WASHINGTON State FACE Program
Fatality Assessment & Control Evaluation

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1-888-66-SHARP (toll-free) or 360-902-5667

INCIDENT HIGHLIGHTS

DATE:
July 29, 2019

TIME:
11:40 p.m.

WORKER:
45-year-old semi-truck driver

INDUSTRY/NAICS CODE:
Specialized Freight (Except Used Goods) Trucking, NAICS 484230

EMPLOYER:
Interstate trucking, bulk transportation

SAFETY & TRAINING:
Employer had a written Accident Prevention Program (APP).

SCENE:
Sawmill, outdoor tarping station

LOCATION:
Eastern Washington

EVENT TYPE:
Crush - Struck by

REPORT#: 52-52-2022 **REPORT DATE:** 4/12/2022

Driver Crushed by Rollaway Woodchip Truck

SUMMARY

Around midnight on July 29, 2019, a 45-year-old semi-truck driver was fatally crushed by his woodchip truck when it rolled away. The driver was at a sawmill in Washington State picking up woodchips for delivery to a pulp mill in British Columbia. After loading the chips, he parked his truck on a paved road under a fall protection tarping station. The road had a 2% downgrade. The driver did not set the truck's parking brake before exiting the cab to access the top of the trailer to prepare his load for tarping.

While the driver was walking on top of his load near the back of his trailer, his truck began to roll forward. He ran toward a ladder at the front of the trailer that went down to a walkway behind the tractor. While trying to descend the ladder, he went over the edge of his trailer and fell to the road. The only other driver at the mill left the site without seeing the incident. Almost two hours later, another truck driver entered the site and found the driver fatally crushed under his tractor's left front drive wheels.

… READ THE FULL REPORT> (p.5)

CONTRIBUTING FACTORS

Key contributing factors identified in this investigation include:

- Uneven road grade at truck tarping station area.
- Parking brake rules in Accident Prevention Program (APP) not followed.
- Inadequate truck parking brake and wheel chocking policy in APP.
- Insufficient safety audits of drivers and customer worksites located abroad.
- …LEARN MORE> (p.18)

RECOMMENDATIONS

Washington FACE investigators concluded that, to help prevent similar occurrences, employers should:

- Install electronic parking brake systems that automatically apply the parking brake when the driver has not set it before exiting the cab.
- Develop APP to have a parking brake and wheel chocking policy with strict requirements for preventing rollaways and unsafe responses.
- Collaborate with owners of remote customer sites outside of their ordinary daily travel range to ensure the sites are safe for their drivers.
- Assist safety supervisors to obtain work visas or hire safety consultants abroad to do safety audits at customer sites in other countries.
- ….LEARN MORE> (p.18)

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DEFINITIONS

APP	Accident Prevention Program
BC	British Columbia
CDL	Commercial Driver's License
CSHO	Compliance Safety and Health Officer
CTPAT	Customs Trade Partnership Against Terrorism
CVIP	Commercial Vehicle Inspection Program
DOSH	Division of Occupational Safety and Health
DRA	Driver Risk Analysis
eDVIR	Electronic Driver Vehicle Inspection Reports
ESC	Electronic Stability Control
GVWR	Gross Vehicle Weight Rating
JHA	Job Hazard Analysis
L&I	Washington State Department of Labor & Industries
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PPE	Personal Protective Equipment
SHARP	Safety & Health Assessment & Research for Prevention
TSCBC	Trucking Safety Council of British Columbia
USDOT	United States Department of Transportation
WA	Washington State

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WASHINGTON STATE FACE PROGRAM INFORMATION

The Washington State Fatality Assessment and Control (WA FACE) program is one of many workplace health and safety programs administered by the Washington State Department of Labor & Industries' Safety & Health Research for Prevention (SHARP) program. It is a research program designed to identify and study fatal occupational injuries. Under a cooperative agreement with the National Institute for Occupational Safety and Health (NIOSH grant# 5 U60OH008487), WA FACE collects information on occupational fatalities in WA State and targets specific types of fatalities for evaluation. WA FACE investigators evaluate information from multiple sources. Findings are summarized in narrative reports that include recommendations for preventing similar events in the future. These recommendations are distributed to employers, workers, and other organizations interested in promoting workplace safety. WA FACE does not determine fault or legal liability associated with a fatal incident. Names of employers, victims and/or witnesses are not included in written investigative reports or other databases to protect the confidentiality of those who voluntarily participate in the program.

Additional information regarding the WA FACE program can be obtained from:

WA FACE program website
PO Box 44330 Olympia, WA 98504-4330
1-888-667-4277

Email | | Website

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INTRODUCTION

In July of 2019, the Washington State Department of Labor & Industries' (L&I) Division of Occupational Safety and Health (DOSH) notified the Washington State Fatality Assessment and Control Evaluation (WA FACE) Program of the fatality of a semi-truck driver who was crushed by his chip truck when it rolled away.

