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WORKER SAFETY AT THE COLORADO DEPARTMENT OF TRANSPORTATION

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**COLORADO DEPARTMENT OF TRANSPORTATION
DTD APPLIED RESEARCH AND INNOVATION BRANCH**

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<p>16. Abstract</p> <p>The Colorado Department of Transportation (CDOT) is currently investigating approaches to reduce the frequency and severity of work-related injuries. The incident rates for CDOT are significantly higher than those achieved by some private organizations (e.g., Kiewit) and comparable DOTs. One element in determining the current state of safety practices within CDOT is evaluation of Job Safety Analysis Forms (JSAs) and their current use. This study examined the effectiveness of these forms in terms of worker perspectives and the overall organizational strategies associated with the forms.</p> <p>Study results indicate that CDOT has a mixed record for implementing JSAs. There is a very positive attitude towards the JSAs and a strong willingness by workers to enhance the safety record. However, this positive is balanced by an equally strong negative aspect in terms of actual usage of JSAs in relation to the intent of the program.</p> <p>Implementation:</p> <ul style="list-style-type: none"> Organize an Accelerated Safety Improvement Workshop where the intent and usage of JSAs would be a central focus. Ensure that leadership responsibility for JSA implementation and safety awareness at work sites is clearly understood. Create a feedback process where data collected by Regional Safety Officers (RSOs) can be used by crews to modify behavior. 					
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EXECUTIVE SUMMARY

The Colorado Department of Transportation (CDOT) is currently investigating ways to reduce the frequency and severity of work-related injuries. The incident rates for CDOT are significantly higher than those achieved by some private organizations (e.g., Kiewit) and other DOTs. In response to this fact, this research focused on evaluation of Job Safety Analysis Forms (JSAs) and their current use as one element in determining the current state of safety practices within CDOT. This study examined the effectiveness of these forms in terms of worker perspectives and the overall organizational strategies associated with the forms.

The method used to accomplish this study was direct interviews with the workers who use JSAs on a daily basis as well as the management in charge of directing this use within the regions. It was postulated that Transportation Maintenance Workers (TMs), Regional Safety Officers (RSOs), Labor, Trades, and Crafts Operations (LTC Ops), and Superintendents are capable of determining whether or not these forms contain the proper information with sufficient detailing, and the appropriate format. Superintendents, TMs, LTC Ops, and RSOs were interviewed in every region across the state, either through focused group settings or individual interviews.

A standard set of structured questions was used in each interview to obtain users' feedback regarding implementation, training, and improvement. The selected group of workers who use JSAs on a regular basis gave first-hand information on how the JSAs were originally introduced, training, typical methods of use, frequency of use, typical methods of access, and general awareness. The workers and managers also suggested ways of changing the format and content to improve the overall effectiveness of the tool.

Consolidation of the interview responses provided both general and specific conclusions:

General Conclusions

- There is a very positive perception of JSAs (and safety) and their potential effectiveness.
- Inter- and intra-region variation exists in the use of JSAs, training, and management oversight.

- A disconnect has been observed between some managers and crews based on the answers obtained from managers and work crews.
- There is a need for consistent activity-specific and site-specific safety planning.

Specific Conclusions

- Employees self-identified as responsible for JSA use were never provided with training.
- In some regions the JSAs are only available electronically which makes consistent use in the field challenging.
- JSAs are not always used proactively.
- The primary worker responsible for the implementation of JSAs has not been identified consistently in all regions.

These findings led to a set of key recommendations for consideration by the Executive Safety Committee (ESC):

- In response to the training issue, CDOT should consider organizing an Accelerated Safety Improvement Workshop where the JSA intent and usage would be a central focus.
- Determine the most effective position to oversee, implement, train, and manage safety within a region to insure that responsibility for JSA implementation specifically, and safety awareness at the work site in general is clearly stated.
- Create a feedback process (reporting and reports) where data collected by RSOs can be used by crews to modify behavior.

In summary, the importance of safety at CDOT has been recognized at all levels through the ESC. This study provides evidence of where safety needs to be examined in terms of JSA usage. We believe the opportunity exists to make these corrections with the appropriate focus and ultimately, make a significant improvement to the current CDOT worker safety situation.

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CHAPTER 1: INTRODUCTION

The safety record at CDOT has been lagging the safety record of some private transportation companies and comparable DOTs for several years. This study was undertaken to examine the critical issues of how CDOT compares with private industry and other DOTs in terms of safety incidents, as well as determining potential approaches for improving the safety record within CDOT. The study focused on two overall questions:

1. How do the current safety practices at CDOT compare to the safety practices in other DOTs or private industry? For this question, the study gathered data from comparable DOTs and a private company with a stellar safety record that does work in the transportation area.
2. How is CDOT performing in a specific area of safety practice? For this question, the study focused on the use of Job Safety Analysis Forms (JSAs) as a specific element of the CDOT safety plan to determine safety practices within the organization.

Given the overall goals of determining good safety practices and determining the current safety practices within CDOT, the study set several specific objectives within these overall goals:

- ***Determine specific safety patterns in each maintenance and traffic region.*** This objective guided the team to ensure that all regions within the Colorado were included within the study.
- ***Determine if any variance exists between management and crews.*** The team was instructed to obtain input from all levels within a region to determine if any variability existed between management and work crew perspectives.
- ***Determine if variance exists between regions.*** In an environment where maintenance and traffic tasks are executed in multiple geographic areas under varying traffic and hazard conditions, the question of consistent application of safety standards was put forward.
- ***Determine areas where immediate and long-term improvement could be made.*** The current safety statistics indicate that issues exist within CDOT regarding safety. This study provides a starting point for guiding discussions on worker safety improvement.

As summarized in the following chapters, these objectives provided the scope under which the current study evolved. Specifically, Phase 1 emphasized understanding the safety issue within CDOT and its relationship to current safety practices in DOTs and private industry.

Subsequently, Phase 2 was designed to build on these findings by doing a comprehensive analysis of the current safety practices within CDOT as defined by the use of the JSAs. It is acknowledged that JSAs do not represent the complete scope of safety activities being undertaken, but they provide an indicator of current safety trends within the organization.

CHAPTER 2: APPROACH

The Worker Safety Study incorporated two primary phases: (1) a background analysis of safety practices, and (2) a focus on the use of JSAs within the CDOT organization. The overall goal of these two phases was to obtain a sufficient understanding of the successful safety practices being implemented in other DOTs and in private companies.

In Phase 1, CDOT's specific aim was to "identify organizations performing work of types similar to CDOT which have exemplary worker safety records, determine what characteristics differentiate these organizations from their peers, and identify ways in which CDOT can emulate the best practices identified to become an exceptionally safe organization" (CDOT Research Newsletter 2007-1). Considering this aim, the first phase involved collecting data on how Colorado's injury rates compare to other state DOTs and private industry as a whole.

Phase 1 included the following tasks:

1. Determine an appropriate definition for safety from which to compare the safety statistics;
2. Obtain data from comparable DOTs;
3. Analyze safety statistics from comparable states;
4. Compare DOT safety statistics to an identified leader in the private sector; and
5. Develop general recommendations from the data to guide an organizational approach to safety by CDOT.

The completion of Phase 1 provided a quantitative basis from which CDOT could be compared to other state DOTs and leading private industry practices. The conclusion from Phase 1 was that CDOT was, in fact, underperforming with respect to incident rates and that attention needed to be placed on the safety actions at the work site. The use of JSAs was selected as a focal point due to their central role in safety planning in the private industry and in DOTs with leading safety records. As stated previously, the JSAs are not the only factor in safety incidents but they do provide an indicator of how safety practices are being followed within the CDOT organization. Given this focus, the team used the following approach to analyze the use of JSAs within the CDOT organization:

1. Obtain contacts for individuals at all levels and in all maintenance and traffic regions;
2. Develop an interview form to focus on use of JSAs;
3. Conduct pilot interviews at two maintenance regions;
4. Review responses to determine if any changes were required in the interview questions;
5. Conduct phone interviews with senior managers in each region;
6. Conduct face-to-face interviews with maintenance crews in each maintenance region;
7. Summarize maintenance data for JSA use;
8. Conduct phone interviews with traffic regions to determine JSA use; and
9. Summarize data and develop recommendations for enhancing safety based on JSA findings.

The following chapters provide an in-depth review of Phase 1 and Phase 2, followed by a set of overall conclusions and recommendations for enhancing safety within the CDOT organization.

