DEVELOPING METHODS TO REDUCE AND PREVENT VEHICLE BACKING ACCIDENTS

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ABSTRACT

This purposes of this report are to (1) help the California Department of Transportation (Caltrans) isolate causes of workplace backing collisions and (2) suggest methods of preventing backing incidents that result in accidents and injuries. While most backing collisions do not result in severe injuries, the large number of backing incidents make this type of crash a significant safety and cost problem. Data for the past 10 years was extracted from the Caltrans accident database and analyzed in order to isolate trends in backing-related collisions including incidence rates in comparison to other collision types, incident locations, and vehicle types, with particular attention to backing incidents reported as preventable. Backing crashes at Caltrans are deemed preventable when the driver could have averted the collision. Backing incidents represent the largest proportion of all preventable incidents at Caltrans; annually an average 30% of backing accidents are deemed preventable. After conducting an analysis of backing causal factors and incident trends, a thorough review of backing counter-measures at Caltrans was conducted. Based on an assessment of vehicle warning systems in place on Caltrans vehicles and of new developments in radar, sonar, video, and warning alarm devices, it was determined that video systems are a feasible technology that Caltrans should consider installing in several of its maintenance vehicles. Based on interviews with Caltrans district safety officers and a survey of safety management practices and policies, it was also determined that designing and enforcing systems of accountability are essential to ensuring employees follow backing safety protocol. Enforcement of driving related safety laws has been shown to have a significant effect on driver behavior because the general driving public has learned that there will be consequences for violating traffic laws through visible enforcement and publicity. The present review summarizes key findings on what backing-related technologies are most appropriate for the Caltrans fleet and reinforces the concept that implementing tougher enforcement policies and making safety and accountability key topics at tailgate and staff meetings will encourage a culture of workplace safety and will significantly reduce preventable backing accidents at Caltrans.

INTRODUCTION

The purpose of this study by the UC Berkeley Traffic Safety Center (TSC) is to help Caltrans isolate causes of workplace backing collisions and determine ways to prevent backing incidents that result in accidents and injuries. While most backing collisions are not severe, the large number of backing incidents make this type of crash a significant safety and cost problem.

In his article on Backing Incident Prevention, D.W. Chappell suggests that companies need to develop special programs to address backing accidents, which typically account for 10 to 40 percent of many companies' motor vehicle accidents.[i] The issue has received significant recent attention. Recently the National Highway Traffic Safety Administration (NHTSA) introduced the Integrated Vehicle-Based Safety System (IVBSS) Initiative, a U.S. DOT safety research program to build and field test an integrated crash warning system designed to prevent rear-end, lane-change, and roadway departure crashes for light vehicles and heavy commercial trucks. The goal of this program is to accelerate the deployment of integrated crash warning technologies by providing government and industry stakeholders with relevant information regarding system performance specifications, objective test procedures, potential safety benefits, and acceptance.[ii]

One reason why vehicle warning systems have received attention is that unlike other types of workplace accidents, most backing incidents are deemed preventable. Based on interviews with safety managers, the TSC estimates that over 95% of backing accidents at Caltrans could have been prevented, indicating that this is an area of workplace safety that merits close scrutiny.

There are essentially two overlapping approaches to preventing backing accidents: technology and training. Most of the literature on backing accidents deals with the development of requirements for warning systems and involve experiments to determine human factors such as glance patterns, warning perception levels, and reaction times. Literature on safety training tends to be more general, not specific to backing but rather to the overall workplace safety systems. Finally, training methods are important, but designing and enforcing systems of accountability are essential to ensuring that employees in all levels of the organization follow backing safety protocol. Such a system establishes safety goals and measures safety activities and provides a means for employees to take personal responsibility for their performance.

PROBLEM SOLVING

The starting point for solving any problem is to have a clear understanding of the scope and magnitude of that problem. The review process involves answering the following five questions:

Question 1. What Is the Magnitude Of The Problem?

The first step is to determine if and to what degree a problem exists. Accident data must be reviewed to find out:

- How many incidents of this type are there?
- How are the incidents distributed?
    - By vehicle type
    - By geographical location (broken down by district at a minimum)

- How many deaths and injuries are involved
- What is the cost of injuries and property damage?

Question 2. Is There More Than One Means To Solve The Problem?

Given the age we live in, our first reaction may be, “What technology exists to solve the problem?” However, the solution may lies in changes not associated with equipment modification but in changes to current policies and/or procedures in the following areas:

- Training
- Better enforcement of current rules and procedures that might include avoiding situations that necessitate backing up, requiring drivers to use spotters, requiring the use of cones
- Consequences for not following rules

Most likely, the solution will be a combination of technology, policies, and procedures.

Question 3. Is The Problem Related To Vehicle Working Environment?

The safety issue in question may be related to where the vehicle is being operated. For example, a equipment that is safe in a rural area when put in a more confined urban environment becomes unsafe. Environmental factors that could affect vehicle safety include:

- Mountain versus desert
- Wet versus dry
- Hot versus cold

Question 4. Is The Problem Statewide?

In addition to the immediate environment issues, what is the geographical distribution of the incidents? Is the problem more prevalent in one District than another? If so, how does this District differ from the others?