Washington State FACE investigators reviewed the DOSH compliance safety and health officer's (CSHO) enforcement case file in lieu of interviewing the employer due to their decision not to participate. Documents reviewed during the course of this investigation included the DOSH inspection summary report, the worker's death certificate, co-worker interviews, incident scene photos, surveillance camera footage, diagrams, and police report.

EMPLOYER

The employer was a long-haul interstate trucking company that specialized in truckload transportation of bulk wood residuals, such as wood chips, sawdust, and shavings, from sawmills to pulp mills. With 31 semi-trucks and 49 truck drivers, the almost 60-year-old company was one of the largest cross-border wood residuals haulers serving the Pacific Northwest of Canada and the United States. The employer had drivers working in two shifts that began at various times during the day and lasted 10 to 13 hours, Monday through Friday. Drivers could also work on Saturdays, if they were in compliance with hours of service regulations. The drivers were paid hourly wages. In 2019, the employer's truck drivers traveled a total of 996,894 miles. The employer was a previous recipient of WorkSafeBC and the Trucking Safety Council of British Columbia's (TSCBC) Certificate of Recognition.

The employer was one of five subsidiaries in a conglomerate headed by a privately held, family-owned parent corporation based in British Columbia (BC), Canada. The conglomerate provided bulk transportation services in the forestry, pulp and paper, petroleum, chemical, mining, and construction industries. The subsidiaries contracted additional trucking companies and provided dispatching for a combined fleet of around 350 trucks operated by over 500 drivers. Trucking operations took place around-the-clock from freight hubs across the Pacific Northwest.

WRITTEN SAFETY PROGRAMS and TRAINING

At the time of the incident, the employer had a formal, written accident prevention program (APP), or safety program, designed to comply with national and local workplace and commercial vehicle safety laws in BC and Washington State (WA) [SOR 1986; WAC 2001; WSP 2022]. The program was formatted as a worker handbook by the conglomerate's parent company for use by the employer and two other trucking companies in the group. The 80-page handbook consisted of four chapters that covered general health and safety policies, job-specific safe work practices, operation and maintenance procedures, and safety awareness guidelines for management and workers. Chapter subsections specified requirements for safety committee and tool box meetings, personal protective equipment (PPE), new worker orientation, safety training, job performance evaluations, disciplinary procedures, and other areas. The APP had a vehicle parking and backing out policy that required truck drivers to set their parking brake securely each time they exited the cab. The company paid bonuses to drivers as an incentive to encourage safe driving. The program included an enforcement policy consisting of progressive coaching and discipline for drivers who demonstrated unsafe driving. Truck drivers were instructed to report incidents and injuries to dispatchers who were on duty 24-hours a day.

The employer's APP required truck drivers to perform daily vehicle pre-trip and post-trip inspections according to Schedule 1 of Canada's National Safety Code Standard 13 and Part 4 of BC's Motor Vehicle Act [NSC 2009; B.C. Reg. 2021a]. The employer also participated in the U.S. Customs and Border Control's voluntary Customs - Trade Partnership Against Terrorism (CTPAT) program, which required trucks bound for the United States to pass a 17-point safety and security inspection [CTPAT 2013]. The inspections checked the condition of major structural, mechanical, and electrical

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vehicle systems, including tractor and trailer air brake systems. Drivers submitted electronic Driver Vehicle Inspection Reports (eDVIR) to management after finishing their inspections.

The employer compiled weekly Driver Risk Analysis (DRA) reports to identify, coach, and retrain unsafe drivers. The DRA reports collected driving behavior data from electronic stability control (ESC) systems on trucks that recorded unsafe driving events, such as excessive speed and hard braking. The employer reviewed driving abstracts anually to identify drivers with traffic violations. Safety supervisors conducted in-cab ride alongs and driver performance audits at customer sites to observe and evaluate drivers periodically during their employment. The employer provided copies of its safety rules to customer sites each year. Whenever possible, bi-monthly safety audits took place at worksites to help ensure truck drivers were following APP requirements.

WORKER INFORMATION

The worker who died in the incident was a 45-year-old semi-truck driver. He was an Asian foreign-born worker who lived in BC with his wife and child. The employer hired the driver in April 2019, two weeks after he finished a Canadian Class 1 Commercial Driver's License (CDL) training program at a professional truck driving school in BC. The program consisted of 96 hours of classroom instruction, 44 hours of drive time, and 35 hours of observation. The driver's CDL training instructed him in the use of parking brakes, and his CDL had an air brake endorsement.