CHAPTER 3: PHASE 1 - SAFETY PRACTICE ANALYSIS

The first task in completing this research was to compare CDOT's safety performance to similar organizations in the road construction and maintenance industry. In order to maintain consistency among organizations, OSHA recordable injury rates were collected. Using this definition standardizes the measure across every organization and therefore allows comparison. The OSHA recordable injury figures were only gathered for maintenance and road construction workers to eliminate cases involving administrative/office personnel.

The definition of a 'Recordable' injury was taken from the Code of Federal Regulations (CFR) Title 29 Part 1904. CFR 29 is the code that covers labor and Part 1904, "Recording and Reporting Occupational Injury and Illnesses," is the guidance that the Occupational Safety and Health Administration (OSHA) requires private industry to follow. CFR 29, Part 1904.7 identifies the basic requirement for a recordable injury to be one that results in the following:

... death, days away from work, restricted work or transfer to another job, medical treatment beyond first aid, or loss of consciousness. You must also consider a case to meet the general recording criteria if it involves a significant injury or illness diagnosed by a physician or other licensed health care professional, even if it does not result in death, days away from work, restricted work or job transfer, medical treatment beyond first aid, or loss of consciousness.

The appropriate method of calculating OSHA recordable injury rates is outlined by the Bureau of Labor and Statistics on the following website: <http://www.bls.gov/iif/osheval.htm>. The formula used is: $(\text{Number of injuries and illnesses} \times 200,000) / \text{Employee hours worked} = \text{Incidence rate (injuries per 200,000 worker hours)}$. The 200,000 hours in the formula represents the equivalent of 100 employees working 40 hours per week, 50 weeks per year, therefore standardizing the incident rate for each organization being assessed. The incident rate therefore states that for every 100 employees you will have X (insert incident rate) number of reportable injuries or illnesses per year.

Using these definitions, CDOT’s incident rates between 2002 and 2006 were compared to the overall highway, street, and bridge construction industry and the Denver District of Kiewit Corporation. Kiewit was used as a comparison due to its exemplary safety record in an area that is comparable to the work conducted by CDOT construction crews. CDOT’s incident rates were calculated using the data from their reportable injury records. The highway, street, and bridge construction industry rates were taken from the Bureau of Labor and Statistics Industry Injury and Illness Data tables titled “Incidence rates - detailed industry level” found at the following website: <http://www.bls.gov/iif/oshsum.htm#05Summary%20Tables>. Finally, the yearly incident rates of Kiewit Corp. Denver District were provided by their district Safety Manager, Tim Howe. The findings showed that the average incident rate for Colorado DOT from 2002 to 2006 was 14.98. The private highway, street, and bridge construction industry had an average rate of 6.62 and Kiewit Denver District had an average rate of only 1.00 over the four year period. Figure 1 below graphically depicts the incident rate comparison between CDOT, private industry, and Kiewit Denver District.

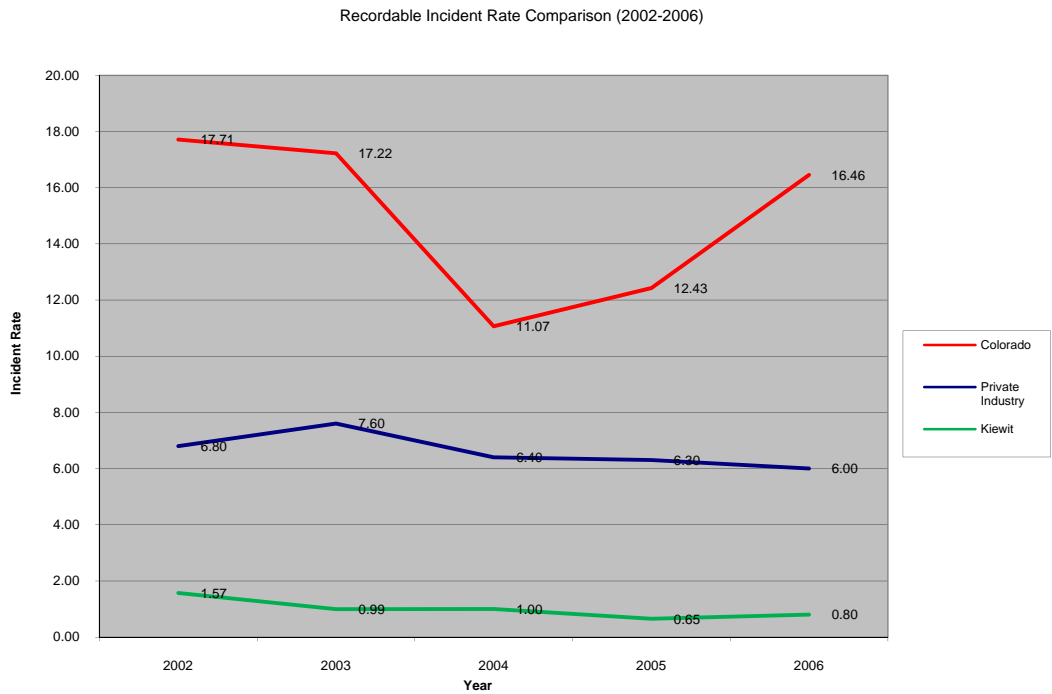


Figure 1. Incident Rates

Figures 2, 3, and 4 show the injury incident rates for private industry, Kiewit Denver, and each of the state DOTs from which information was gathered. The average incident rate in 2004 of all the organizations for which data was gathered was 8.13 with Colorado at 11.07 and Utah with the lowest rate of any state DOT at 2.32 incidents per 100 workers. The average in 2005 was 8.18 with Colorado at 12.43 and Utah at the bottom of the states with 2.24. Finally, 2006 had an average incident rate of 8.87 while Colorado was at 16.46 and Utah again had the lowest rate of any state recording 2.22 incidents per 200,000 worker-hours.