Question 5. Is This A Recent Problem Or One That Has Been Occurring For Some Time?

The time frame of the safety issue is important in that it may reflect changes instituted at the time of the increase in incidents or the introduction of a new or modified piece of equipment.

To address these questions we will begin by looking at motor vehicle incident data.

ANALYSIS OF MOTOR-VEHICLE INCIDENT DATA

Motor vehicle data for the ten year period 1998-2007 was obtained from the Caltrans SIMS database and analyzed for patterns and trends in preventable backing-related collisions. The source of data used to construct the graphs and tables in this section is the SIMS database.

A motor vehicle incident involving a Caltrans vehicle requires the preparation of three reports. The first, Form STD 269 "Accident Identification Card,” is completed by the driver while at the accident scene. The second, Form STD 270 "Vehicle Accident Report,” is the official form used

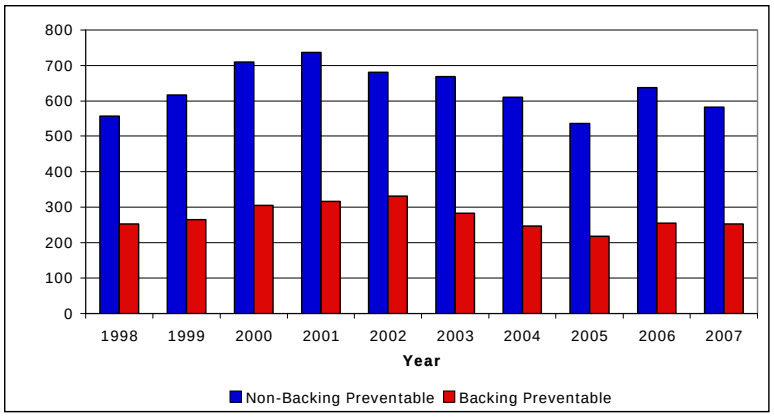
to document the specific details about the accident and is typically completed by the driver/operator upon returning to the office. This form, along with Form STD 269, is then turned over to the driver's first-line supervisor. The third, Form PM-S-0270 "Data Input For Motor Vehicle Accident," is a computer input document that is completed by the first-line supervisor based on the information provided by the driver/operator, and after completing an investigation. The form must be filled out accurately and completely to ensure that an accident has been properly classified, documented, and included in the SIMS computer data base.

The data analysis in this report was based on incidents that were preventable by the Caltrans driver. Preventability is determined in each incident by the driver's first-line supervisor and reviewed by the District Safety Officer prior to entry into the SIMS database.

Backing Incidents Overview

Backing collisions account for approximately 30% of all preventable collisions that involve Caltrans vehicles. During the period of 1998-2007, this ranged from a low of 28.6% in 2006 to a high of 32.8% in 2002. Backing was also the most common "Movement Preceding Collision" followed by "Driving Straight Ahead" (25.4%) and "Stopped" (10.5%).

Figure 1: Backing versus Non-Backing Preventable Collisions 1998-2007



An analysis of backing and non-backing crashes by location shows that a disproportionate number of backing collisions (24.6%) take place on state yard or property. Unfortunately, this General Location category is not well defined since several other general accident locations (e.g., "conventional highway") can also be considered state property.

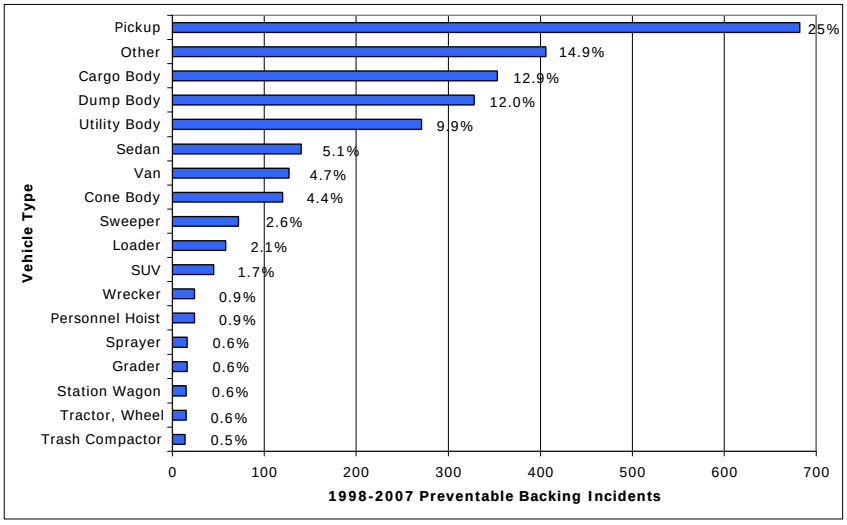
An analysis of the party responsible for backing and non-backing crashes reveals that between 1998 and 2007, 93% of backing crashes were determined to have been preventable by the Caltrans driver. In contrast, drivers were deemed responsible for 47% of non-backing crashes.

