



## Evaluating Amtrak's Safe-2-Safer: Are Recorded Injury Rates Showing Actual Injury Rates?

### SUMMARY

Since 2009, Amtrak has been engaged in unprecedented efforts to advance its safety processes and improve the safety culture of the entire corporation, including establishing a peer-to-peer feedback process, known as the Safe-2-Safer program. FRA is conducting an evaluation of these efforts in order to provide lessons learned for other railroads pursuing large-scale safety culture change.

While Amtrak's worker injury rates have risen since 2009, the FRA evaluation suggests this increase might be above actual injuries due to factors both related to and separate from efforts to improve safety culture. The data suggest that these factors have increased the proportion of injuries *recorded* by Amtrak. Under-recording of injuries is common in many companies, especially those with safety culture issues (see [1]). The distinction between *actual* and *recorded* injuries highlights both the promise and challenges of changing a safety culture.

### SAFE-2-SAFER

In June 2009, Amtrak initiated the Safe-2-Safer (S2S) program, the centerpiece of its efforts to reduce injuries and improve Amtrak's safety culture. S2S used the contractor Behavioral Science Technology (BST), who were used in FRA-sponsored Clear Signal for Action (CSA) programs, and BST implemented essentially the same peer-to-peer feedback method that was effective in pilot demonstrations at three locations from 2001 to 2008 [2][3][4].

The S2S method was first tested by Amtrak in 2002 with baggage handling employees at Chicago Union Station as one of the three FRA-sponsored pilot demonstrations of CSA. Injury rates in Chicago Union Station declined by 76% when the method was implemented [4], at a time when there were no known factors that would affect the proportion of actual injuries recorded by Amtrak. Amtrak determined that subsequent trial implementations at other Amtrak sites across the country were also successful, and all these results led in 2009 to implementation of the S2S method at these locations covering the entire Amtrak system.

### INJURY RATE RISE

Since 2009, the injury rate for Amtrak, calculated from injury data Amtrak recorded, has increased (quarterly injury rates with time,  $r = 0.848$ ,  $p < 0.0001$ ). When including all injuries recorded by Amtrak, whether meeting FRA's reporting criteria or not, the annual rate in 2014 was 78% greater than the rate in 2009. This was an unexpected contrast to the experiences with earlier CSA-type implementations, including all three FRA-sponsored pilot demonstrations, where implementation was followed by improving safety measures [2][3][4].

A detailed analysis of the injury data indicates some possible causes of the rise in recorded injury rate, as illustrated in Figure 1 with red circles. The rise in recorded injury rates appears to begin in the transition between the fourth calendar quarter of 2009 and the first quarter of 2010. More sensitive



analysis, using cumulative incident plots as used in reliability engineering and medical sciences [5], indicate the start of the increase was the first half of December 2009.

While S2S was officially launched in June 2009, the first year was associated with planning, safety culture assessments, and training. Actual S2S operations –the peer-to-peer feedback activities –did not begin until October 2010.

Figure 1 shows (with blue x's plotted against the right-hand axis) the percent of the 28 S2S locations that were operating. None were operating in the third quarter of 2010, and less than half were operating before the first quarter 2011. S2S did not approach full operations until about the fourth quarter 2011. This time period suggested that other factors than S2S operations were responsible for the apparent rise in 2014 injury rates.

### EVENTS RELATED TO RECORDED INJURY RATE

Three events were associated with an apparent rise in injury rates at the end of 2009, the first of which was not at all connected with S2S, but was merely a coincidence.

#### ***Managers Discouraged from Disciplining Injured Workers***

The Federal Railroad Safety Act (FRSA) protects a worker against retaliation when he or she notifies a company of an injury. In November 2009, Amtrak told managers to “not charge [i.e., discipline] an injured employee without a solid underlying rule violation,” and informed them that “discipline must be consistent both in cases with injuries and those without injuries.”

The apparent effect of this advice was to drastically discourage any disciplining of injured workers. As shown in Figure 1 by the dashed orange line plotted against the right-hand axis, prior to the November

2009 presentation (left-most gray vertical line in Figure 1), approximately 11% of injured workers were disciplined; subsequent to the presentation, less than 1% of injured workers were disciplined ( $F(94,466) = 12.94, p < 0.0001$ ).

Prior to 2009, workers may not have notified their supervisors of (or actively hid) their workplace injuries to avoid potential disciplinary action. If so, then dramatically reducing the chance of discipline could result in more notifications of injuries and therefore, more injury *recording* by Amtrak. With more injuries being recorded, the calculated injury rate would appear to rise even when there is no actual increase in injuries among workers.

#### ***CEO Requires Complete Injury Recording***

There is data to suggest that workplace injuries were under-reported at Amtrak in 2009. As part of its safety culture assessment in preparation for S2S, BST conducted a system-wide survey of all employees in August and September of 2009. In the survey and focus group sessions, workers indicated they were not willing to notify supervisors of injuries due to potential repercussions.

Quantitatively, their willingness to notify was substantially lower than the average company BST consults for. On October 30, 2009, BST warned Amtrak that this was a serious concern because an effective safety culture relies on accurate and complete safety data.

