



# OPERATING EXPERIENCE SUMMARY

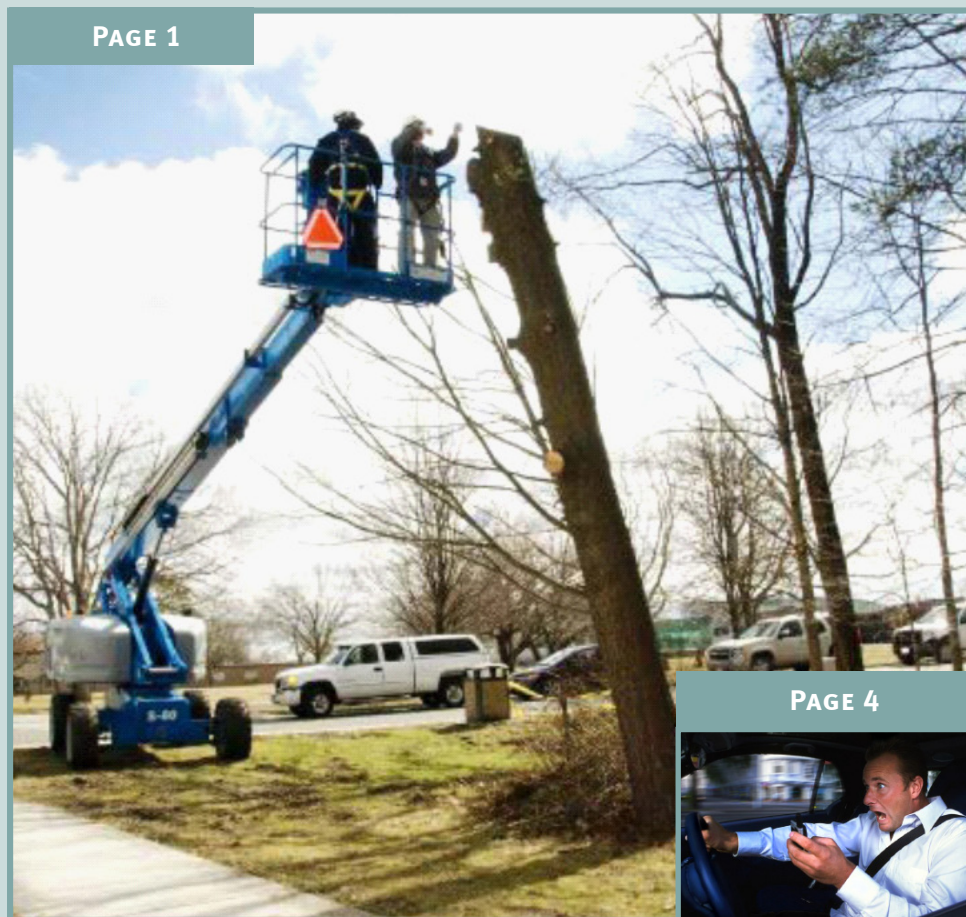


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## Worker Injured While Cutting Down Tree

# 1

*The following article provides a summary of the Accident Investigation Report of an event that took place at the Department of Energy's Brookhaven National Laboratory on March 5, 2011, resulting in the serious injury of a worker who was felling a pine tree from a boom lift 20 feet above the ground. The Accident Investigation Board concluded that this event was preventable. Failure to conduct a thorough hazard analysis, implement effective work controls, and properly train workers were identified as contributing causes.*

*After reading the article, we encourage you to visit the Operating Experience Summary Blog at <http://oesummary.wordpress.com> and rate the article in terms of value to you and provide a comment on the article and/or identify topics that would be of interest to you for future articles.*