Vehicle Types Involved in Preventable Backing Incidents

Drivers of pickup trucks were responsible for the most preventable backing crashes (682) of any vehicle category occurring statewide between 1998 and 2007 (Figure 3). This works out to 25%

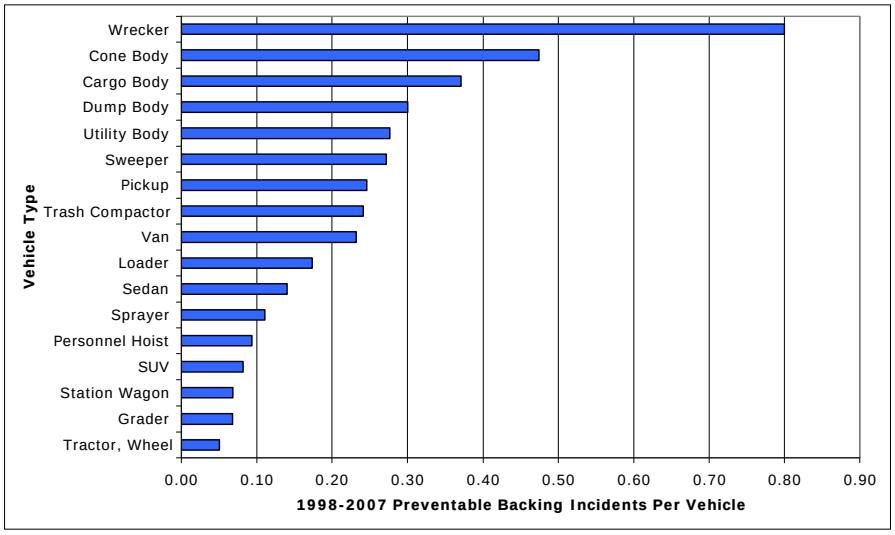
of all preventable backing crashes. Even though this data is not normalized (there are more pickup trucks than any other type of vehicle in the Caltrans fleet), it does give focus to remedial action since by addressing backing problems in pickups, sedans, vans, SUVs, and station wagons, vehicle that do not differ materially from the family car, 37% of backing crashes could be eliminated. Unlike incidents in other vehicle types where visibility to the rear and size may be contributing factors, the elimination of backing incidents in these vehicles involves changes in policies and procedures rather than technology.

Figure 2: Preventable Backing Collisions By Vehicle Type 1998-2007



When the incident data by vehicle type are normalized, that is, when the number of each type of vehicle is taken into consideration, a different picture emerges (Figure 3). Here the larger vehicles, many with limited vision to the rear, have the highest crash rates. Given the nature of the job the wrecker performs, its high incident rate is understandable though not acceptable. . It is important to note that even though wreckers have the highest incident rate, eliminating all incidents in this vehicle type would only reduce Caltrans total incidents by three per year.

Figure 3: Rate of Preventable Backing Collisions By Vehicle Type 1998-2007



Preventable Backing Collisions by District: An Overview of Trends

Total numbers of preventable backing collisions between 1998 and 2007 vary dramatically by district (Figure 4), with the highest number in Districts 4 (Bay Area) and 7 (Los Angeles) and the lowest numbers in District 32 (Headquarters) and 9 (Inyo County). Given the differences in size and numbers of vehicles this is understandable.

Figure 4: Total Number Preventable Backing Collisions By District 1998-2007

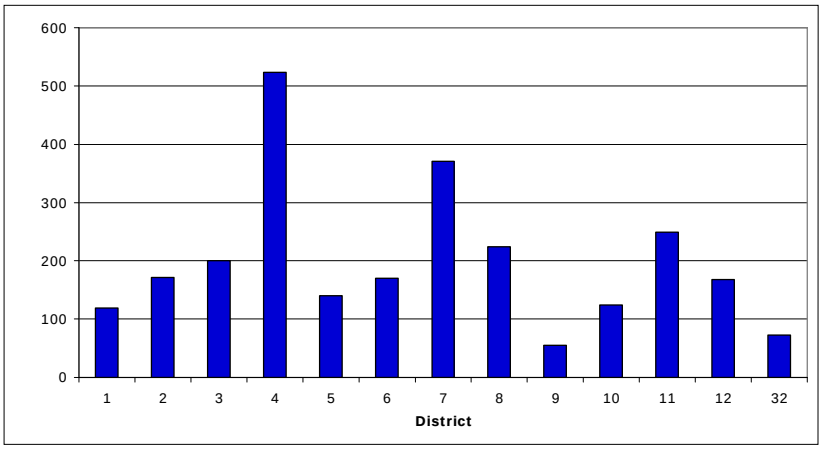
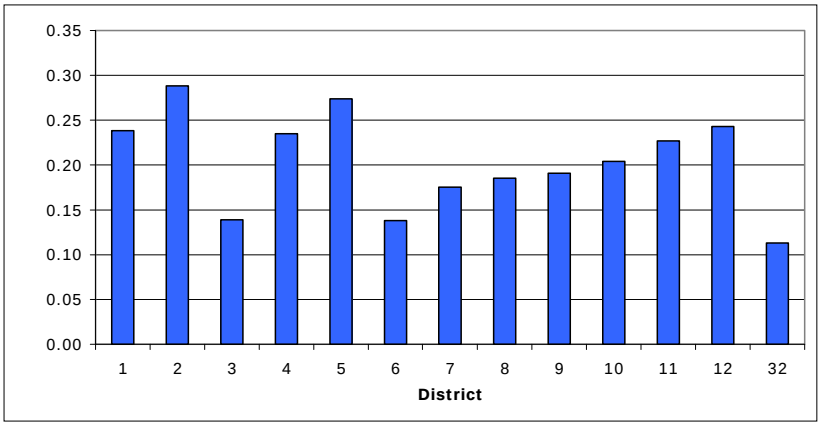