The employer required the novice driver to complete a four-week new driver mentoring and training program before allowing him to drive alone. The one-on-one, on-the-road training was led by two credentialed trainers who rotated instructional duties during the training period. The training covered tractor and trailer operation, fall protection, and loading and unloading procedures at mills. It also included several mill site orientations in BC and WA. The driver was trained to operate a Western Star semi-tractor with a TYCROP high-cube, quad axle, Super B-train chip trailer.

The truck driver worked Monday through Friday. His daily shifts began at 4:30 p.m. and ended 10 to 13 hours later. He operated a semi-trailer truck to load and deliver woodchips from a sawmill in northeastern WA to a pulp mill in southcentral BC. The employer did not own the mills but was contracted by a Canadian private limited company to haul the chips. In addition to maintaining commercial driving requirements, the driver's duties included loading, leveling, tarping, and unloading freight with the truck he drove during the employer's new driver training. He typically made two daily five-hour round-trip deliveries that involved traveling nearly 336 miles over secondary highways between the mills. He met the required medical qualifications to safely perform his job.

EQUIPMENT

The chip truck in the rollaway incident was a BC-registered 2016 Western Star semi-tractor with a 2004 TYCROP high-cube, quad-axle, possum belly Super B-train chip trailer (Photo 1). The Gross Vehicle Weight Rating (GVWR) of the tractor and trailer was 105,500 lbs. At the time of the incident, the loaded truck had a total weight of 66,225 lbs. spread over four axles on the tractor and four on the trailer. The vehicle was 70 feet long from the tractor's front axle to the trailer's rear axle. The tractor was an airbag equipped day cab model with an automatic transmission. Its odometer reading was 388,739 kilometers (241,551 miles) when the rollaway occurred. The trailer had an open top aluminum body, side roll tarp, top hinge tailgate with ladder at the rear, and a fall protection work platform with ladder mounted

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at the front. Driving hazards included the risk of collisions and rollovers, while performing job tasks on and around the truck entailed the risk of struck by incidents, crushing, strains and sprains, and slips, trips, and falls.

Photo 1: The fatally injured driver operated this 2016 Western Star semi-tractor with a 2004 TYCROP high-cube, quad-axle, possum belly Super B-train chip trailer.

The chip truck had a dual air brake system consisting of primary and secondary circuits for the drive and steer axles, respectively. The system used an engine-mounted compressor that pumped pressurized air into a series of hoses, valves, storage tanks, and couplings to brake chambers at each wheel. The driver contolled the tractor and trailer service brakes with a foot pedal located next to the accelerator on the driver's side floor of the tractor cab. The service brakes were applied and released with a foot pedal located next to the accelerator on the driver's side floor of the tractor cab. The tractor parking brake was released and applied by manually pushing and pulling a yellow air brake valve control knob on the driver's instrument panel in the cab (Photo 2). Pulling the yellow knob would set the tractor parking brake and the trailer emergency brake at the same time. Pulling the red trailer air supply knob would only set the trailer emergency brake, which was not intended as a parking brake but to protect the tractor's air supply if the trailer broke away and air pressure dropped. Safe air pressure range in the system was from 100 to 120 psi and was indicated by a gauge on the driver's instrument panel. The air compressor would automatically recharge the system when the pressure dropped about 20 psi below safe operating range. Low air pressure between 20 and 45 psi would make the control knobs pop out and activate the parking brake. A warning light and buzzer on the instrument panel would activate when air pressure dropped below 60 psi. The driver's pre-trip inspection included a test that checked the air brake system's mechanical performance and warning features. The instrument panel had transmission shift and parking brake indicators. Also, an in-cab alert system emitted an audible alarm signal when a driver left their seat without setting the parking brake.

Photo 2: Industry standard push-pull air brake valve control knobs that are installed on semi-truck cab dashboards.

In addition to driver training, vehicle safety was achieved with safety technology and software, preventive maintenance checks and services, and commercial motor vehicle inspection requirements. Trucks in the employer's fleet had mandatory electronic stability control (ESC) systems to help prevent skidding and rollovers due to sudden braking, slippery roads, and loss of steering control. The computer-controlled system used sensors to monitor wheel-speed, lateral acceleration, and steering angle to determine the correct braking forces for individual wheels. The system's monitoring capabilities provided vehicle performance data that management used to create weekly DRA reports to identify unsafe drivers. Any equipment deficiencies had to be reported to the employer's maintenance staff for repairs. Unsafe trucks would not be dispatched until repairs were completed. The employer required lease operators' trucks in its fleet to maintain the same safety standards as its own trucks.