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On March 5, 2011, at Brookhaven National Laboratory (BNL), a building and grounds worker, who was cutting down a 60-foot-tall pine tree (Figure 1-1) with a 20-inch gas-powered chainsaw, while elevated in an aerial lift about 20 feet above the ground, was injured when an 8-foot-long, 18-inch-diameter, 520-pound-section of the tree trunk (Figure 1-2) fell toward the lift, struck his right forearm, and compressed it against the top railing of the lift basket. The worker had started cutting the trunk sections at the top of the tree trunk and, as he cut each section, the lift operator lowered the lift and positioned it for the next cut as directed by the worker. Figure 1-3 shows the position of the aerial lift when the accident occurred. The lift operator



**Figure 1-1. Pine tree being felled when accident occurred**



**Figure 1-2. Section of tree trunk that struck worker's arm**



**Figure 1-3. Position of workers and aerial lift when the accident occurred (re-enactment)**

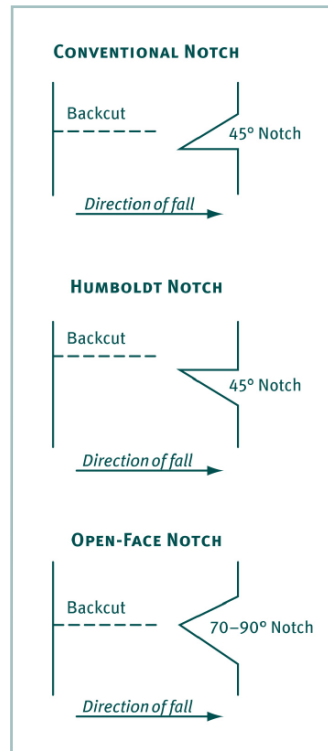
immediately lowered the lift to the ground, and emergency responders transported the injured worker to a local hospital, where he was hospitalized for more than 5 days. All elevated tree work was stopped. Brookhaven Site Office management appointed an Accident Investigation Board to investigate this event to determine the causal factors and develop Judgments of Need (JON). The Board's report can be accessed at [http://www.hss.doe.gov/csa/csp/aip/docs/accidents/typea/BNL\\_Tree\\_Felling\\_Injury\\_Report.pdf](http://www.hss.doe.gov/csa/csp/aip/docs/accidents/typea/BNL_Tree_Felling_Injury_Report.pdf). (ORPS Report SC--BHSO-BNL-BNL-2011-0005)

### Investigation Results

The Accident Investigation Board determined that the direct cause of this accident was the uncontrolled fall of the tree trunk section after it was cut loose from the pine tree. The worker expected the trunk section to fall away from the lift basket after he completed a downward-angled through-cut; however, as he completed the cut, gravity caused the trunk section to fall toward, rather than away from, him. Although notch-cutting (i.e.,

a directional felling cut in the side of a tree) is the primary method professional tree cutters use to fell trees, BNL grounds workers told investigators that they usually cut trunk sections with a single throughcut at an angle that would make the section fall in the chosen direction. Figure 1-4 describes three types of directional notch cuts and shows how they influence the direction of the fall.

The Board determined that the root causes were that hazard analyses and work controls for the tree-felling task were not adequate to protect the workers performing the task. They also determined that department managers and supervisors



**Figure 1-4. Conventional, Humboldt, and Open-Face notches**

did not ensure that the workers assigned to the task had the necessary skills or the knowledge of standard industry practices to recognize unsafe conditions when felling the tree. Contributing causes included (1) identifying the tree-felling task as low-risk work, (2) inadequately communicating expectations about using a work permit to safely plan the task, and (3) not including the hazards of performing the task in an aerial lift in the hazards assessment.

Investigators found that, although the Job Risk Assessment (JRA) discussed the hazards associated with tree felling, it never fully described the cutting methods (i.e., creating a notch) or how to evaluate the way the fall direction and weight of a limb or trunk being felled could affect the task. The JRA also did not include a discussion of the hazards involved

with performing the task while using a chainsaw in an elevated aerial lift. In addition, controls to meet applicable Occupational Safety and Health Administration (OSHA) requirements of Title 29 of the Code of Federal Regulations (CFR), Section 1910.266(h)(2), *Manual Felling*, were not included in the JRA. The textbox shows excerpts from the OSHA requirements that were applicable to the tree-felling task, but were not addressed in the JRA.