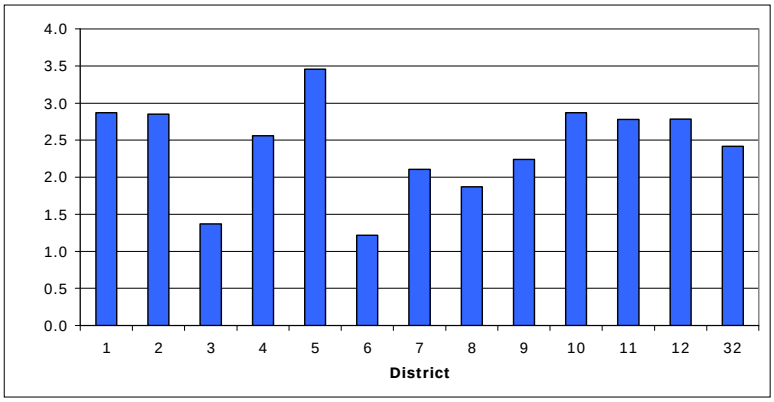
Figure 5 shows the number of backing collisions per vehicle in each district, a rate which, while showing less variability than the non-normalized number, still shows large differences between districts. Further research comparing vehicles in operation in specific districts to incident rates would help clarify causes of variation between districts.

Figure 5: Preventable Backing Collisions Per Vehicle By District 1998-2007



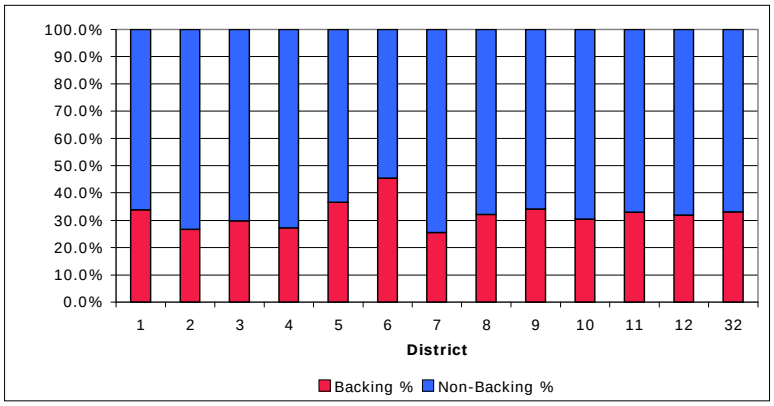
Because this variability between districts could be attributable, at least in part, to the amount these vehicles are driven, the number of incidents per 100,000 miles driven were calculated. Here again, the number of preventable backing collisions varies considerably between districts. During the period 1998 and 2007 the highest rates of preventable backing collisions occurred in District 5 (Monterey), 1 (Eureka) 2 (Redding), 10 (Stockton), 11 (San Diego) and 12 (Irvine). The lowest numbers occurred in District 6 (Fresno).

Figure 6: Preventable Backing Collisions Per 100,000 Miles By District 1998-2007



Finally, proportions of backing crashes versus non-backing preventable crashes also vary between districts. The highest proportions of backing crashes were in District 6 (Fresno) with 44%. In the majority of districts approximately 35% of preventative crashes involve backing-up.

Figure 7: Preventable Backing vs. Non-backing Collisions By District 1998-2007



Based on an analysis of the backing incident rates, it is reasonable to suggest that more research will be necessary to understand if increased exposure to high volumes of drivers and high-risk vehicles might be responsible for increased rates of backing collisions in urban areas such as the Bay Area.

INFORMATION MANAGEMENT

Safety Information Management System (SIMS)

As previously discussed, the starting point for solving any problem is to have a clear understanding of the scope and magnitude of that problem. The repository for safety data available for statistical analysis at Caltrans is the Safety Information Management System (SIMS) This database is the basis for the quarterly and annual reports produced by the Department of Health and Safety.

Based on a review of the current SIMS database as well as interviews with district safety officers

and safety representatives from other state departments of transportation, a number of suggestions for making the system a more powerful safety tool are discussed below.

Methods For Collecting Injury And Incident Information

The information available to compile statistics for safety reports involving motor vehicles comes from Form PM-S-0270 "Data Input For Motor Vehicle Accident," which is completed by the first-line supervisor for the Caltrans driver involved in the incident based on an investigation and review of forms STD 269 "Accident Identification Card" and Form 270 "Vehicle Accident Report," which are completed by the driver. If the driver was injured in the incident, information is available from Form PM-S-067 "Data Input for Personal Injury Accident."