INCIDENT SCENE

The incident scene was an outdoor fall protection tarping station at a sawmill in rural northeastern WA. The employer did not own the mill but was contracted to deliver woodchips from it to a pulp mill in BC. The sawmill owner was in charge of the area. The tarping station was a steel fixed scaffold structure at the north end of a pair of approximately 47-foot-high steel bulk storage bins where trucks loaded the chips (Photo 3). The bins and tarping station had an approximately 15-foot clearance height that allowed trucks to drive and park under them. The loading procedure began when a single tractor and trailer unit arriving from BC would drive slowly on the paved road under the bins from their south entrance and position the trailer below them (Photo 4). The bins had overhead, hydraulically operated, clam-shell type bottom gates that opened to release dried chips into the trailer. Hardhat and eye protection requirement signs were posted on the bins. After setting the parking brake, the driver would exit the cab, walk to an approximately 15-foot ladder, and climb it to a platform on the left side of the bin where hydraulic levers were located that controlled the bottom gates. Pit-style scales in the road under the bins weighed the truck as it loaded. The truck's engine was left

running the whole time. The driver would then return to his truck and move it slightly back and forth to use the inertia of the woodchips to slide, spread, and level them in the trailer. The procedure would then be repated once again to finish loading. When the trailer load reached capacity, the driver would fill out a bill of lading and leave copies for the mill in a box next to the bins. The entire loading process would take from eight to fifteen minutes.

Photos 3 and 4: The left photo shows the fall protection tarping station extending north from the bulk woodchip storage bins. Arrow shows the path of chip truck travel on paved road under the bin entrance and loading area to the tarping station exit in foreground. Right photo shows entrance to bin loading area. Red arrow shows the bin's clamshell gates that released woodchips into trailers. Blue arrow shows PPE requirement signage.

After loading was completed , the truck would pull forward and park under the ad joining tarping station, which extended approximately 50 feet from the bin loading area exit (Photo 5). The road under the tarping station had a 2% downgrade toward the station's exit. Drivers were required to set their parking brake, shut off the engine, and put the ignition key in their pocket when exiting the cab to tarp the trailer. An approximately 16-foot caged ladder mounted to the station allowed truck drivers to access a platform equipped with fall protection guardrails above the right rear of the trailer (Photo 6). A second platform at the north end of the station could be accessed from the ladder and platform on the front of the trailer (Photo 7). Guardrails extended from the platforms around the entire tarping station. The guardrails allowed the driver to walk from the platforms onto their load to level and tarp it with a reduced risk of falling off the trailer. When tarping was finished, the driver climbed down from the tarping station, returned to the truck cab, started the engine, dropped the trailer's rear tag axle, released the parking brake, and drove out to their delivery destination. Leveling and tarping would typically take five to ten minutes to complete.

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Photos 5 and 6: Top left photo shows tarping station extending north from bins toward exit. Red arrow shows rear of incident truck's trailer. Blue arrow shows bin hydraulic control platform with ladder. Top right photo shows caged ladder and first tarping platform that drivers used to access top rear of trailer.

Photo 7: Arrow in bottom left photo shows second tarping platform and entrance that drivers accessed by climbing their front trailer ladders. Yellow guardrails around tarping station provided fall protection for truck drivers tarping on top of trailers.

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Chip truck loading operations continued around the clock. Spotlights illuminated the area during hours of darkness. The employer's PPE requirements in the area consisted of work boots, hardhats, safety glasses, and high-visibility vests. The entire loading area was fenced and had a speed limit of 10 mph, which was posted at the entry gate. Vehicles inside the fenced area were subject to inspection at any time.

WEATHER

The incident happened around 11:40 p.m. The weather was clear with no wind and temperature of 58 degrees [Weather Spark 2019]. The sun set at 8:34 p.m. The weather was not a factor in this incident.

INVESTIGATION

On Monday, July 29, 2019, the chip truck driver started his usual night shift at 4:30 p.m. He was performing his regular job of loading and hauling woodchips from a sawmill in northeastern WA to a pulp mill in southcentral BC. His employer did not own the mills but was contracted by a Canadian private limited company to haul the chips. The driver was operating a 2016 Western Star semi-tractor with a 2004 TYCROP high-cube, quad-axle, possum belly Super B-train woodchip trailer (Photo 1). He arrived at the sawmill in WA at 11:18 p.m., completing the first half of his second and final 160-mile, five-hour trip between the mills. He had been to the sawmill at least 30 times before without incident.

The truck entered the woodchip loading area after entering the sawmill southward through a fenced security gate near the property's northern boundary (Photo 8). Both sides of the gate had red plastic reflectors and private property, no smoking, and 10 mph speed limit signs posted. The paved road into the area was bordered by freight railroad tracks on the left and a small stand of pine trees on the right. Woodchip debris were scattered on the road surface. The fall protection tarping station and elevated bulk storage bins were situated about 110 feet from the entrance on the left side of the road. The road and loading areas were lit by truck headlights and spotlights mounted on various structures. The truck's tractor and trailer lights were on at all times. A security camera located south of the area monitored and recorded truck traffic.