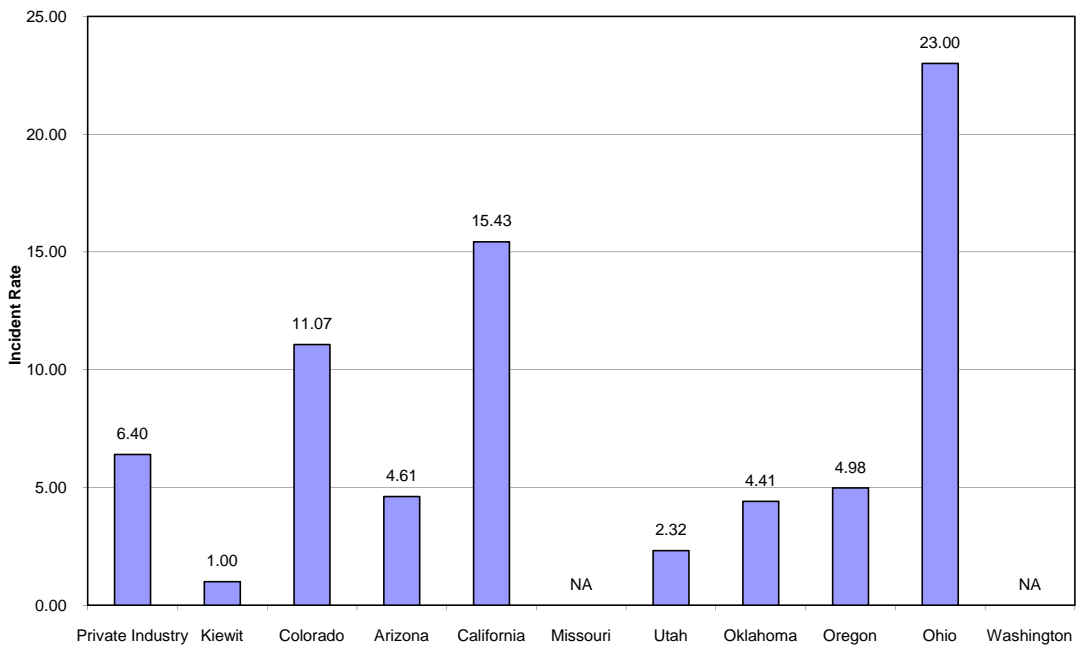


Figure 2. 2004 Incident Rates

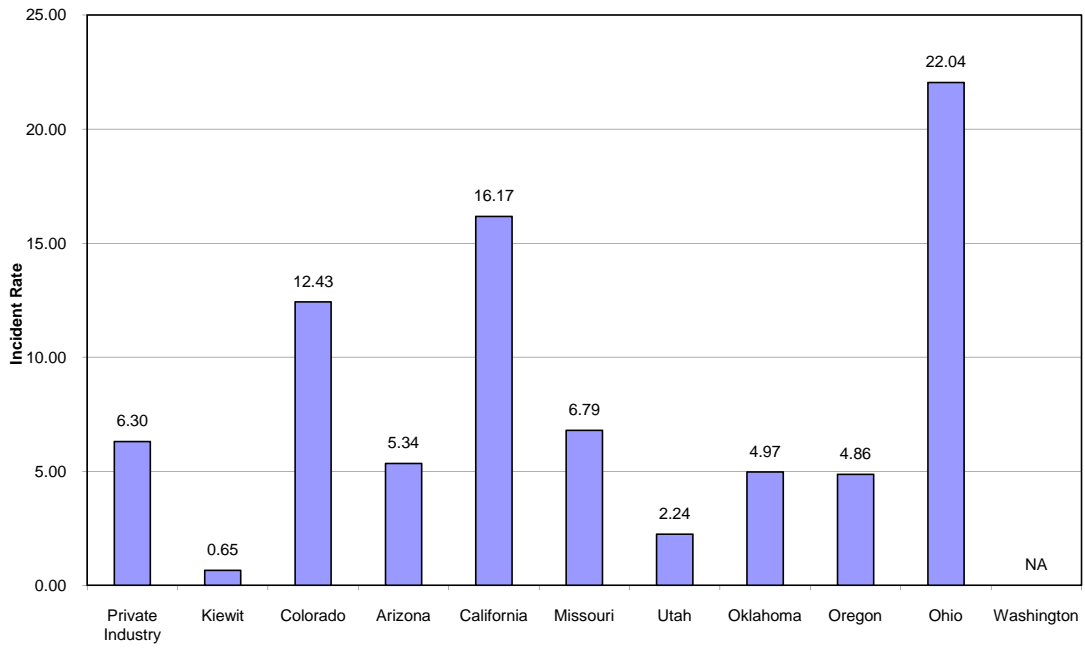


Figure 3. 2005 Incident Rates

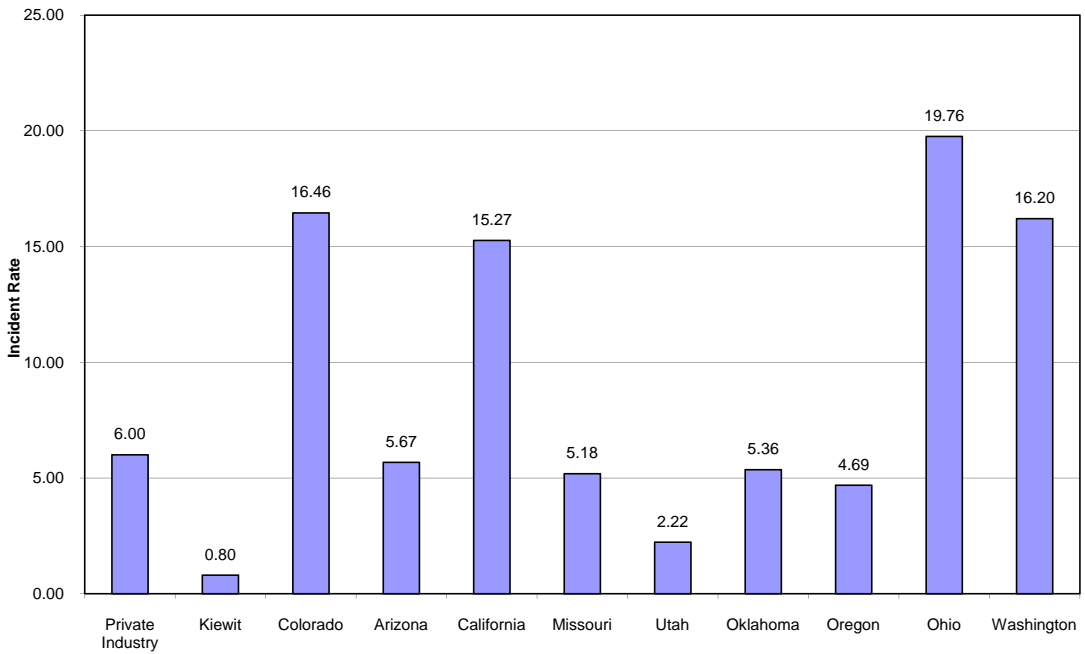


Figure 4. 2006 Incident Rates

The last part of this data analysis looks to answer the following question: What are the most prevalent injuries at CDOT that contribute to the incident rate? As illustrated in Figure 5, the most prevalent injuries are of the Strain/Sprain/Hernia variety. These types of injuries account for over 50% of the total reportable injuries in every year between 2002 and 2006.

Contusion/Crush injuries are by far the next most common injury followed by reportable Lacerations/Punctures. Figure 6 goes on to further analyze the Strain/Sprain/Hernia reportable injuries. Figure 5 shows that the majority of those types of incidents have Lift/Push/Pull or Slip/Fall as the cause. The increase in Lift/Push/Pull and Slip/Fall causes may not be significant to note because it seems to be due to the refinement of reporting procedures and the way the data was put in the database.