A common problem is that forms are missing information. None of the categories listed include information that might not be available at the time the forms are filled out such as estimated repair costs. First-Line supervisors and District Safety Officers need to make sure that there is no missing information before the incident is entered into SIMS.

At present there is no link between motor vehicle and personal injury files. A person compiling statistics would have to note that the "Caltrans Employee Injured" box was checked "Yes" and then perform a search using the driver's name or ID. Each motor vehicle incident is assigned an "M" number and each personal injury is assigned a "P" number. If a Caltrans employee is injured in a motor vehicle incident, that person's "P" number should appear as part of the motor vehicle incident file. Similarly, the "M" number should be listed in the personal injury file.

A common problem is also incorrect information. One example is the mis-classification of vehicle movement prior to the incident. Under "Movement Preceeding Collision," two of the choices are "Stopped" and "Parked." Another area in which the choices are not clear or are not understood deals with the incident location. The P-MS-0270 has 10 choices for general location and six for specific location. A problem lies in the fact that incidents that occur in general locations that include "City Street, Conventional Highway, Freeway, Freeway Ramp Or Connector, Rural Road, and Tunnel Or Tube" could all be considered to have occurred on state property and could be placed in general location "State Yard Or Property".

Additional Data Fields

In addition to clarifying current data fields and insuring the accuracy and completeness of the entered data, more information should be collected for input into SIMS than is currently available. This should include the following:

- Hire dates for all Caltrans employees undated quarterly - Using this information, time on the job can be calculated to see if there is need for additional training or refresher training at certain times during an employees career.
- Birth dates for all employees updated quarterly - Is there an age group (or groups) that appears to be more vulnerable than others? This can also be used in conjunction with hire dates to look at patterns of time-on-the-job and age.
- Vehicle mileage information - Incidents per vehicle may not tell the whole story if a district uses its vehicles much more intensely than another.
- Complete crash costs. It should be noted that as a result of this project, work is currently

underway to make repair cost information accessible through SIMS.

Data Entry and Database Access: Accident Investigation Training.
Supervisors should receive uniform training in investigating accidents and injuries and filling out forms. Data entry into SIMS should be restricted to designated personnel (including district safety officers), and they should receive a minimum level of training in the Microsoft Access™ data management program to help them generate more useful reports.

Caltrans has no formal system for training district employees to enter data into SIMS, and no staff members are designated as responsible for entering the information. Many are not trained in the task, leading to errors. Nor is there a uniform deadline for entering data. In some districts, it can take a month before a form's data is entered into SIMS, while in others it happens as soon as forms are submitted.

District safety officers, who do most of the data entry, are not trained in Microsoft Access™. Therefore, few have the skills to take advantage of SIMS to generate detailed statistics and reports. If they need a non-standard report, they request it from the central office in Sacramento.

Data Collection Lessons From Other State DOTs
Data collection methods used by the Idaho, Texas, Vermont, and Washington Departments of Transportation offer approaches that Caltrans might adopt in whole or part to improve its system. The information in this section is based on interviews with Safety Officers at several state DOTs.

The Idaho Department of Transportation (ITD) collects injury and motor vehicle incident information from a wider array of sources than Caltrans does. They include employee accident forms, tort claim forms, and safety meeting records. Each district has a data entry employee, and all data are entered at least once a week. Only the seven safety staff members, six district business managers, and the employees who enter data in each district may log onto the database. The ITD's chief safety staff members, the Safety Risk Management Manager, generates comprehensive quarterly reports from this database.

At the Texas Department of Transportation (TxDOT), as soon as an incident occurs, district staff e-mail the central safety office, the Division of Occupational Safety, which triggers the creation of an entry in the database. In development since 1989, the database is maintained by trained staff and tracks workplace injuries and workers' compensation claims on a daily basis, compiling data from a wide variety of sources. For example, when an employee is involved in a motor vehicle accident, the finance division provides the employee's hours worked, and fleet equipment operations submits information about the vehicle and its mileage.

At the Washington Department of Transportation (WSDOT) the Safety and Health Administrator, has made it a priority to establish a comprehensive database of the rates of injuries and claims and their costs. Before he was hired in 2005, there was no internal injury database in place. Now the regional safety officers input injury, lost time, and medical data into an online system, which copies data to the central server. The system is set up to analyze, synthesize, and produce reports so that safety officers can obtain the information that they need.

Incorporate Of State Compensation Insurance Fund (SCIF) Claims Cost Data with Injury Reports

Separately from the injuries information that the SIMS system collects, extensive data is gathered on all Caltrans employees' workers' compensation claims by the State Compensation Insurance Fund (SCIF), which serves as the claims administrator for Caltrans. Combining and analyzing these data sources would generate useful knowledge such as the types of injuries that are more likely to result in workers' compensation claims, their costs, and the extent to which claims were disputed successfully. This would provide a context for calculating the return on investment that could be gained through injury prevention activities targeted at specific injuries.

For example, the Washington State Safety and Health Assessment and Research for Prevention (SHARP) program recently studied musculoskeletal disorders to learn how much these injuries contributed to workers' compensation costs. Currently, extensive information is available from SCIF, all in electronic format, making integration into SIMS possibly feasible.