Amtrak responded swiftly to BST's warning. In November 2009, the CEO of Amtrak sent a letter to all employees urging them to notify their supervisors of all injuries (thick gray vertical line in Figure 1). Citing the BST survey and later amendments to the FRSA, the letter cautioned disciplining any employee –worker or manager –for intimidating, harassing, or retaliating against another employee who notifies a supervisor of an injury.

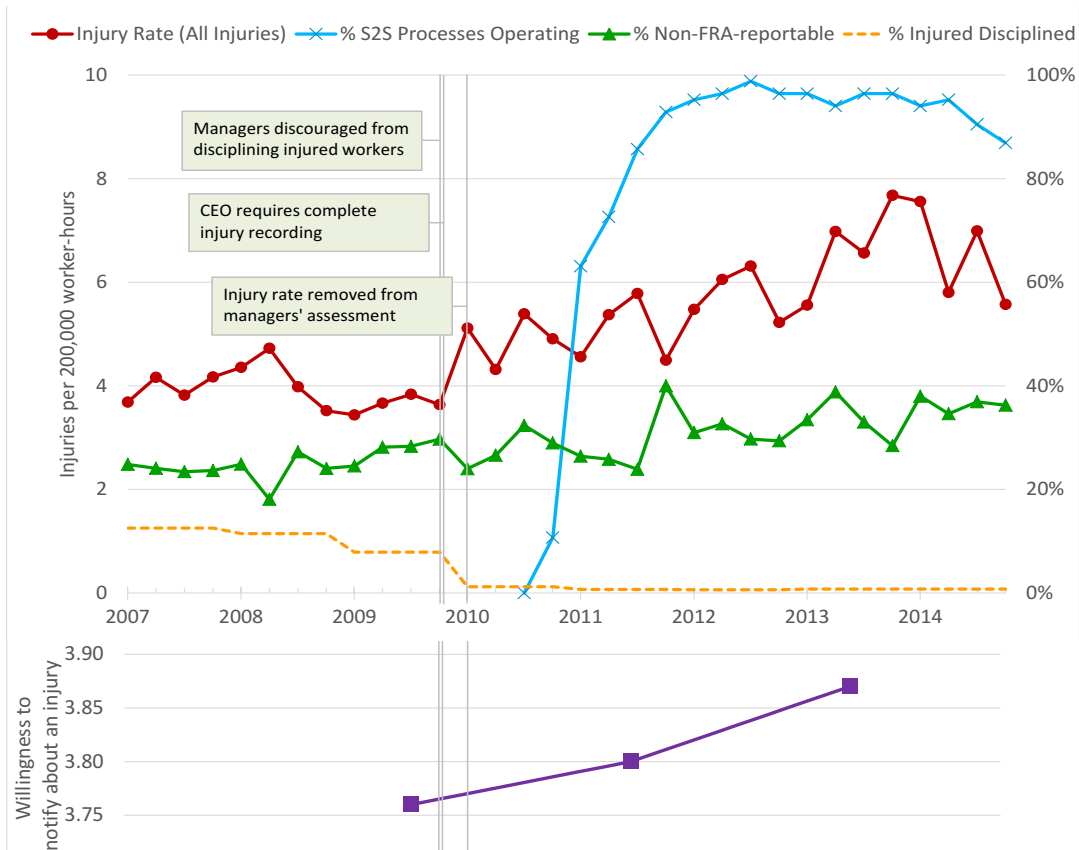


Figure 1. Events and metrics related to injuries at Amtrak

**Injury Rate Goals Removed from Managers' Assessments**

The CEO letter was followed by a change in the manager assessment policy. Through 2009, managers were given injury rate goals to achieve as part of their performance assessment. Recognizing that improved injury recording would most likely increase the recorded injury rate, Amtrak removed injury rate goals from managers' assessments in February 2010 (right-hand vertical line in Figure 1). The intention and apparent effect was to remove incentives for managers to suppress injury recording.

**Impact: Improved Injury Recording**

In sum, from the fourth quarter 2009 to the first quarter 2010, the incentives for both workers and managers changed to encourage more injury

recording. Amtrak changed the incentives in response to both the FRSA amendments, which coincided with S2S, and the survey and focus group data on worker injury notification, which was part of S2S preparation. The data indicated that the change in incentives was effective. Follow-up surveys by BST in the third quarters of 2011 and 2013 show a gradual rise in worker willingness to notify supervisors of injuries (see squares at bottom of Figure 1). This mirrors the general increase in recorded injury rate. Plotting the proportion of injuries among all recorded injuries that do not meet the criteria for reporting to FRA provides further evidence of an increase in the recording of injuries. These non-FRA reportable injuries (e.g., not requiring medical attention) tend to be less serious than FRA-reportable injuries.