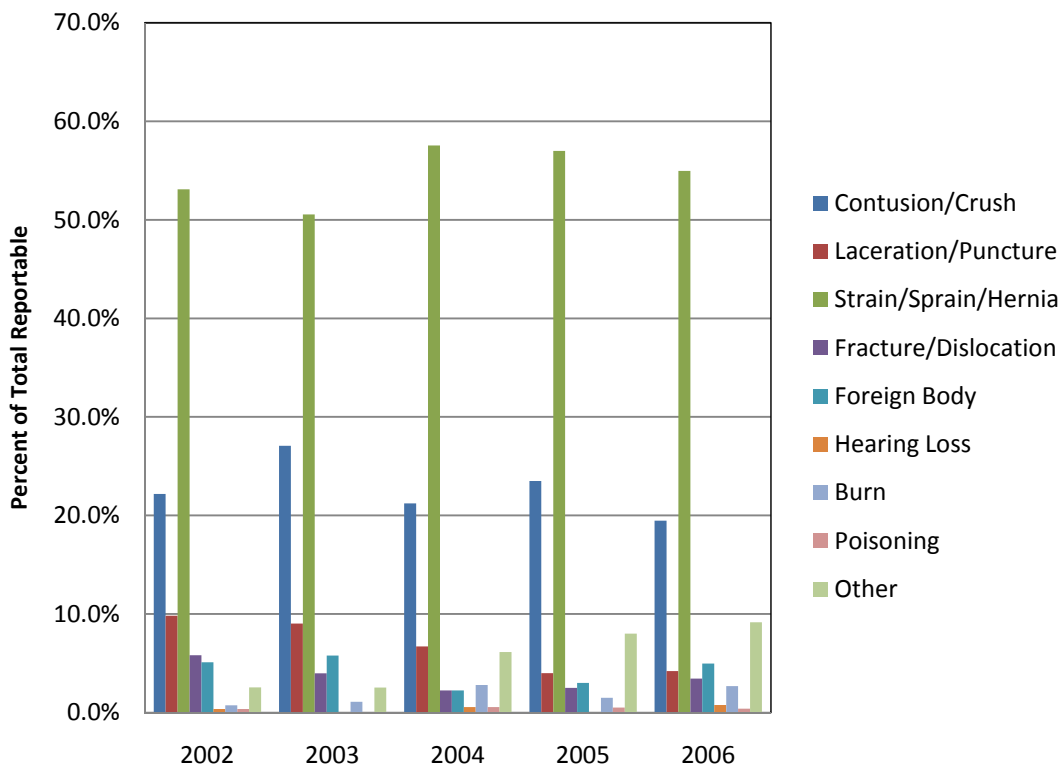


Figure 5. CDOT Injuries by Type

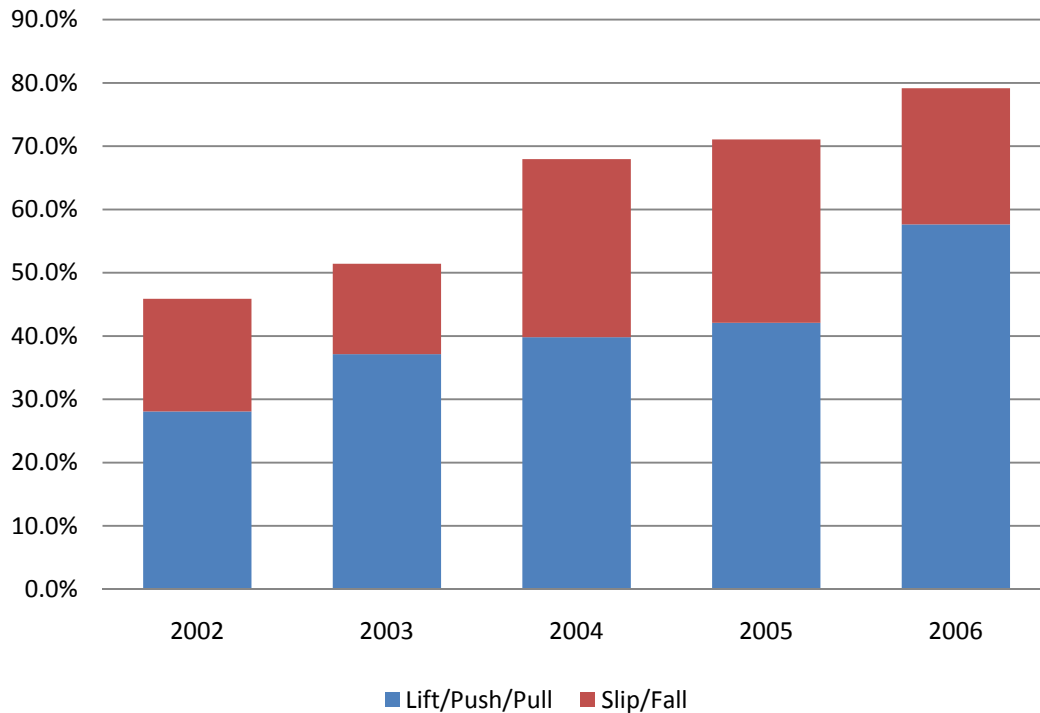


Figure 6. Percent of Strain/Sprain/Hernia

Safety Practices Assessment

Once the injury data were analyzed, the study focused on defining the safety-related “best practices” that are being utilized by organizations with low incident rates. It was found that written policy does not set the “safe” organizations apart from “unsafe” organizations. Nearly all have similar safety policies in place. Examples of the “best” safety plans, policies, return to work policies, and risk management plans used by the various “safe” organizations are described below.

The Washington DOT has an excellent comprehensive safety plan in place for their employees. As the word comprehensive suggests, the plan consolidates all of the state’s safety policies and risk management procedures into one document. The data shows Washington as having some of the highest incident rates (16.2 in 2006), pointing to the fact that having a safety plan does not always equal safe operations. However, further analysis did determine that the Washington DOT

has maintained a much lower rate (10.4 in 2007) following implementation of their new comprehensive safety plan.

Oregon consistently has one of the lower incident rates of all organizations observed. Oregon's basis for their "safe" organization is a general safety policy that identifies the responsibilities of employees at different levels within the organization and the specific actions they are to take regarding safety. The Oregon DOT is ultimately putting the responsibility for safety on each individual employee and laying the foundation for a "culture" of safety. They do not have a "comprehensive" plan but do have numerous safety policies that, if organized together, would be representative of a comprehensive safety plan.

In the 2002 to 2006 timeframe, the Utah DOT (UDOT) has consistently displayed the lowest incident rate. This could partially be due to the fact that all of their employees were included as part of the data. The effect would seemingly be the skewing of their incident rate to the low side since more than just the road crews were considered (administrative personnel, engineers, etc). Despite this fact, their extremely low incident rates warrant a closer look into their safety practices. The one difference in Utah's safety practices is their "active" Return to Work policy. Utah has a Case Management Team (CMT) at the state level that regularly reviews return to work requests and a Return to Work Team (RWT) that monitors modified duty claims at the local level. The RWT is the "eyes and ears" while the CMT provides management oversight and acts as the conduit between local level and upper level state managers, as well as external agencies such as the worker's compensation insurance company. This process appears to add bureaucracy but the teams are simply representatives from the various organizations within UDOT that have to act on worker's compensation claims anyway. It is a formal consolidation of employee assets that must take action on an injury claim. Using this "team" concept results in more "creative" modified duties that encourage an injured employee that may be "milking the system" to return to work more quickly. An example given by the UDOT Risk Management Office was that a modified duty could include charity work such as serving food at a homeless shelter. UDOT claims that the "creative" types of modified duty act as a deterrent for employees looking to take advantage of the system and collect wages during injury leave for sitting at home.

Another common practice observed in "safe" organizations was their use of statistics to identify problem areas. UDOT develops trend analysis of their injury data and uses the trends to focus on

specific injury prevention training. UDOT employs a private contractor to manage their injury database who provides tailored reports and trend analysis at the DOT's request. Similarly, Kiewit uses trend analysis in what they call their Leading Indicator Program. Kiewit randomly assigns workers as safety monitors during different periods and has them conduct safety inspections on the job site they are working on. The inspection data is posted on the jobsite and analyzed by the District Safety Manager to spot areas where safety incidents could occur and target those areas for improvement prior to them happening.

The final practice in this discussion that is commonly found in "safe" organizations was the use of formal risk management plans. The United States Department of Defense (DoD) and Kiewit Corporation both utilize proactive risk/hazard management programs in an effort to maintain a zero-incident safety culture. Kiewit uses a policy of Enhanced Job Hazard Analysis to pre-plan activities while incorporating a hazard avoidance objective. This is completed by requiring work-site level supervisors and workers who outline responsibilities for safely completing a task. The active involvement by the workforce with risk management helps foster a "culture" of safety. Kiewit attributes its low incident rates primarily to their use of Job Hazard Analysis.

Recommendations from Data Comparison

Figures 2-4 show that, when compared with other DOT's, Colorado has room to improve safety practices in an effort to better align with the organizations having lower incident rates. Finally, Figure 5 shows that the majority of Colorado's reportable injuries are preventable and refining statewide safety practices could help do just that.

Based on the approaches implemented within comparable DOTs and private industry, CDOT should consider the implementation of a proactive risk management policy designed to promote accident prevention through employee involvement. The DoD's risk management policies are the cornerstone of their injury prevention programs and Kiewit Denver cites their Job Hazard Analysis as the top factor contributing to their low injury incident rates. CDOT does have Policy Directive 89.0, "Risk and Insurance Management," and Procedural Directives 89.1, "Accident Reporting and Claim Handling," 89.2, "Worker's Compensation," and 89.3, "Modified Duty" in place to promote "the utilization of basic risk management principles and techniques to serve all operating units and employees in meeting the mission and goals of CDOT." The stated goal

describes the required elements; however, the policy/procedural directives only outline the immediate actions and responsibilities of personnel *after* an injury occurs. It is recommended that the directives be rewritten to form a true preventative risk management policy.

Kiewit's Enhanced Job Hazard Analysis guidelines are one example of "proactive" risk management. In addition to acting as a proactive approach, the risk management function should include a new training requirement. Safety training acts as the conduit between upper management's goals for policy implementation and the general workforce. A policy can look great on paper but if employees don't know about or understand it the safety "culture" is never changed. Safety training should be routine with requirements identified in every policy that the organization utilizes. Training can be as creative as the person who organizes it but it should at a minimum provide the audience with particular objectives and educate them on how to accomplish the goals outlined.

The finding that active risk management at the job site was a common, critical element in the development of strong safety results provided the basis for focusing Phase 2 in the research effort. Specifically, the focus of Phase 2 was placed on CDOT's use of JSAs to determine if CDOT crews were approaching safety in a proactive manner that was found to be a key to success in comparable organizations.

CHAPTER 4: PHASE 2 - ANALYSIS OF JSA FORM USE

The completion of Phase 1 provided the team with sufficient background from which to determine that: 1) CDOT has comparably high injury rates, and 2) although written CDOT safety practices do not differ greatly from those at other state DOTs or in private industry, there is room for improvement with respect to the application and implementation of these strategies. Thus, Phase 2 focused on identifying an element of the CDOT safety program that could be targeted for analysis. The response was to focus on activity-specific practices.

The introduction of RSO positions and written guidelines at the organization level appeared to address the need for a corporate commitment to safety. Therefore, the focus was transferred to the site level to determine the appropriate area where safety should be analyzed. The transfer of focus provided the opportunity to converge on the JSAs. The selection of these forms as the new unit of analysis also presented the opportunity to focus on activity-specific injury prevention strategies that were identified in Phase 1. As illustrated in Appendix A, the interview format for the JSA analysis was developed to provide flexibility in terms of its application to all levels of the organization as well as standardization for comparing results. These two elements returned to the original study objectives of addressing the potential variability that may exist both within regions and among regions, and determining how safety was being implemented throughout the organization. The development of this interview format provided the team with a standard protocol from which to elicit the necessary data from each maintenance and traffic region. However, the traffic component of the process was significantly reduced as it was found that the JSA process was limited to only one traffic office and further limited to just the striping crews within that office. In contrast, the maintenance regions were studied throughout the state.