The tree-felling work was considered to be a low-risk task that could be performed using “skill of the craft.” The Board determined that the work plan documented only cutting limbs going up the tree and cutting trunk sections going down, clearing cut limbs and debris from around the pine tree, using an aerial lift, and cutting down a nearby cherry tree. The only other comments in the work plan concerned barricading access to the work area and protecting nearby areas. The actual step-by-step instructions and the process or procedure to be followed when cutting the trunk sections were not included in the plan.

**Excerpts from Title 29 of the Code of Federal Regulations, Section 1910.266 (h)(2)(v-vii), *Manual Felling***

- An undercut shall be made in each tree being felled unless the employer demonstrates that felling the particular tree without an undercut will not create a hazard for an employee. The undercut shall be of a size so the tree will not split and will fall in the intended direction.
- A backcut shall be made in each tree being felled. The backcut shall leave sufficient hinge wood to hold the tree to the stump during most of its fall so that the hinge is able to guide the tree's fall in the intended direction.
- The backcut shall be above the level of the horizontal facecut in order to provide an adequate platform to prevent kickback. Exception: The backcut may be at or below the horizontal face-cut in tree pulling operations. This requirement does not apply to open-face felling where two angled facecuts rather than a horizontal facecut are used.





During interviews, two of the workers present at the pre-job brief were asked if there was any direction given on what size or length of tree section should be cut or should not be exceeded when cutting. All of the workers interviewed agreed that the length of tree trunk sections to be cut was not addressed at the toolbox meeting the morning of the accident. When asked if there was a standing rule or understanding about the appropriate length to cut tree sections when using an aerial lift, one worker said it was common to keep the lengths to between 2 and 4 feet, another stated it was between 4 to 6 feet, and a third did not believe there was any informal standing direction or understanding on the length of tree trunk sections that could be cut when using an aerial lift. This lack of clear direction indicated that neither the work plan nor work permit was adequate for the scope of the job.

In interviews with supervisors and workers, the Board learned that the only experience the grounds workers had with tree felling was at BNL and the only tree felling training they received was through viewing videotapes. Despite the lack of a documented training program for the workers involved in felling large trees, they had never had an accident. Based on the interviews, the Board determined that the grounds workers were not adequately aware of or trained on the hazards and controls for felling large trees.

The Board concluded that if a comprehensive hazard analysis would have been performed and corresponding mitigating controls implemented, and if BNL had ensured that the workers were experienced and effectively trained to perform their assigned work, the workers would have been better protected during tree felling work.

## Judgments of Need

The Board identified a number of JONs as a result of this event and the subsequent investigation, including the following.

- Develop and implement both a step-by-step work plan procedure for tree felling and for formal training for grounds workers that incorporate the applicable industry standards and OSHA regulations.
- Develop and implement a JRA for tree felling that details performing work while elevated in an aerial lift and incorporates controls that match all 29 CFR 1910.266(h)(2) requirements and industry safe work practices.
- Revise the “Craft Screen Criteria for Work Permit” to correctly classify tree pruning, trimming, and removal as greater than “low-risk” work.
- Train supervisors, planners, and environment, safety and health subject matter experts to ensure they possess the skills needed to recognize potential hazards and know how to implement the hierarchy of controls for minimizing or eliminating those hazards.

More information is available in the Board’s report, which can be accessed at [http://www.hss.doe.gov/csa/csp/aip/docs/accidents/typea/BNL\\_Tree\\_Felling\\_Injury\\_Report.pdf](http://www.hss.doe.gov/csa/csp/aip/docs/accidents/typea/BNL_Tree_Felling_Injury_Report.pdf).