They are less likely to incapacitate the worker or be visually obvious to supervisors, and are thus easier to hide from a supervisor by a worker seeking to avoid repercussions of notifying the supervisor of the injury. Changing incentives could be expected to increase the rate of mild and serious injuries that are recorded. Many kinds of injuries requiring medical attention can be “worked through,” at least until the end of a shift. However, changing the incentives would increase the rate of mild injuries recorded over serious injuries, which means that mild injuries would become a larger proportion of all recorded injuries. As shown in Figure 1, the percent of non-FRA-reportable injuries (plotted with green triangles using right-hand axis) has been generally increasing since the last quarter of 2009 (quarterly proportions with time  $r = 0.697$ ,  $p = 0.0001$ ), consistent with recording more of all injuries.

#### ***More Injury Recording, Not More Injuries?***

All this evidence suggests that recorded injury rates reflect not just the underlying actual injury rates, but the social context and incentives in the process of creating injury records quite apart from whether or not the injury actually occurred.

This suggests that some, or possibly all, of the apparent increase in the recorded injury rate at Amtrak is due to changed incentives for notifying supervisors of injuries. It is possible that there was no *actual* increase in employee injuries, but only an increase in the *recording* of injuries. The increase in the recorded injury rate may have been a positive development, indicating successful compliance with the FRSA amendments, improved completeness of safety data, and better safety culture.

### **REMAINING ISSUES, CONTINUED WORK**

#### ***Actual Injury Increase?***

At this time, it is not possible to determine what percentage of the recorded injury rate increase is due

to more complete injury recording versus what percentage is due to an actual increase in injuries (if any). By removing injury rate goals from manager performance assessments in 2009, Amtrak removed incentives for managers to suppress injury recording. However, removing injury rate goals might have also unintentionally removed an incentive to maintain a safe workplace.

Amtrak had planned to replace injury rates as a manager metric with proactive metrics of a manager’s safety performance by the end of 2010. However, new metrics were not established until late 2014 when Amtrak established a new Chief Safety Officer position. Until then, managers might have been less focused on safety than they were before 2009. This could have resulted in a rise in the actual injury rate. At this time, it is unknown if this occurred. Meanwhile, Amtrak is continuing to re-introduce safety performance metrics.

#### ***Safety Information to Managers***

Amtrak managers encountered challenges in monitoring safety performance in their area of responsibility on their own, regardless of goals set by superiors. An upgrade to the corporate injury database system around 2007 made *ad hoc* data extraction difficult. In 2010, regular injury statistical reports to managers were discontinued due to shifting responsibilities as S2S was implemented. Amtrak reorganized in 2013, but the injury database could not be restructured to reflect the reorganization, which further hobbled the effective feedback from safety information. While managers can make special requests for safety data, it is unknown how often this is done, or how quickly and reliably responses can be sent.

Amtrak is currently working to improve its internal safety information feedback process. For example, in 2015, Amtrak gained the ability to analyze injury rates



in the Engineering Department by division. This ability is being extended to all other departments.

### ***Role of Discipline***

The FRSA amendments do not prohibit disciplining injured workers. Instead, Amtrak recognizes that discipline must be consistent whether it is applied to cases with injuries or cases without injuries. Furthermore, discipline enforcement must be clear and consistent to promote safety effectively [6]. In particular, a company should discipline a chronically unsafe worker (such as after a rule violation) before she or he is injured. After an injury occurs, any disciplinary action taken is too late to prevent the injury and is not very useful, because the injury itself serves a natural punishment.

All railroads are required to conform with the FRSA amendments, but, unlike Amtrak, other Class 1 railroads did not experience an increase in recorded injuries following the passage of these amendments [7]. It is possible that safety rule systems for other Class 1 railroads did not require a change in policy or management behavior that would promote greater injury recording. That is, Amtrak's rule system may have had unique issues that make compliance with the amendments difficult when the rules are enforced. For example, the written rules may have inhibited consistent enforcement when there are no injuries.

Amtrak is currently overhauling its safety rules, with labor involved in redrafting the rules, and seeking to make the rules more behavior based. The overhaul is expected to be completed in 2016. Amtrak is challenged with introducing the new safety rules without also re-introducing disincentives to notify supervisors of injuries.

### ***Challenges for S2S***

The increase in recorded injuries does not appear to be related to S2S operations, such as peer-to-peer feedback. However, that does not necessarily mean S2S is operating at peak performance. Even with the

increase in injury recording, one expects S2S to measurably impact injury rates at some point. In an in-depth study of the S2S process from November 2013 through 2014, Amtrak's Office of the Inspector General found weaknesses in S2S at various locations, and recommended strengthening employee engagement and accountability for injuries at all levels of the company [7]. The irregularity in implementation strength suggests that scaling CSA-type initiatives to a national system presents its own unique challenges. Beginning in 2014, Amtrak has been working to remove the weaknesses of S2S and integrate it within a comprehensive safety management system.

### **FRA EVALUATION**

Amtrak is continuing its efforts to improve its safety performance and safety culture processes, following a strategic plan to address issues in management accountability for safety, the safety information feedback process, safety rules, and S2S. FRA will continue to identify lessons learned so they may be applied to the whole industry. Since S2S was designed to reduce injury rates, the recorded injury data cannot be disregarded despite its questionable relation to actual injuries. Instead, this evaluation has taken into account, as best as possible, the context for the increase in injury recording in determining its findings [8].

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## KEYWORDS

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