Other information available from SCIF under the state master agreement could be used to establish a departmental claims tracking system. For each claim, SCIF can furnish the name of the office administering the claim, the adjuster name and telephone number, the names of any SCIF attorneys involved in the case, the WCAB case number from the Caltrans Return to Work Unit, information on whether the claim has been litigated, the name of the applicant attorney, and whether liability in the case was accepted, delayed, or denied. SCIF can also provide the start and end dates for the claim as well as type of current benefits.

Merit rating policies, which include both "experience rating" and "schedule rating," are worth exploring. Experience rating, for example, is widely used in private sector workers' compensation programs. It compares a firm's ratio of losses to all other employers in the state in similar business classifications and sizes. This can be used to give employees incentives to reduce the cost of claims that might be excessive relative to other firms.

Breaking down Caltrans' department-wide data and showing each region and departmental unit its own experience could allow for more region-specific accountability. While there may be good reasons for regions or departments to achieve different results, the first step is getting the information out and allowing such comparisons to be made. At the very least, managers and supervisors should know the costs associated with injuries within their control.

Target Safety Problems, Increase Accountability Based On Results Of Data Analysis

Data are an important tool for targeting injury and accident trends and to inform supervisors and to guide planning and development of safety programs. To take advantage of this tool, Caltrans needs to invest in more data analysis and communication of findings to key personnel.

Currently each Caltrans district generates statistics that include year-to-date accident and injury rates, but there is little analysis or comparison, and they are shared on a casual basis, typically via e-mails from district safety officers. Caltrans headquarters generates reports that include district accident summaries, incident histories, and Cal/OSHA district injury logs and summaries.

To make this data more useful, first, it needs to be more accurate. Second, analysis should take place at least twice yearly to determine injury and incident rates and trends. Finally, the data need to be distributed systematically to all employees, from top-level managers on down.

Data Analysis Lessons From Other State DOTs

The New York, Idaho, Texas, and Washington DOTs have commendable systems that use data to inform the employee safety program. These DOTs could be used as models for Caltrans to improve its own data management systems.

The Washington Department of Transportation (WSDOT) provides managers with breakdowns of claim costs and open cases within their region on a regular basis. The New York State Department of Transportation (NYSDOT) created a safety campaign to reduce motor vehicle backing accidents after annual trend reports generated from the accident and injury database revealed that they were increasing. As part of the new safety campaign, NYSDOT created driving maps for the maintenance yards and instituted routine reviews and updates of backing policies listed in the employee manual.

The Idaho Department of Transportation (ITD) safety staff issues quarterly reports listing all industrial accidents and tort claims filed against the ITD. The safety manager first issues these statistics to top management in summary form and then issues a full formal report with complete accident descriptions to all forepersons and section supervisors. The quarterly reports are discussed in detail at all monthly safety committee meetings.

The Texas Department of Transportation (TxDOT) Safety Division publishes an annual report that includes a three-year summary of TxDOT personal injury and motor vehicle rates. The Safety Division issues a monthly report containing year-to-date injury and incident frequency rates, injury severity rates, and loss time rates for every district and division. The central Safety Division sends the monthly report to safety officers and to district administrative directors. The safety officers in turn distribute it to supervisors and area engineers. Supervisors often report the injury statistics to employees during routine safety meetings. TxDOT uses this data to decide which safety issues are most urgent and to evaluate solutions. Recently, after analyzing department injury data and concluding that backing was a major source of injuries, it took steps to reduce backing accidents in select pilot districts by installing detectors, cameras, and back-up alarms in some vehicles.

BACKING TECHNOLOGY

The purpose of backing warning technology is to alert drivers of potential risk in a manner that allows sufficient time (essentially the total of reaction time plus stopping time) for preventative action.[iii] In this section we summarize the results of our review of studies that compared different technologies (e.g. radar versus camera).

Based on this review of literature, it is reasonable to conclude that the most effective backing accident prevention systems integrate multiple technologies including video, radar, and back-up alarms. The following list highlights the TSC's research findings, which will soon be published and available in an extended form.

- A report on highway work zones based on opinions obtained from government, labor, industry, academia, and state departments of transportation suggested the following engineering solutions might effectively reduce backing accidents:
  - Parabolic mirrors on construction equipment
  - Vibrating alarms that give 8-10 seconds notice of approaching vehicles
  - Sensing devices that sound an alarm when an object is near the vehicle
  - Closed-circuit television cameras, mirrors, and devices that stop a vehicle nearing a collision[iv]

- NIOSH investigated backing prevention equipment on job sites and concluded that combined radar-video systems successfully alert drivers that something may be behind the vehicle and directs their attention to a monitor.[v]

- Mirrors are not the most effective means of increasing truck drivers' visual range. However, truck drivers believe supplemental mirrors have the potential to significantly reduce blind-side and backing crashes.[vi]

- Back-up warnings that alerted drivers approaching known obstacles were more successful in preventing incidents than warnings that sounded in response to a surprise event[vii], although some argue that audible alarms do not always protect pedestrians due to malfunctions and work site noise.[viii]

