons will be made between the SASU and other UP service units. In addition to safety and safety-related

outcomes, CAB is likely to affect attitudes and organizational culture. To test this, a set of organizational culture scales is being deployed to employees in San Antonio and possibly some comparison sites as well.

CONCLUSIONS

Progress so far suggests that CSA methods are viable in railroad settings, with key elements of a successful CSA project being implemented and supported at SASU:

- Labor is able to give and receive cross-craft feedback about safe and unsafe practices in a way that is confidential and acceptable to all parties while promoting a positive safety culture.
- Railroad management and labor leadership are able to establish and use positive relations with each other to cooperate and support the kinds of activities needed to implement CSA programs.

It remains to be seen whether CSA methods will affect safety and process efficiency in railroad settings. As further data become available, FRA will report findings related to other regions of Figure 1.

WANT MORE INFORMATION?

Findings from another CSA project are available on the FRA Web site (http://www.fra.dot.gov):

Behavior-based Safety at Amtrak-Chicago Associated with Reduced Injuries and Costs, February 2007, Research Results RR 07-07

Krause, Seymour, and Sloat, "Long-term evaluation of a behavior-based method for improving safety performance. A meta-analysis of 73 interrupted time series replications," Safety Science, Vol. 32, 1999, pp. 1-18.

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