The Maintenance Interviews

Within each maintenance region, the Superintendents, Regional Safety Officers (RSOs), Labor, Trades, and Crafts Operations (LTC Ops), and Transportation Maintenance Workers (TMs) were interviewed to get a complete picture of what was occurring within the region in terms of JSA usage. The goal in these interviews was to determine the existing safety measures and procedures and their adequacy from the users' point of view. Each interviewee was interviewed using the prescribed interview protocol to provide the team with the potential to make comparisons and draw valid and reliable conclusions at the completion of the study. A summary of the interviewees is as follows:

- Superintendents: The Superintendents from each of the six maintenance regions were interviewed either by phone or in person.
- RSOs: The Regional Safety Officers from each of the six maintenance regions were interviewed either by phone or in person.
- LTC OPS: Ten LTC Ops were interviewed for the study with at least one LTC Op coming from each of the regions.
- TMs: A total of 18 Transportation Maintenance Workers were interviewed during the study (seven TM-IIIs, six TM-IIs, and five TM-Is). Once again, TMs were selected from each of the six maintenance regions. However, not all maintenance yards were included in the total sample.

Summary of Interviews by Question and Staff Category

For each of the following questions, the results of the interviews are summarized. An aggregation and simple interpretation of the results in tabular format for quick reference, specific comments made by the interviewees, and an interpretation of the results are included in the summary.

1. *Are you aware of the Job Safety Analysis sheets produced for maintenance work tasks? How long have you been using them? How is the quality of the existing JSAs?*

	Region A	Region B	Region C	Region D	Region E	Region F
TM, I, II, III	Yes	2 of 3 interviewees NOT aware	Yes	Yes	Yes	Yes
LTCOPS	Yes	Yes	Yes	Yes	Yes	Yes
LTCOPS	Yes	Yes	Yes	Yes	Yes	Yes
RSO	Yes	Yes	Yes	Yes	Yes	Yes
Superintendent	Yes	Yes	Yes	Yes	Yes	Yes

As one can see from the tabular summary of responses, there was great consistency within and among regions with respect to the level of awareness. With the exception of Region B, all interviewees were aware of the JSAs.

a. Superintendents

While the interviewed Superintendents were aware of JSAs, there was significant variance in terms of how long they had been implementing them. At the time of the interview, some regions had just started using the JSAs, while others were into their third year of use. One common area of concern was the perception that a large number of JSAs were missing. One Superintendent explained that their region was missing an entire category of JSAs. In one region a worker who created his own JSA for a new task was chastised by the RSO for not following protocol. In another region, Supervisors were involved in the development of the missing JSAs and sent them to the Safety Officer for review. On the date of the interview, it had been approximately three years since the original submission without any response.

As for the quality of the existing JSAs, most of the Superintendents thought that they were cumbersome in volume and included some repetition. In other words, the standard JSA binders have a large number of extra and unrelated forms that makes them hard to handle and complicated to use. They suggested JSAs need to be task-specific and more concise.

b. TMs

About half of the TMs interviewed were aware of JSAs and had started using them within the past year. Four TMs used blank JSAs and hand-filled them in for their particular tasks. Two TMs were not aware of JSAs at all, and when they were shown an example (CDOT Form 1370) they welcomed the idea. One TM that had seen the JSA format had not been able to find it. He was aware of a ‘white book’ that had the JSAs in them, but did not know where that was located. TMs who used JSAs thought it would be beneficial to modify the tasks for each region.

c. LTC OPS

All the LTC OPS interviewed were aware of JSAs.

d. RSOs

The RSOs were aware of the JSAs and said that JSAs were developed by Safety Officers. Some of the interviewees were personally involved in the original development and dissemination of the forms.

2. *How were you directed to use these forms and what instructions were you given? What training were you and your workers provided?*

	Region A	Region B	Region C	Region D	Region E	Region F
TM, I, II, III	No training	No training	No training	No training	No training	No training
LTCOPS	Tailgate talks	No training	Tailgate talks	No training	No training	No training
LTCOPS	After an accident	Tailgate talks	No training	Tailgate talks	No training	No training
RSO	Provided training	No training	No training	Provided training	Provided training	Provided training
Superintendent	No training	No training	Training for RSO only	No training	No training	No training

As one can see from the summary above, the majority of TM I, II, and IIIs received no training in the expected use of the JSAs despite the fact that several RSOs indicate that they provided training. This disconnect is perplexing.

a. Superintendents

The general response from the Superintendents was that neither they nor their workers had participated in any training sessions on the JSAs. Some said that their TM-IIIs lead safety meetings. Other superintendents relied on their co-workers who had participated in such training sessions to inform them on how to use JSAs. In some cases, Superintendents explained that they were given a three-ring binder and had to figure out how to use it on their own. In one region the RSO does the training for the Superintendents.

b. TMs

The Transportation Maintenance Workers were consistent in their responses in that very few received any training or directions on how to use JSAs. Some said that they were handed JSAs and told to use them without further explanations. One TM said that his JSA binder was outdated.

c. LTC OPS

While all the interviewed LTC Ops knew about the JSAs and where to find them online, most indicated that they had not received any training in using them. One noted that he was told he should train the employees on how to use them, but he was not trained himself. Another LTC Ops said: “As a supervisor, I knew that they were on-line. They are very similar to the Employee Safety Manual. I do not remember any instructions on their use, and think that it would have been beneficial if they had been printed and distributed.”

d. RSOs

Two of the interviewees said that they did not need training since they were members of the committee that developed JSAs. One of these Officers said that he prepared a PowerPoint to train others in his region. Another RSO believed there was adequate training at all levels including the Maintenance Training Academy while yet another RSO indicated that the training was not particularly for JSA, but that it was a combination of other trainings, stating: “Initially, CDOT’s Maintenance Department trained personnel on the Maintenance Management System (MMS) which contained Maintenance Program Areas (MPAs), and each Area had activities with associated Standard Operating Guidelines (SOGs). Rather than adding a 3rd element to the activity, CDOT combined existing MPAs and the SOGs and incorporated them into the JSAs.”

One Officer said that initially there was no training and it has improved within the past three years. He personally has developed a PowerPoint presentation for his region and has tried to meet and train most of the employees. He emphasized that CDOT needs to work with RSOs on developing JSA trainings.

3. *Who in your region has access to these forms?*

a. Superintendents

Most regions said that TM-IIIs, TM-Is, and supervisors had access to the forms.

b. TMs

A majority of the Transportation Maintenance Workers said that they were all supposed to have access to the forms through the website but that they found it difficult to navigate through the website to find them.

c. LTC OPS

The interviewed LTC Ops said that everyone had access to the JSAs online.

d. RSOs

The officers believed that everybody had access to the JSAs. This access was mainly online, but some were utilizing the printed form of the JSAs. One of the Officers said that he was sure the JSAs were copied on CDs and distributed. Another Officer said: “Access to JSAs are online and hard copies (either or). Everyone has access. People know where they are and have a good sense of what the JSAs entail.”

4. *How are these forms being used in your region?*

	Region A	Region B	Region C	Region D	Region E	Region F
TM, I, II, III	Regular tailgate talks	Sometimes during regular tailgate talks	Inconsistent	Only for 'special' situations	If employee is hurt	Regular tailgate talks
LTCOPS	Not sure	Regular tailgate talks	Regular tailgate talks	Regular tailgate talks	Talking point in monthly meetings	Before each activity
LTCOPS	If employee is hurt/acts unsafely	Regular tailgate talks	Not sure	Not sure	Talking point in monthly meetings	Before each activity
RSO	Not sure	Regular tailgate talks	Regular tailgate talks	Sometimes during regular tailgate talks	Regular tailgate talks	Before each activity
Superintendent	Regular tailgate talks/after an injury	Not sure	Not sure	Regular tailgate talks	Sometimes during regular tailgate talks	Regular tailgate talks

As one can see from the summary table above, there is a great deal of variability in use. The most common response provided was that the JSAs were used as a talking point during regular tailgate talks.

a. Superintendents

According to the superintendents, the JSA forms are designed to raise awareness of how and when accidents can happen, and how to avoid them. Some regions provide them in the form of hard copies and others have them accessible on the web and provide printers. Some regions discuss JSAs with the workers on a weekly basis along with toolbox talks, and other regions review safety manuals, maintenance field manuals, and JSAs every morning. If a new task comes during the day however, it appears that safety procedures are not reviewed prior to the job.

b. TMs

In most cases where JSAs were used they would be discussed during morning meetings. The degree of emphasis put on the review of these forms depended on the individual who was in charge of the safety meeting. One region had every worker sign a JSA for every task even if they were responsible for more than one task a day. If a task lasted one week for instance, they would go over the same JSAs every day. TMs in this region considered this to be “too much” and said this meant up to two and a half hours and up to thirty signatures a day. In a region where blank JSAs were used if a worker got hurt s/he would need to fill out blank JSAs for three months after the accident. Workers considered this procedure a punishment. In the regions with no use of JSAs, Transportation Maintenance Workers discussed job safety from meeting forms.

c. LTC OPS

The answer to this question by LTC Ops was variable. It ranged from every activity, to weekly, monthly, and even “not sure.” Most of the LTC Ops said they used JSAs at tailgate talks. One even stated: “For those employees who do not have good safety records they have to review the JSAs as a punitive process.”

e. RSOs

Most of the officers said that the JSAs are reviewed at weekly tailgate meetings, as well as monthly sessions. Two RSOs said that they were used before any activity and that they were available online as well as in the form of binders. One officer explained: “Each Patrol has a Lead Worker (TM-II) who conducts a ‘Tailgate’ Safety Meeting each Monday morning. The TM-II reviews the JSA for each planned activity for that week.” Another officer emphasized that there was improvement possibilities: “If they see a chance for improvement and it gets kicked up the chain of command. This updating is rare but it’s possible (2 only).”