Photo 8: View looking south at road through sawmill entrance's security gate. Incident truck is parked on left with the fall protection tarping station and bulk woodchip storage bins behind it

The truck passed the tarping station and bulk storage bins on its left and made a wide left U-turn to align itself with the south end entrance to the bins (Photo 4). The truck stopped for 20 seconds until the only other truck in the area, which was parked at the end of the tarping station road ahead, exited the property. The driver was now alone in the area. He drove his truck slowly under the bins and parked it when the back half of its trailer was below the second bin at the far end. It is not known if he had set his parking brake under the bins. He then exited the cab, walked to the bin control platform ladder, and climbed up to use the hydraulic levers for the bottom gates that released woodchips into his trailer (Photo 9). After the back of his trailer was loaded, the driver returned to his truck and reversed it to level the load and position the front half of the trailer under the first bin behind him. The driver parked the truck and went back to the bin controls to finish loading the trailer.

Photo 9: Bin control platform with ladder that truck drivers used to access hydraulic levers for bottom gates that released woodchips into the trailer. Arrows point to the gates.

As he was loading, another chip truck from the same employer pulled into the site at 11:27 p.m. and parked approximately 20 feet behind his trailer. The second driver exited his cab to check the bins and wait for the first driver to finish loading. As he waited, he saw the first driver on the bin control platform and asked him for a flashlight to get a better look at the bins. The first driver returned again to his truck and maneuvered it under the bins for the last time. He also brought a flashlight to the second driver, and both drivers determined the bin had sufficient woodchips to load the second driver. The first driver then climbed back to the control platform to finish loading his trailer. The second driver walked to his truck to open his tarp in preparation for loading. When the first driver finished loading his trailer, he

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returned to his truck, drove it forward until the trailer was under the adjoining fall protection tarping station, and parked on the station's paved road, which had a 2% downgrade toward the exit. The second truck then pulled forward and parked the front of its trailer under the first bin. This left approximately 30 feet of space between the front of the second truck and back of the first truck now parked at the tarping station (Photo 10).

Photo 10: Red arrow shows where the back of the fatally injured driver's trailer was laligned under the back of the tarping station above. Green arrows show the ladder and platform that allowed the driver to access the rear top of his trailer. Yellow arrow shows where the front of the second truck's tractor was located under the bins when the incident occurred. Approximately 30 feet of space separated the trucks. The paved road under the tarping station had a 2% downgrade toward the exit in the foreground.

As the second driver began loading his trailer, the first driver exited his cab to drop off a sawmill copy of his bill of lading in a box near the bins. Around the same time, he submitted load information to his dispatcher using an onboard fleet tracking system. The driver then walked to the tarping station, climbed the ladder to the guardrailed platform, and stepped onto his load at the top rear of his trailer to level it for tarping. The second driver returned to his cab, reversed his truck under the bins, and made several brake applications to slide and level the load in his trailer. As he drove forward again, the first truck started to roll ahead at approximately 1.2 mph under the tarping station with the driver still on the trailer. Security camera footage showed that as the truck rolled away, the driver ran on his load from the back of the trailer toward the front trailer ladder before going over the edge and out of view (Photo 11). The truck rolled approximately 30 feet down the road. When it stopped, the rear of the trailer was almost aligned with the tarping station exit (Photo 12 and Diagram). During interviews by investigators, the second driver said he saw the first truck move at the tarping station but was not paying attention to see if the driver was on the load. He did not percieve the movement as a roll away, but assumed the first driver had finished tarping and pulled forward to take a rest break or fill out paperwork. Thinking he saw nothing unusual, the second driver parked his truck under the bins again and resumed loading his trailer. When he finished loading, he saw the first truck still stopped at the tarping station exit. Unable to pull his trailer fully under the tarping station, he backed out from the bins and drove forward on their west side until he was parallel with the first truck. He parked next to the truck for seven minutes but never left his cab or saw the fatally injured driver before departing the mill at 11:51 p.m.

Photos 11 and 12: Red arrows in left photo show front trailer fall protection platform and ladder that driver ran toward while on top of the load at the back of the trailer when rollaway ocurred. Yellow arrow shows the trailer's air and electrical supply lines suspended between the tractor to the trailer. Right photo shows truck's approximate stop location after it rolled away down the paved road's 2% grade.

