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SHORT LINE SAFETY INSTITUTE: MEASURING SAFETY CULTURE GROWTH ACROSS FOUR RAILROADS

SUMMARY

Research shows that a strong safety culture can influence a railroad's safety outcomes, resulting in less frequent, less severe accidents. The U.S. Department of Transportation's (DOT) Safety Council defines safety culture as "the shared values, actions, and behaviors that demonstrate a commitment to safety over competing goals and demands" (Morrow, S., & Coplen, M., 2017).

Since 2014, the Federal Railroad Administration's Office of Research, Development and Technology has supported the American Short Line and Regional Railroad Association in its efforts to establish a Short Line Safety Institute (SLSI) focused on improving safety culture on short line and regional railroads. SLSI conducts voluntary, non-punitive, confidential Safety Culture Assessments (SCAs) for short line and regional railroads across the United States. SCAs provide a diagnostic appraisal of a railroad's safety culture at a given point in time, with documented Opportunities for Improvement.

This research summarizes findings from a case study analysis conducted in 2021 of initial and follow-up SCA reports completed for four railroads.

BACKGROUND

SLSI began industry-wide implementation of its SCA model in 2016. In 2019, SLSI developed its post-Assessment process to measure changes made by railroads following initial Assessments. To date, SLSI has completed post-Assessments for four railroads (referred to as Railroads 1, 2,

3, and 4 in this report), all of which completed their first Assessments in 2017.

SLSI's SCA model utilizes teams of two Assessors and a multi-method, data-focused, site-customized in-depth process that involves surveys, observations, interviews, and document inventories. SLSI uses the Ten Core Elements of a Strong Safety Culture (Morrow, S., & Coplen, M., 2017) as a theoretical framework to operationalize its definition of safety culture.

On-site Assessments range between 5 and 10 days, with the majority taking 8 days. At the end of each Assessment, the participating railroad receives a final report that summarizes positive and negative findings about the railroad's safety culture and details actionable Opportunities for Improvement, where the Assessors suggest organizational changes that, if implemented, may strengthen the railroad's safety culture.

CASE STUDY ANALYSIS

To increase understanding of the safety culture growth realized by participating railroads over time, the Volpe National Transportation Systems Center (Volpe) completed a case study analysis of the initial (Time 1) and follow-up (Time 2) SCA reports for four railroads. The current research provides updates to a previous report summarizing safety culture growth across two railroads (Kidda, S., & Howarth, H., 2020). The current analysis includes the two railroads reported on previously and two additional railroads.



METHODS

To gauge safety culture growth across the four participating railroads, the Volpe team systematically compared each railroad’s initial SCA report with its follow-up SCA report. The analysis, framed around the Ten Core Elements of a Strong Safety Culture, focused on two aspects:

1. Differences between Time 1 and Time 2 Findings
2. Whether the railroad took action on noted Opportunities for Improvement

Volpe analysts identified positive and negative safety culture indicators under each of the Ten Core Elements. Using these indicators, the Volpe team estimated whether the safety culture under a particular Core Element strengthened, stayed about the same, or weakened. The Volpe team then determined whether the railroad’s overall safety culture (across all Ten Core Elements) showed evidence of strengthening.

To support interpretation of the SCA summary reports, the Volpe team reviewed areas of uncertainty with the SLSI Assessors.

RESULTS

Individually, each of the four railroads demonstrated evidence of overall safety culture growth. Figure 1 shows the changes that took place from Time 1 to Time 2 for each railroad, by Core Element. A plus sign indicates strengthening, a negative sign indicates weakening, and an equal sign indicates no substantial change.

The Volpe team identified emerging trends in safety culture changes across the four railroads. As shown in Figure 1, all four railroads showed evidence of safety culture growth under Core Elements 2, 6, and 7, and no substantial change under Core Element 5. Of note, three out of four railroads showed evidence of safety culture weakening under Core Element 8, with the fourth railroad showing no substantial change in this area. For the remaining five Core Elements, the results differed for at least one of the four

railroads. As the case study sample size continues to grow, the Volpe team will be better able to identify trends across the Core Elements.

In both the Time 1 and Time 2 SCA reports, SLSI issued multiple Opportunities for Improvement to each of the railroads. Figure 2 summarizes the implementation status of the Time 1 Opportunities for Improvement across the four railroads, as of the Time 2 Assessment.