- Durability and reaction time studies showed that radar and sonar systems generally perform reliably, except under the following conditions:
  - cold and snow[ix]
  - congested work areas (especially affects sonar systems)[x]
  - cluttered conditions, when objects posing no immediate danger set off false alarms[xi]
  - when vehicles' speeds exceed that at which most pedestrian collisions occur (especially affects sonar)[xii]

- A study of particular relevance is the Arizona Department of Transportation (ADOT) evaluation of ETON brand Backspotter rear cameras on ADOT's heavy vehicles. They were well received by field crews on dump trucks and stripers, but did not work with trailers and medium trucks.[xiii]

- Recent innovations in cameras suggest they may be one of the most popular and affordable approaches to reducing work zone backing incidents.[xiv]

CALTRANS' POLICIES AND PROCEDURES

Caltrans guidelines for backing a department vehicle are contained in both the Department's Safety Manual and the Maintenance Manual. A review of these two manuals as well as interviews with other state DOTs show that Caltrans policies and procedures cover the topic well

and, if followed, would greatly reduce backing incidents. The contents of these manuals are covered below and, where appropriate, suggestions are made for changes.

Caltrans Safety Manual, Chapter 17 Motor Vehicle Safety section 17.13 Vehicle Backing Policy directly addresses backing maneuvers and lists that, "To decrease the likelihood of a backing accident, the following procedures shall be adhered to:

- Whenever feasible, operations will be modified to eliminate backing. If backing is necessary, the affected supervisor, operator and employees will discuss the backing maneuvers before beginning operations.
- Before backing any vehicle, the operator shall visually inspect all sides of the vehicle to assure there are no obstacles, clearances or employees in the area. It may be necessary for the operator to exit and walk around the vehicle to perform a visual inspection.
- The driver should be alert to any other pedestrian or vehicular traffic that may enter the backing zone. If pedestrian traffic is anticipated, a spotter shall be utilized whenever practicable while backing.
- When two or more employees work together, the driver shall ask the other employee to act as a spotter at the rear of the vehicle before starting the backing movement. The operator and spotter shall have a clear understanding of the backing maneuver before moving the vehicle.
- If the operator must stop or park the vehicle in a position that will require backing, the vehicle should be positioned to maximize visibility to the rear and critical areas adjacent to the vehicle."

The TSC recommends the following minor changes to 17.13 Vehicle Backing Policy

1. Any time a vehicle is backed, if another Caltrans employee is present, that person **will** act as a spotter.
2. If a vehicle has been stopped or parked for any length of time, the driver **shall** exit the vehicle and perform a visual inspection
3. In all procedures, the word "shall" will be used rather than "should."

Caltrans Maintenance Manual, Chapter 8: Protection Of Workers section 8.13, Planning Work To Reduce Worker Exposure, lists that supervisors shall plan all work methods to minimize the need for the backing of equipment and vehicles at the work site. Section 8.36 Backing of Vehicles and Equipment, advises that, "Backing accidents have always been the most prevalent type of vehicle accident. Because so many of the tasks Maintenance employees perform involve the backing of vehicles and equipment, the potential for serious accidents exists, and extra emphasis must be placed on preventing their occurrence." This section contains helpful work plan and work site recommendations aimed at preventing backing incidents, as well as a list of "Personal Responsibilities" aimed employee precautions. The TSC found these sections valuable and suggests only that the Maintenance Manual be changed such that **i**n all procedures, the word "shall" will be used rather than "should."

ACCOUNTABILITY AND DISCIPLINE

If Caltrans is to substantially reduce workplace incidents and injuries, management must commit to the establishment of a strong safety culture, a key element of which is a system of accountability for all levels of the organization. Such a system establishes safety goals and measures safety activities, with all employees playing by the same rules and held accountable for fulfilling their responsibilities. It also provides a means for employees to understand how critical their performance is and teaches them to take personal responsibility for their performance.

Accountability

"Accountability ranks right at the top with management commitment as a critical ingredient in a company's safety and health management system. In fact, if employees don't believe they're going to be held accountable (experience consequences) for the decisions they make related to safety, you can be sure that any safety effort is ultimately doomed to failure."[xv]

According to OSHA, an effective accountability system should have the following five elements:

1. Established standards in the form of company policies, procedures or rules that clearly convey standards of performance in safety and health to employees. Before people can be held accountable, they must be told what is expected. Performance objectives must be attainable, clearly stated, realistic, challenging and measurable.
2. Resources needed to meet the standards, such as a safe and healthful workplace, effective training, and adequate oversight of work operations.
3. A measurement system which specifies acceptable performance. It's important that behaviors, rather than results, be evaluated. What action, or inaction, led to the incident?
4. Consequences, both positive and negative. Without an *expectation* of effective consequences, accountability is not believable and has no credibility. No consequences...no accountability.
5. Application at all levels means that consequences are consistently applied throughout the organization - top to bottom and across functions.[xvi]

Discipline

U. S. Occupational Safety and Health Review Commission (OSHRC) decisions have long demonstrated its belief that safe work practices are not effective if their use is not enforced and typically holds the employer responsible for lack of enforcement. To prove adequate enforcement of its safety rule, an employer must present evidence of having a disciplinary program that was effectively administered when work rule violations occurred.[xvii]

In 1984, the "Caltrans Guide To Employee Conduct and Discipline" was issued to offer "supervisors a constructive approach for handling situations related to employee discipline...[The guide is to serve] as a general reference and will have served its purpose if it brings about a better understanding of discipline as a positive factor in personnel management." In March of 1985, in a section titled "Offenses and Corresponding Adverse Actions," a disciplinary matrix was added that specifically defined offenses and matched types of offenses with suggested adverse actions. By 1992, the matrix included a section specifically addressed backing.