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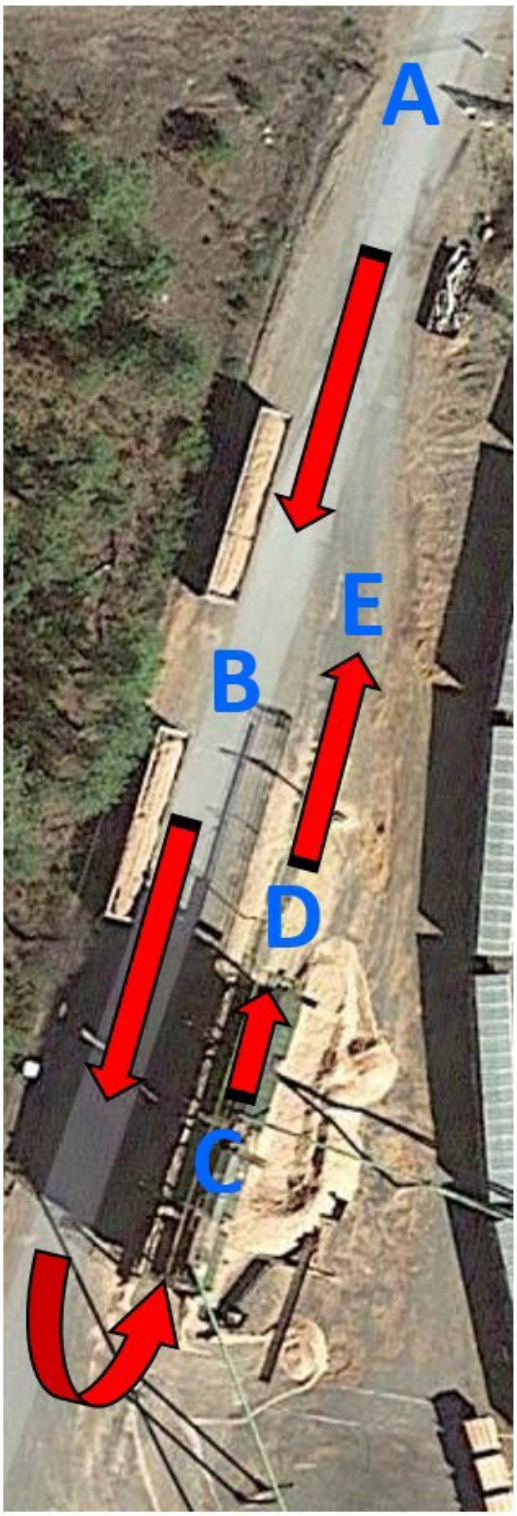

Diagram of incident scene. A) sawmill entrance gate, B) paved road, C) chip bin loading area where second truck parked, D) tarping station where first truck rolled away, E) location where rollaway truck crushed driver and stopped. Arrows show travel path of chip truck from sawmill entrance gate to chip bin and tarping station areas. Image courtesy of Google Maps.

A third truck from the same employer arrived at the sawmill at 1:51 a.m., nearly two hours after the rollaway occurred. As the truck entered the area, the driver saw the rollaway truck still parked with its lights on at the tarping station exit. The truck's engine was not running because an idle shutdown system stopped it after idling in neutral for several minutes. The third driver's attention seized on the rollaway truck's partially levelled load and what appeared to be a chock block laying nearby. He reversed his truck and from his cab window saw the first driver on the ground partially crushed under the tractor's left front drive wheels. The third driver parked his truck, exited the cab, and saw that the first driver was deceased. He called his dispatcher and 911 to report the incident. After police arrived, an area manager and safety supervisor for the employer came to the scene and found the rollaway truck's parking brake released. A body recovery team asked the area manager to back the truck off the driver's body. He reversed the truck four feet to free the body.

Investigators concluded the truck rolled away because when the driver exited his cab to use the fall protection tarping station, he left the truck's engine running with the transmission in neutral and parking brake released while parked on the road with the 2% downgrade (Photos 13-15). As is typical for semi-tractors, the truck's automatic transmission did not have a park position, which made it absolutely necessary to set the brake. The employer conducted a post-incident inspection that found no faults with the truck's air brake system. The driver's pre-trip vehicle inspection report from the day of the incident also indicated the truck was in safe operating order. Maintenance records showed that three months earlier, the incident truck passed a mandatory semi-annual safety inspection per requirements of BC's Commercial Vehicle Inspection Program (CVIP) [B.C. Reg. 2021b]. Around the same time, the brake pads and drums on the tractor's rear drive axle were replaced by a commercial truck maintenance shop in BC. An air brake system regulator was also replaced about two weeks before the incident.