Core Element	Railroad 1	Railroad 2	Railroad 3	Railroad 4
1 Leadership Is Clearly Committed to Safety	+	+	+	-
2 The Railroad Practices Continuous Learning	+	+	+	+
3 Decisions Demonstrate That Safety Is Prioritized Over Competing Demands	=	=	+	+
4 Reporting Systems and Accountability Are Clearly Defined	+	+	=	+
5 There is a Safety Conscious Work Environment	=	=	=	=
6 Employees Feel Personally Responsible for Safety	+	+	+	+
7 There is Open and Effective Communication across the Railroad	+	+	+	+
8 Mutual Trust is Fostered between Employees and the Railroad	-	+	+	+
9 The Railroad is Fair and Consistent in Responding to Safety Concerns	-	+	+	+
10 Training and Resources Are Available to Support Safety	+	=	+	+

Figure 1. Change in Safety Culture Elements over Time, by Railroad

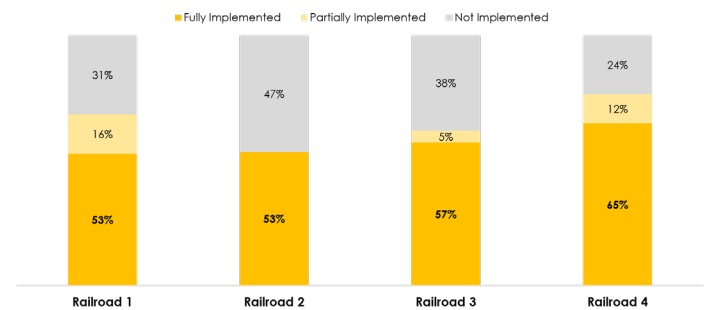


Figure 2. Status of Time 1 Opportunities for Improvement, by Railroad

As shown in Figure 2, each of the four railroads fully implemented the majority of the Time 1 Opportunities for Improvement issued by SLSI. Railroads 3 and 4 both fully implemented a higher percentage of Time 1 Opportunities for Improvement (57 and 65 percent, respectively) than Railroads 1 and 2 (53 percent each). A potential contributing factor to this may be the amount of time that had passed between the Time 1 and Time 2 SCAs for these two railroads. As shown in Table 1, more than 3 years had passed between the initial and follow-up SCAs for Railroads 3 and 4, compared to approximately 2.5 years for Railroads 1 and 2.



Table 1. Time Elapsed Between Initial and Follow-Up SCAs, by Railroad

Railroad	Time Between Assessments
Railroad 1	2 Years 5 Months
Railroad 2	2 Years 6 Months
Railroad 3	3 Years 8 Months
Railroad 4	3 Years 1 Month

Figure 3 shows the change in number of Opportunities for Improvement issued between the Time 1 and Time 2 Assessments across the four railroads. The Assessors issued 25 percent fewer Time 2 Opportunities for Improvement (on average) across the four railroads. The majority (34 out of 54, or 63 percent) of the Time 2 Opportunities issued across the four railroads were repeated or expanded upon Time 1 Opportunities. Of interest, Railroad 3, which had the biggest drop-in new Time 2 Opportunities (from 21 to 12) had the highest proportion of repeated/expanded upon Time 2 Opportunities.

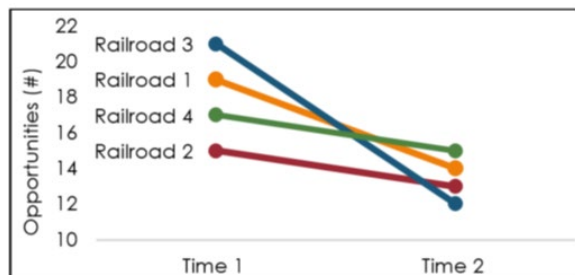


Figure 3. Number of Opportunities for Improvement Issued to Participating Railroads in Time 1 and Time 2 SCA Reports

CONCLUSIONS

All four railroads implemented most of the Time 1 Opportunities for Improvement issued by SLSI, which supported a stronger safety culture by the Time 2 Assessment. For all railroads, however, the Assessors reported that there was room for additional safety culture improvement.

This case study raises the possibility that it may be easier for railroads to strengthen their safety culture under some Core Elements and more difficult under others, as evidenced by the trends

in safety culture growth for the four subject railroads. The available data do not explain why railroads differ in their ability to improve certain Core Elements.

FUTURE ACTION

The updated analysis continues to suggest that there may be a link between the SCA process and strengthened safety culture. The results should be interpreted with caution, given the small number of railroads included in the analysis. An increased sample size will strengthen the analysis and increase understanding of the relationship between the SCA process and changes observed at the railroads. Future research could also examine barriers to improving safety culture and identify ways that SLSI can equip railroads with the tools they need to implement best practices.

REFERENCES

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