In 1994, the Department of Personnel Administration issued its "Supervisor's Handbook, A Guide to Employee Conduct and Discipline." This was intended for use as a general guide to State law only and was not designed to take the place of individual State department's policies or practices. Nevertheless, Caltrans issued a revised guide in April 1998 that was more in line with the DPA guide, having dropped the offense/adverse action matrix. Since then, the DPA guide has become the de facto Caltrans guide to employee conduct and discipline, with no further revisions, changes, or, it would seem, interest in a separate Caltrans guide.

In 2008, the DPA's Supervisors Guide, which had been revised in 2004, was pulled from the DPA website because it no longer reflected current law. This has the effect of leaving Caltrans without a current conduct and discipline guide.

Enforcement

Ideally, there would be a study that looked at the effects of a change in enforcement of progressive discipline for preventable motor vehicle crashes carried out by a state department of transportation. By comparing the long term difference in crash rates for the before and after periods, we would have proof of the efficacy of such a change in enforcement. Unfortunately, such a study does not exist.

There is, however, a large body of work demonstrating the efficacy of enforcement in deterring unsafe behaviors such as speeding, red-light running, and seat-belt use. Enforcement of driving related safety laws has been shown to have a significant effect on driver behavior, not because the people who receive tickets have learned their lesson, but because the driving public has been made aware, through visible enforcement and publicity, that there will be consequences for violating traffic laws. By implementing tougher enforcement policies and keeping safety and accountability the key topics at tailgate and staff meetings, Caltrans has the opportunity to see significant improvements in workplace safety.

Recommendations

To get results, Caltrans must implement a process based on leadership, commitment, understanding, and no excuses. Employees need to understand that they must take personal responsibility for their actions and will be held accountable. Violations of safety policies will be met with disciplinary actions that are immediate, certain, and applied equally to everyone.

The object of increased safety enforcement is not to see how many employees can be disciplined, but rather to try to reach the point where no one needs to be. By the time a driver receives disciplinary action, the costs to Caltrans have already been incurred. The only way to eliminate injury and fatal crashes is to eliminate all crashes

To ensure compliance with safety policies and to prevent people from having their first crash (general deterrence), the consequences for preventable incidents must be tough enough that people will want to avoid them. The minimum action for a first preventable backing incident should be a formal letter of warning. There should be no discretion regarding this minimum because as soon as a supervisor has discretion, the entire process fails since disciplinary actions

will no longer be uniformly applied. Uniform application is one of the key elements to making this work. It is only the minimum action for which there is no discretion. If an employee has an excellent record, then this is the action that will be applied. If, on the other hand, the backing incident is merely the latest in a string of violations, or if the driver's behavior was particularly egregious, there is no reason that a stronger action cannot be taken.

Additionally, members of upper management at Caltrans must make it clear that not only will they support supervisors who fairly enforce safety rules, they will demand such action. Any supervisors who fail to follow Caltrans policy regarding applying minimum disciplinary actions for safety violations will, themselves, be reprimanded. This policy has the added benefit of removing pressure from supervisors in that they cannot be asked by at-fault drivers to overlook the violation if they do not have the ability to do so.

Achieving zero incidents and injuries has to be the goal at Caltrans. If incidents and injuries are preventable, how can any given level be acceptable?

CONCLUSION

In spite of the policies and procedures that currently exist, Caltrans continues to experience backing incidents that cost over $500,000 a year in vehicle repair costs alone. At present time, there does not appear to be enough being done to mitigate the problem in high-incidence districts or with vehicle rates identified as likely to be involved with a backing collision. Along with considering technological enhancements, Caltrans should hold managers or negligent drivers accountable for violations. Failure to enforce and follow safety policies not only undermines the purpose and efficacy of progressive discipline, it exposes Caltrans to the possibility of adverse actions by OSHA as well as third-party lawsuits.

If Caltrans is to substantially reduce workplace incidents and injuries, management should consider installing technology that has proven to reduce backing incidents and commit to the establishment of a strong safety culture, a key element of which is a system of accountability for all levels of the organization. A comprehensive system establishes safety goals and measures safety activities, with all employees playing by the same rules and held accountable for fulfilling their responsibilities.

ENDNOTES

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[xii] Glazduri, V., "An Investigation Of The Potential Safety Benefits Of Vehicle Backup Proximity Sensors" (*Transport Canada*, 2005).

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[xvi] OSHA website: http://www.osha.gov/SLTC/etools/safetyhealth/mod4_factsheets_culture.html, accessed SEPtember 7, 2008.

[xvii] U. S. Occupational Safety and Health Review Commission, *Gem Industrial, INC.: OSHRC Docket No. 93-1122* (December 6, 1996).

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