5. *Who is primarily responsible for their use on worksites?*

	Region A	Region B	Region C	Region D	Region E	Region F
TM, I, II, III	TMII	TMII	TMII, TMIII	TM II, TM III	Does not know	TMII
LTC OPS	TMIII	LTC OPS, TMIII, TMII	TM II	TMI, TMII, TMIII	TM II's	TMII, TMIII
LTC OPS	TMII, TMIII	TMII, TMIII	TMII	TMIII	LTC OPS, TMII	TMI, TMII, TMIII
RSO	TMII, TMIII	LTC OPS, TMIII	TMII	TMII	TMII, TMIII	TMI, TMII, TMIII
Superintendent	Does not know	TMI, TMII	TMIII	TMII, III	TMII, TMIII	TMII, TMIII

The summary table above indicates that the majority of interviewees feel that the TM IIs and TM IIIs are primarily responsible for the use of JSAs on the work sites.

a. Superintendents

TM-Is and TM-IIIs use them for their daily tailgate meetings. Supervisors are ultimately responsible for their use.

b. TMs

In most cases it was agreed that these forms and signatures were the responsibility of the TM-IIIs or TM-IIIs.

c. LTC OPS

Again the answers were all over the place. Some LTC OPS interviewed believed that it was TM-IIIs, or TM-IIIs. Some LTC OPS said it was their own responsibility, or the lead worker, or the supervisor. It seemed like there was some confusion and not a definite person in charge.

d. RSOs

The responses from the RSOs ranged significantly and are described as follows:

- Generally the lead worker.
- The LTC OPS and their Jr. Foremen (TM-IIIs) are responsible for making sure the JSAs are being used.
- TM-IIs & TM-IIIs take the lead although anyone can utilize
- TM-II and TM-I employees
- Leading the discussion is the TM-II but everyone is encouraged to take the lead. Pulling the JSAs and tracking comes from the lead workers. They'll also lead that for their patrol. Some patrols rotate the roles based on all employees regardless of rank.
- The TM-II leads all charge on the JSAs prior to the performance of the activity. Sometimes a unit meeting will be led by the TM-III

6. *Is it standard practice to use these forms for every work task? If not, when do you decide when to use them (e.g., start of the day, pre-task, etc.)?*

	Region A	Region B	Region C	Region D	Region E	Region F
TM, I, II, III	No	No	No	No	No	no
LTCOPS	No	No	No	No	No	Yes
LTCOPS	No	Does not know	No	No	No	No
RSO	Doesn't know	No	No	No	Yes	Yes
Superintendent	Doesn't know	Not sure	Doesn't know	No	Doesn't know	No

The table above indicates that the forms are generally not used for every work task. It should be noted that CDOT has yet to set formal recommendations regarding the frequency with which JSAs should be used.

a. Superintendents

Most superintendents said that JSAs are discussed first thing in the morning for the particular tasks of the day. They believe that workers need to use JSAs more often. Specifically, JSAs need to be used in cases where workers change activities during the day. However, Superintendents note that this is not always possible because the change of activities is not always foreseeable. They call some of the tasks ‘surprise activities’ in which case there is not enough time to brief the workers on the particular JSAs.

One Superintendent did not seem to know that JSAs are supposed to be used regularly as a part of a task-specific safety program. He said that JSAs were supposed to be used for accident investigations and in-depth training.

b. TMs

The method and frequency of implementation of the JSAs varies from region to region. Some regions use the forms in their toolbox talks. These meetings range from once a week to three times a day. In each case, the related JSAs are brought to the meeting by TMs and discussed. Then workers sign the meeting sheet that contains the discussed hazards and safety measures.

c. LTC OPS

While some LTC Ops said they used JSAs for every task, others said they used them for major work of the week, in their tailgate talk safety meetings, and for tasks that have JSAs. One LTC Ops stated: “The new employees use them more and ask questions. Pay attention more than veterans. Everyone is involved in the projects. They sign a piece of paper stating what they did.”

d. RSOs

All the RSOs that were interviewed said “Yes”, and one explained: “Every employee has been encouraged to use the forms as often as possible, ie-tailgate talks, monthly safety meetings, project safety meetings, etc.”

7. *Approximately what percent of the time are these used?*

a. Superintendents

The responses to this question by the Superintendents varied. The primary factor that affects the use (or perceived use) among regions was the level of site safety focus of the RSO. Some RSOs are very supportive and hands-on which encourages the use of JSAs. In one region, the Superintendent compared the newly appointed RSO with the one before him stating: “The new RSO has isolated himself in his office most of the time and hardly ever visits the field. He is, therefore, not in touch with workers who are supposed to follow the safety instructions.”

In one region, it was also mentioned that there are disconnects between superintendents and the main office. For the purpose of giving feedback on the quality of JSAs it would be a good idea to have face-to-face meetings between the enforcing body and the office that publishes the forms.

b. TMs

The answers ranged from 0% to 100%. Some regions said that JSAs do not exist for all tasks. Another region said the percentage depended what patrol you were on.

c. LTC OPS

Four out of ten LTC Ops interviewed said 50% of the time. One respondent said 70%, another 90%, and the rest said they could not put a percentage on it. One interviewee said 15 minutes per day, and another said major projects: “50 percent. The deciding factor is when there will be more people. Big projects used, small projects not used. Not used for the regular everyday tasks. Need to be for multiple people.”

d. RSOs

Two officers said 100%, one 90-95%, and one 70% explaining: “The 30 percent mostly due to where they are on the road. When they just have to respond they might not use them (emergency tasks). They are working on improving this.” The two others said they could not give a number but that they believed “most of the time.”

8. *Do workers and managers discuss safety hazards before tasks begin?*

a. Superintendents

The overall feeling for this question was that yes, safety was discussed. To emphasize, the respondents felt that when a JSA is not available, the TMs will improvise and use experience.

b. TMs

A couple of groups said that managers and workers discuss safety before every task. In one region the TM-II lead said that he would ask the RSO for JSAs to make his job easier in such meetings.

c. LTC OPS

All the interviewed LTC Ops said “yes” except one who said “hopefully.” One said: “Yes. It is done every week on Monday with the crew (TM-Is and IIs) and before every project with a supervisor (TM-III). Employees have told me that they discuss hazards on the way to jobs as well.”

d. RSOs

All of the RSOs responded with a positive to this question. One RSO explained: “The LTC Ops and/or the TM-III may be at some of the Tailgate Meetings on Monday mornings, but cannot be at all because the Patrols are not all located at the same facility. Hazards are discussed at the Tailgate Meetings, but they may not be brought up later during the week if they weren’t discussed at the Monday morning Tailgate Meeting.”

9. *What are the repercussions for not using the JSAs when they are appropriate?*

a. Superintendents

From the answers given to this question during the interviews, it seems as though there are no repercussions or incentives offered for not-using/ using JSAs.

b. TMs

There were no repercussions or incentives for not using the JSAs in the regions where interviews were conducted.

c. LTC OPS

The answer to this question was “none at this time” by most and one said that it was an “employee accountability issue”, and two of the LTC Ops said PDF- Performance Documentation Form.

d. RSOs

Two said “corrective action” could result, one said “none at this time,” and two said an employee is held accountable: “All CDOT personnel are held accountable for following existing safety policies and procedures. Failure to do so could result in corrective action.”