**KEYWORDS:** Tree, trunk section, aerial lift, uncontrolled fall, injury, through cut, notch cut, gravity, tree felling, trimming, accident investigation, AI

**ISM CORE FUNCTIONS:** Define the Scope of Work, Analyze the Hazards, Develop and Implement Hazard Controls



## Avoid Vehicle Accidents: Stay Focused on Driving

# 2

*The following article discusses the problems associated with distracted or inattentive driving and provides links to informative studies and articles, as well as to the state laws that address distracted driving. Driving distractions can result from focusing on anything inside or outside of the car; however, the use of a cell phone, whether talking, texting, or tweeting, has been found to be the leading cause of distracted driving incidents. Because safe driving is an essential part of worker safety, distracted driving policies and programs should be developed, evaluated for effectiveness, and routinely reinforced by management.*

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On March 24, 2010, the Hanford site submitted an Occurrence Reporting and Processing System (ORPS) report identifying “lack of attention or driver awareness” (i.e., distracted driving) as a contributor to the majority of 14 vehicle incidents that occurred at the site over a 6-month period between August 24, 2009, and February 18, 2010. These accidents were typically “fender benders” (e.g., backing into other vehicles or striking barriers). In one of the accidents, the driver was reaching for something inside the vehicle when he struck an object; in another, the driver was focused on avoiding large ruts in the road and hit a post. This large number of incidents was submitted as a manage-

ment concern and prompted an investigation to determine causal factors and corrective actions. Based on their analysis and interviews, site event investigators determined that, in general, driving is a task where there is inadequate risk perception and that expectations for safe driving had not been made clear to either the workers or management. Corrective actions included updating vehicle hazard information to remind workers that safe vehicle operation, parking, and traffic safety are part of the job activity and discussing travel routes, current conditions, parking options, and other hazards associated with vehicles during pre-job briefings. (ORPS Report EM-RL--MSC-GENERAL-2010-0002)

Being distracted or inattentive while driving is a common occurrence. Distracted driving occurs across all age groups and all modes of transportation, from cars to buses and trucks to trains. Distracted driving involves focusing on almost anything that is inside or outside the car, rather than on the road ahead, and comes in many forms. Figure 2-1 on the following page shows some common types of driver distractions.

According to a Governors Highway Safety Association (GHSA) study, *Distracted Driving: What Research Shows and What States Can Do*, most drivers admit to being distracted between 25 and 50 percent of the time when they are behind the wheel. The GHSA also found that between 15 and 30 percent of drivers involved in vehicle accidents have admitted to being distracted. A link to the GHSA report and to other distracted driving studies and articles, as well as state laws addressing distracted driving, can be accessed from the list below.

### Distracted Driving Online Resources and Articles

- *Distracted Driving: What Research Shows and What States Can Do* (<http://www.ghsa.org/html/publications/pdf/sfdist11.pdf>)
- *Distracted Driving* ([http://www.cdc.gov/motorvehiclesafety/distracted\\_driving/index.html](http://www.cdc.gov/motorvehiclesafety/distracted_driving/index.html))



**Figure 2-1. Examples of distractions/inattention while driving**

- *Statistics and Facts About Distracted Driving* (<http://www.distraction.gov/stats-and-facts/>)
- *DOT: Enforcement Cuts Distracted Driving* (<http://ohsonline.com/articles/2011/07/12/dot-enforcement-cuts-distracted-driving.aspx>)
- *State Laws on Distracted Driving* (<http://www.distraction.gov/state-laws/>)
- *Driver Distractions—Don't Be a Statistic* ([http://www.dmv.ca.gov/pubs/brochures/fast\\_facts/ffdl28.htm](http://www.dmv.ca.gov/pubs/brochures/fast_facts/ffdl28.htm))
- *Driven to Distraction* ([http://topics.nytimes.com/top/news/technology/series/driven\\_to\\_distraction/index.html](http://topics.nytimes.com/top/news/technology/series/driven_to_distraction/index.html))
- *'Don't Text While Driving' Documentary* ([http://www.youtube.com/watch?v=debhwd6ljzs&feature=player\\_embedded#at=90](http://www.youtube.com/watch?v=debhwd6ljzs&feature=player_embedded#at=90))
- *Understanding the Distracted Brain – NSC White Paper* ([http://www.nsc.org/safety\\_road/Distracted\\_Driving/Documents/Dstrct\\_Drvng\\_White\\_Paper\\_1\\_2011.pdf](http://www.nsc.org/safety_road/Distracted_Driving/Documents/Dstrct_Drvng_White_Paper_1_2011.pdf))
- *Understanding Distracted Driving Video Series (YouTube)* (<http://www.youtube.com/playlist?p=PL337F74DED367FDE7>)