An area manager, safety supervisor, and driver trainer for the employer stated during interviews by the CSHO that they instructed drivers to follow the employer's APP requirement to set their parking brake each time they left the cab, and that drivers were required to shut the truck off and put the ignition key in their pocket if they were going to enter the trailer. They also stated having knowledge of the tarping station road's downgrade but had no way of checking if drivers were regularly using their parking brakes at the location. A driver told the CSHO that he also knew about the downgrade, and that it would immediately cause a truck to roll if the parking brake was not set. Another driver said he believed most drivers disarmed their in-cab alert systems that activated audible alarm signals when a driver left their seat without setting the parking brake. No one knew why the deceased driver failed to set his truck's parking brake, if he was aware of the downgrade, and if his truck had a disarmed parking brake alert system. A safety supervisor also told the CSHO that fewer worksite safety audits took place in the Unites States because not all safety supervisors had work visas to legally travel for work across the border from Canada. Employer records showed that only four audits were made at the incident sawmill in the three month periods before and after the incident date. Out of nine instances where the employer disciplined unsafe drivers in the year leading up to the incident, only one occurred in WA. The fatally injured driver was never audited or evaluated when he worked at the mill.

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Photo 13: Red arrow in top left photo shows approximately where the driver's body was found crushed under the chip truck's left front drive wheels. Yellow arrows show base of front trailer ladder and walkway between cab and trailer that the driver attempted to access as his truck rolled.

Photos 14 and 15: Bottom left photo shows chip truck's transmission shifter set to "N" neutral after the crushed driver was found. The transmission did not have a "P" park position. Bottom right photo shows dashboard instrument panel indicator showing that the truck's transmission shifter was in "N" neutral and parking brake disengaged when the incident occurred.

CAUSE OF DEATH

According to the coroner's report, the chip truck driver died of crush injuries of the head, neck, and torso.

CONTRIBUTING FACTORS

Occupational injuries and fatalities are often the result of one or more contributing factors or key events in a larger sequence of events that ultimately result in the injury or fatality. Washington FACE investigators identified the following unrecognized hazards as key contributing factors in this incident:

- *Uneven road grade at truck tarping station area.*
- *Parking brake rules in Accident Prevention Program (APP) not followed.*
- *Inadequate truck parking brake and wheel chocking policy in APP.*
- *Insufficient safety audits of drivers and customer worksites located abroad.*

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Employers should install electronic parking brake systems that automatically apply the parking brake when the driver has not set it before exiting the cab.

Discussion: An employer's best efforts to establish safe parking brake practices through APP policies and safety training may not guarantee a truck driver will always set their parking brake as required. When this happens it can end in severe or fatal injuries and costly property damage. One of the surest ways to prevent this from happening is to install commercially available electronic parking brake systems. These safety technology systems automatically apply the truck's parking brake when the driver has not set it or has mistakenly released it before exiting the cab. Current system designs replace the truck's parking and trailer brake control valve knobs with ergonomic electronic switches that are wired to servos inside the dashboard that set or release the brakes. Electronic interlocks automatically set the parking brake when sensors detect a driver has left their seat or opened the door before applying the brake. The switches feature built-in LED indicator lights that show the status of the brake in applied or released positions. The technology can be integrated with existing fleet telematics systems to notify managers when a rollaway occurred or almost happened so they can respond appropriately. Drivers should be trained to understand that the automatic parking brake technology is a driver assistance system that does not replace the need to maintain safe driving and parking practices. Drivers should also be trained not to modify or disable any such systems.

Recommendation #2: Employers should develop APP to have a parking brake and wheel chocking policy with strict requirements for preventing rollaways and unsafe rollaway responses.

Discussion: Every trucking company should have an APP or safety program with a clearly written parking brake and wheel chocking policy that has strict rollaway prevention requirements. The policy can be included in an APP chapter that covers hazard prevention and control. It should be based on Job Hazard Anlaysis (JHA) results and information from vehicle manufacturer's instructions and commercial motor vehicle safety research and regulations. At a minimum, a parking brake policy should require all vehicle operators to set the parking brake any time they park. This is safer than only requiring the driver to set the brake when they leave the cab because they may park their truck and stay in the cab to fill out paperwork, make a phone call, take a rest break, or use the sleeper berth. It is more likely in such situations for distraction and loss of situational awareness to occur that can lead a driver to forget to set their parking brake if they subsequently decide to leave their cab, especially if they are fatigued or rushing. If this happens while a truck is parked on a grade, as with the chip truck involved in the incident, then the risk of a rollaway greatly increases.

The parking brake and wheel chocking policy should also require drivers who leave their truck unattended to put their foot on the service brake, place the transmission in neutral, set the parking brake, stop the engine, lock the ignition, and remove the key and place it in their pocket. If parked on any grade, drivers must turn the truck's front wheels to the curb or side of the road and chock at least one tractor drive wheel on each side. This is also a safer practice because an unattended truck parked on a very slight grade with its parking brake disengaged can easily roll away if it is bumped by another vehicle or mobile equipment. As a form of hazardous energy control similar to Lockout/Tagout (LOTO), such procedures are required by state safety rules for workplaces and public roads to control the sudden hazardous release of a vehicle's mechanical energy caused by unexpected vehicle movement [B.C. Reg. 2021c; RCW 1980; WAC 2005; WAC 2017]. Drivers should also be required to check their dashboard parking brake indicator, if equipped with one, before exiting their cab. The policy should plainly state the employer will periodically check the operation of the parking brake alert system or other warning indicators installed on trucks and discipline drivers who disarm or ignore them. Drivers should be trained and evaluated in their knowledge and performance of the parking brake and wheel chocking procedure requirements.