10. How could the JSAs be improved?

a. Superintendents

Most of the Superintendents think that JSAs are good and put together by knowledgeable people, but they need to be updated, improved, and modified according to the task. They feel that the heavy binder of printed JSA forms is not very helpful. It may be more practical to have small ring-less folders for each Maintenance Performing Area (MPA) so that superintendents can carry them to the field. Some also feel it is appropriate to let employees modify JSAs if needed. Most of the interviewed superintendents emphasize that information on JSAs should be gathered from TMs.

Another important suggestion is that there must be a differentiation of ‘high risk,’ versus ‘low risk’ tasks. For instance traffic control is a high risk task and needs more emphasis on public safety. It also requires faster pace maintenance work, and could sometimes undermine the workers’ safety. Safe work behavior needs to be addressed in both high risk and low risk tasks. Missing JSAs need to be developed and shared with regions. There needs to be a formal process for improvements.

b. TMs

Most of the Transportation Maintenance Workers agreed that digital copies of JSAs would be more appropriate since they are easily modifiable and could be updated constantly. The website should be more user-friendly for better access to the JSAs. One worker stated that he would like to see someone: “Email a shortcut icon to all workers that they can drag to their desktop and will take them straight to the JSAs and manuals. These workers rarely use a computer except for email and consider themselves computer illiterate.”

Some emphasized that JSAs needed to be printed and brought to the field and this was especially emphasized for new workers. Task related JSAs with modification and regular updating need to be available for every MPA. One region asked for more JSAs on traffic control.

Some regions asked for crew sizes to be kept at a minimum. They were interested to see page numbers on JSAs to match the manuals on the website. They explained further that JSAs reference safety manuals but don't have specific page numbers of where to go in a 3" thick manual. Have these page numbers for each task. Some mentioned a discrepancy between the equipment listed in JSAs with what really was used at job sites. One TM mentioned that: "On the JSA resource field there are missing specifications and regulations."

c. LTC OPS

Three out of ten said that the JSAs were good as they were. One LTC Ops said they needed to be periodically reviewed, another said they should be used "as their intent implies." One interviewee emphasized on "more training," and a couple said they should be printed. One interviewee stated: "I believe the manual should be printed and distributed. I also think that if their use was required, they would be useful. I don't think their use is widespread and mandatory."

d. RSOs

The variable responses from the RSOs are summarized below:

- May be a professional manual to set on desk or keep in the equipment.
- They probably should be reviewed every couple of years and updated if any changes in the activity (i.e., work process or equipment used) have occurred.
- Periodically reviewed
- Be used as their intent implies
- The flip book would be an excellent thing to have in the vehicles. Would make it easier for them to be more accessible. There are a few missing ones. Make this a living document. Presented in the training. Doesn't mean that these are final. If they find things that need to be added the employees let them know and improve the JSAs. Changes make it through the region through the RSO weekly conference

- Looked at different samples and they all say the same basic thing. The code classes, they know what they mean and can find the information quickly. Most JSAs 2-page form. Comments on flip book – it's one of his side projects but not on the front burner.

11. *How would you suggest improving the effectiveness of implementation?*

a. Superintendents

Interviewees confirmed that guidelines and training on how to use JSAs are needed on how to better practice the safety instructions. They also think that RSOs should count on TM-II's and TM-III's feedback in the development and improvement of JSAs. Face-to-face meetings are sometimes delayed for months which can cause disconnection between the enforcing bodies.

Another important suggestion is to have consistency of implementation throughout the region. Also regional and inter-regional cooperation was emphasized to be helpful. A superintendent said: "Maintenance crew wants more of practical side and not charts and graphs. The RSO does not connect to them and does not work practically with workers. Headquarter loses connection here. Headquarters is cut off from the RSO, and the RSO is disconnected from the field."

b. TMs

Transportation Maintenance Workers gave the following suggestions:

- JSAs are more helpful if they are short and to the point. Some suggestions in this regard included elimination of equipment and class codes, material type, and crew size.
- Use yearly training to bring out JSAs to all the regions. Training should go through management and then to the curriculum class coordinators for the annual yearly training academy. Some feel that CDOT is constantly changing procedures for safety and expecting them to pick it up without training. The workers feel Camp George would be a place of training since every maintenance worker takes the week-long training. Including JSA training in the Camp George will show upper management commitment to uniformity of the safety program across the regions by getting everyone on board. Some TMs thought it was a good idea to include superintendents on the rollout and to receive proper training.

- Have a safety specific website that is easy to find and has everything (i.e. JSAs, manuals, procedural directives). Presently everything is scattered and difficult to find.
- Get missing JSAs, in the 200s there are missing 203, 215, 221, 223, 224, and 225 of the JSA task activity numbers on the website.

c. LTC OPS

Some LTC Ops said that the JSAs are too generic and need to be more task-specific. Some others emphasized on the need for frequent updates. Others discussed better means of communication and reminding the importance of these documents. An interviewee emphasized on more training and another on teaching them at the MTA. An LTC Ops mentioned that hard copies may not be as up-to-date: “The problem with flip book is that they would need to be customizable and old information. UPDATE THESE. The updates would be made online but updates would not make their way into the flipbooks. There are too many vehicles to have continuous updates.”

d. RSOs

All Regional Safety Officers that were interviewed said there was no need for improvement except one who said: “Implementation should have been unified statewide with a consistent message that reviewing JSAs was mandatory.”

12. *Do you continually improve the JSAs in your region?*

a. Superintendents

Most regions answered that there is little improvement on the JSAs. One region became active on such improvements due to a fatal accident that had happened last April.

Another region stated that a feedback process was missing. In a region where new JSAs were added there was no training on the new additions. Another superintendent said that in order to sell an idea to the RSO he needed to sell it to the Regional Transportation Director (RTD) first and that the safety program was pulled in too many directions.

b. TMs

The answer was predominantly “NO.”

c. LTC OPS

Some LTC Ops said that JSAs were not improved and some said if an employee brought up an issue then changes would be made accordingly. A couple of interviewees said they were improved as needed and one said that they were continually improved: “CDOT developed statewide generic to address all the activities. The training specified that when an employee performs a JSA they address local hazards and issues. They are continually improved.”

d. RSOs

Except for one interviewee the rest of the officers said that there was continual improvement including attempts to make them site specific. One of the officers explained: “CDOT developed statewide generic to address all the activities. The training specified that when an employee performs a JSA they address local hazards and issues. They are continually improved.”

One RSO had an opposing position and stated that: “no JSAs have been modified since implementation in 2007.”

13. *Do you believe that relative risk scores for each task would be useful? Would it be helpful if you could customize these forms for your region? Do you have other suggestions for improvement?*

a. Superintendents

Most of the interviewees thought that risk training would be helpful. They confirmed that a small amount of risk information was given by Regional Safety Officers, and that it was not enough.

b. TMs

Most Transportation Maintenance Workers feel having risk scores will minimize some tasks and workers will become complacent on those tasks result in an increase in accidents.

c. LTC OPS

Some like color coding and some do not. One interviewee expressed concern for color prints not being available in every region. Another thought it would be good to have color “red” for extreme hazards. One of the LTC Ops thought it would not be effective and said: “I think the employees like this version. Adding color to the hazards would not change its effectiveness. It is like Homeland Security with the ‘Threat Levels.’ Employees and citizens are still confused what they mean.”

d. RSOs

All but one officer favored “color coding,” and most emphasized that it should be statewide unless there are specifics for the region.

14. *What comments do you have about JSAs in general?*

a. Superintendents

“More training is needed and especially it is good to know the safety goals and expectations. Each patrol is supposed to have copy of the JSA forms. In Maintenance Performing Areas (MPAs) JSA can be pocket size instructions which are good for switching tasks.”

“We are reactive and not pro-active. For instance if there is a situation where public safety is at stake, it is more important than our workers’ and we don’t have time to tailgate. Safety talks happen but not total JSA for little supplements. Small crews follow more informal procedures and sometimes do not use JSAs.”

“We have generalized forms that list equipment that we don’t even own, and it causes lengthy, confusing instructions. Our employees should be allowed to modify the forms according to their needs/ interpretations. TM-II’s are good for tailgate talk and for checking the JSAs since they are the team leaders.”

“We need to have it at the TM-II level, or TM-III. TM-II level is better since they work directly with workers. TM-III has two TM-IIs and seven to ten TM-Is (basic entry levels). It is better to initiate change from the field instead of one way flow from top down. The JSA implementation needs to be more focused instead of pulled in many different directions. Regional Safety Officer needs to be present in the field and practical instead of theoretical.”

b. TMs

“Make a sign-in area at the bottom for the workers to put their name after going over the JSA during the safety meeting.”

“TMs would like to have the RSOs (Robert Fontenot for Pueblo region) consult the supervisors/workers when creating the JSA fields of sequence of job tasks, potential hazards and safe job procedures because of their experience (37 years experience between all three workers at the interview).”

c. LTC OPS

All the LTC Ops thought JSAs are helpful safety tools. One suggested they somehow be attached to the “work order.” There were some comments that they need to be used correctly and the missing ones need to be developed. A detailed suggestion given by one of the interviewee’s was: “-To make this a living document that s updates instead of keeping it all static and get the word out. Many of the workers look at this and see that its not specific and does not add value. Keep the communication open so people know the changes. Don’t build something and keep it static.”

d. RSOs

They are essential safety tools.

Traffic Response

The final data collection effort implemented in this study was to conduct interviews with the signing, striping, and signaling functions within CDOT to determine the extent to which the JSAs are used. After brief interviews with the Traffic Operations Engineers in each region, it became apparent that JSAs have yet to be created for any region with the exception of Region 6. In region 6 the signing and striping crews have, and use, JSAs. However, JSAs are not used for signaling crews, even in Region 6.

Within Region 6's signing and striping crew, the typical maintenance JSAs are used with modification. The crews tend to use the forms regularly as a part of their tailgate talks prior to performing planned tasks but initial training was never provided to the crews. Finally, according to the Traffic Operations Engineer, the JSAs are used 100 percent of the time during morning meetings for all planned tasks. While the JSAs are working well for this region, no other region has begun to adopt or consider adopting JSAs for their traffic operations crews.

CHAPTER 5: INTERVIEW SUMMARY

Consolidation of the interview responses provided a set of both general and specific conclusions. The former of these are general perceptions that apply across the interview questions. The latter are specific conclusions based on answers to individual questions.

General Conclusions

- Very positive perception of JSAs (and safety) and their potential effectiveness – There is an overall positive perception of the use of JSAs specifically and safety practices in general. This sets a solid foundation on which to expand safety activities.
- High degree of inter- and intra-region variation in use, training, and management oversight. There is significant variation between the levels within a maintenance region and between regions.
- Disconnect observed between some managers and workers – The responses from managers and work crews leads to a general conclusion that there is a level of disconnect between management and the workers.
- Disconnect observed between some Superintendents and RSOs – A specific disconnect was observed in some regions between the Superintendent and the RSO. This is concerning since these two positions are both instrumental in implementing safety practices and cooperation is required to enhance implementation.
- What is the specific intent/purpose of JSAs? – This is a question that arises because it is unclear to the majority of interviewees what the specific intent of JSA usage is intended to be. CDOT needs to determine the frequency for JSA usage and then communicate that clearly to the maintenance regions.
- Activity-specific and site-specific safety planning is not used consistently – The intent of the JSAs is to provide crews with the opportunity to perform activity-specific, site-

specific safety planning. However, this planning is not occurring as planned due to the inconsistent implementation of the JSA forms.

Specific Conclusions

- A high level of awareness of JSAs – As documented in the initial interview question, the level of awareness of the JSAs is very high. Almost all interviewees were aware of the JSAs even if they were not using them consistently.
- People self-identified as responsible for JSA use were never provided with training – The issue of training is a significant one in terms of the JSAs. Individuals who self-identified themselves as being responsible for JSA implementation did not receive training on the use of the JSAs.
- The JSAs are generally available electronically which limits their use in the field – Although many workers were aware of the electronic access that was available for the JSAs, the lack of a printed copy discouraged use of the JSAs in the field.
- Not always used proactively – Once again, the issue of intent arises as individual regions appear to not understand the intent of when the forms are supposed to be used.
- Responsibility for JSA use has been pushed down the line of command (from Superintendents to TM-IIs) – This finding is neither positive nor negative. Rather, it is one that needs to be recognized by CDOT as the appropriate individual is determined for having the responsibility for JSA implementation.

CHAPTER 6: RECOMMENDATIONS

While it is understood that the Executive Safety Committee (ESC) is responsible for making official recommendations regarding safety implementation, a few recommendations are provided below as issues that should be considered by the ESC based on the results of the current study. These recommendations are divided into near-term recommendations and strategic recommendations.

Near-Term Recommendations

- Accelerated Safety Improvement Workshop – To enhance safety-related orientation and training, CDOT should consider holding an Accelerated Safety Improvement Workshop where the JSA intent and usage would be a central focus.
- Put safety directives (such as JSAs) in a printed form – This will address the concerns by crews that the electronic format is not conducive to field work. This would be an easy fix and one that is appreciated by the workers.
- Determine the most effective position to oversee, implement, train, and manage safety within a region – It is not clear from the interviews that the regions understand who is specifically responsible for JSA implementation. It is critical to understand which person could be most effective in leading the safety effort within a specific region.

Strategic Recommendations

- Develop agency-wide guidelines for safety strategy (required training, specific goals, usage requirements, and oversight responsibility) – Although this has already been initiated in some areas by the ESC, we believe additional focus is required to insure that all regions are focusing on the same requirements and strategic objectives.
- Create a feedback process (reporting and reports) where data collected by RSOs can be used by crews to modify behavior – The implementation of a feedback process can have

multiple benefits including greater awareness of which regions are having success with specific safety programs, greater ability to guide individual practices, and awareness of tasks which have a high level of risk attached to them.

- Develop a review process and incentive program for safety performance – A CDOT task force should revisit the issue of how to integrate safety performance into individual performance evaluations. As a critical element in the success of the organization, safety should be examined for opportunities to bring it into the core performance ratings.

CHAPTER 7: CONCLUSIONS

The incident rates for CDOT are significantly higher than those achieved by some private organizations and comparable DOTs. The questions arising from this fact are twofold:

1. What should CDOT do to reduce this incident level?
2. What is the status of safety practices within the state?

This study focused on answering the second question as a foundation for answering the first question. Understanding what an organization should do to remedy a concerning situation must be based on its understanding of current circumstances. This study provides the answer to the current circumstances in terms of one component of safety practices, the use of JSAs. In this regard, the study finds CDOT to have a mixed record in terms JSA implementation. The study found a very positive attitude towards the JSAs and a strong willingness by workers to enhance the safety record. However, this positive is balanced by an equally strong negative aspect in terms of actual JSA usage in relation to the intent of the program.

The challenge of meeting these objectives is the centerpiece of the first question. What should CDOT do to improve? This study provides specific recommendations in relation to JSA usage, but the underlying issue of improving safety is closely related. Formal state-wide training, easy website access, on-going updating process, format change, and many other valuable proposals came from the maintenance workers. However, three key recommendations should be considered as fundamental steps to moving the organization forward in addressing the JSA issue specifically and safety in general.

- Accelerated Safety Improvement Workshop
- Determine the most effective position to oversee, implement, train, and manage JSA usage within a region
- Create a feedback process (reporting and reports) where data collected by RSOs can be used by crews to modify behavior

We believe the implementation of these suggestions will result in a better safety environment within CDOT and in turn a safer work atmosphere for the workers.

In summary, the importance of worker safety has been recognized at all levels through the ESC. This recognition is the first step to establishing a strategic correction. This study provides details of where safety needs to be examined in terms of JSA usage as well as recommendations for potentially correcting some of the concerns. We believe the opportunity exists to make these corrections with the appropriate focus and ultimately, make a significant improvement to JSA usage.

APPENDIX A: INTERVIEW QUESTIONS

1. Are you aware of the Job Safety Analyses sheets produced for maintenance work tasks?
2. How were you directed to use these forms and what instructions were you given? What training were you and your workers provided?
3. Who in your region has access to these forms?
4. How are these forms being used in your region?
5. Who is primarily responsible for their use on worksites?
6. Is it standard practice to use these forms for every work task? If not, when do you decide when to use them (e.g., start of the day, pre-task, etc.)?
7. Approximately what percent of the time are these used?
8. Do workers and managers discuss safety hazards before tasks begin?
9. What are the repercussions for not using the JSAs when they are appropriate?
10. How could the JSAs be improved?
11. How would you suggest improving the effectiveness of implementation?
12. Do you continually improve the JSAs in your region?
13. Do you believe that relative risk scores for each task would be useful? Would it be helpful if you could customize these forms for your region? Do you have other suggestions for improvement?
14. What comments do you have about JSAs in general?

APPENDIX B: CDOT FORM 1370 – JOB SAFETY ANALYSIS



JOB SAFETY ANALYSIS

Activity Name:		Activity Number:	
Activity Description & Purpose:			
Date Prepared:		PPE Required	
Typical Equipment		Typical Crew Size: (Crew sizes vary due to different conditions throughout the state).	Typical Material
Description	Class Code		Description Class Code
Sequence of Job Tasks	Potential Hazards	Safe Job Procedures	Never