The parking brake and wheel chocking policy should also provide guidance on how to respond if a rollaway occurs. A driver who sees or feels their truck begin to roll while they are outside of their cab may respond in various instinctive ways to try to stop it. However, such responses may be more likely to end in serious injury or death than in safely stopping the truck. Attempting to jump off or onto a truck as it is rolling can end in serious injury or death caused by falling hard on the ground or being struck or crushed by the moving vehicle. If a driver is on top of a rollaway tractor or trailer, and the truck's movement does not present a risk of major injury or death to themselves or bystanders, then they should not attempt to climb down or jump off as doing so may increase the risk of serious injury or death and not allow them to stop the truck anyway. If the driver is outside of or away from the rolling truck, then they should not try to jump into the cab as it would be a serious injury or death risk and unlikely for them to establish three points of contact to enter it safely.

Recommendation #3: Employers should collaborate with owners of remote customer sites outside of their ordinary daily travel range to ensure the sites are safe for their drivers.

Discussion: As lone mobile workers, truck drivers at remote customer sites should have a level of hazard protection that equals the standard maintained at their employer's own facilities. While drivers have the right to refuse working at hazardous job sites on reasonable grounds, a better approach to ensuring safety is active collaboration between the driver's employer and the customer site owner. The goal of collaboration or working together is achieving the most effective methods of hazard prevention that will keep truck drivers safe and business relationships and operations stable. Collaboration involves partnering with customers in developing site hazard identification, assessment, and control methods. Such methods can include designing jobsite hazard analysis forms and checklists for customers to identify unsafe conditions in loading and tarping areas, such as uneven roads, lack of signage, dim lighting, dangerous walking surfaces, erratic traffic patterns, loud noise, and chemical exposure risks. The customer can also be asked to assess job tasks drivers will be completing and equipment they may be using, such as loading from bulk storage bins, climbing ladders to work platforms, and working on fall protection tarping stations.

Employers can request written hazard descriptions, measurements, diagrams, maps, photos, and video to help them assist the customer in assessing the risks that identified hazards present to drivers. This is especially vital at outdoor work areas where continuous exposure to truck traffic and erosive natural forces emphasize the need for frequent site safety audits to identify and address changes in physical workplace conditions that may be diminishing the effectiveness of previously implemented hazard controls at the site. The employer should ask to review the customer's hazard findings and participate in designing corrective action plans and solutions to eliminate or control hazards, such as repaving

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deteriorated or uneven roads and parking areas and installing signs that remind drivers to set their parking brakes and report hazards. The employer and customer can periodically reevaluate their collaborative methods to identify ways to improve them. Employers can describe their approach to collaboration in an APP chapter dedicated to customer site safety, which can also be developed with customer input.

Recommendation #4: Employers should assist their safety supervisors to obtain work visas or hire safety consultants abroad to do safety audits at customer sites in other countries.

Discussion: If feasible, trucking companies that are international carriers should assist their safety supervisors who perform driver evaluations and worksite safety audits to obtain work visas that will permit them to travel to customer sites in other countries. The ability to travel abroad can also allow employers to perform worksite Job Hazard Analyses (JHA) with shippers and customers to jointly ensure safe work conditions for truck drivers working at pick up or delivery sites outside of the employer's home country. Employers can contact the destination country's nearest embassy or consulate to inquire about specific international business travel requirements [Embassy Finder 2022].

If unable to travel abroad, employers can also consider hiring the services of occupational safety and health consultants based in other countries where their drivers routinely work. Consultants provide many services to help manage APPs and can assist employers in determining how to keep their drivers safe where they are working abroad. Before hiring a consultant, it is important to verify their credentials, experience, and qualifications by interviewing them and checking their professional references. Employers should keep records of the consultant's work to satisfy any legal obligations they may have to show that the consultant is qualified or competent to act on their behalf. Consultants can be found by contacting industry associations, health and safety associations, credentialing organizations, and searching the internet [CCOHS 2021].

ADDITIONAL RESOURCES

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WA FACE [2013]. Fatality Investigation: Truck Driver Dies after being Run Over by Propane Transport Rolling Backward at Bulk Plant. Olympia, WA: Washington State Fatality Assessment and Control Evaluation Program.

WA FACE [2019]. Trucking Fatality Narrative: Truck Driver Crushed Between Two Trailers. Olympia, WA: Washington State Fatality Assessment and Control Evaluation Program.

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