## What Distracts Us? Mostly Our Cell Phones

There are three general types of driver distractions: (1) visual (looking away from the road); (2) cognitive (thinking about something other than driving); and (3) manual (fiddling with something other than the steering wheel or gear shift). Drivers can be distracted by items already in a vehicle, like a GPS system or radio, and by items brought into the vehicle like food, pets, and passengers. They also can be distracted by something outside the vehicle, like a billboard or, like the Hanford driver, by a rut in the road. Many distractions last less than a second or two (e.g., adjusting temperature controls); however, those who text or talk while driving can be completely oblivious to their





surroundings and road conditions for long periods of time while engaged in these activities.

**“I won’t text and drive. Instead I’ll just call.”**

The risk of phoning and driving versus texting and driving is less, but it is still a distraction that can lead to accidents.

Making a call or texting on a cell phone involves all three sources of distraction: holding the phone; looking at, touching it to dial or text; then listening to (or reading) and thinking about the conversation.

Using a cell phone, whether talking, texting, or tweeting, is the leading cause of distracted driving. Statistics compiled by the Department of Transportation (DOT) showed that in 2009, 5,474 people were killed and an estimated additional 448,000 were injured on U.S. roadways in accidents that involved distracted drivers. Of those killed in distracted-driving-related crashes, 995 (18 percent) of the fatalities that occurred involved cell phone use.

Because text messaging has grown dramatically—an almost 10,000-fold increase in 10 years—and because there is already near-public consensus that it is a serious driving safety risk, texting receives a great deal of attention. However, National Safety Council (NSC) data, reported in *Understanding the Distracted Brain: Why driving while using hands-free cell phones is risky behavior*, showed that drivers talking on cell phones are involved in more crashes than those who text. More people are talking on cell phones while driving more often, and for greater lengths of time, than they are texting. Thus, in 2008, an estimated 200,000 crashes involved texting or e-mailing, versus 1.4 million crashes involving talking on cell phones.

Drivers using cell phones are four times as likely to cause a crash as other drivers. For those who are talking while driving, their braking time is slower than that of someone with a 0.08 percent blood alcohol level, which is the point at which drivers are generally considered to be intoxicated. A series of articles in the New York Times includes a game that you can

play to measure how your reaction time is affected by external distractions. To test your reaction time, go to <http://www.nytimes.com/interactive/2009/07/19/technology/20090719-driving-game.html>.

Slower reaction time and braking time are underlying factors of crash risk for drivers using cell phones. The other major factor is “looking but not seeing,” which researchers call inattention blindness, similar to that of tunnel vision—drivers look out the windshield, but they do not process everything in the roadway environment needed to effectively monitor their surroundings. Nor do they seek and identify potential hazards and respond to unexpected situations. Estimates indicate that drivers using cell phones “look but fail to see” up to 50 percent of the information in their driving environment.

## Distracted Driving Awareness Across the Complex

The 2010 Department of Energy (DOE) *Annual Occupational Safety and Health Report for Federal Employees to the Secretary of Labor* reported that most DOE sites have some form of motor vehicle safety and distracted driving awareness training and/or initiatives to improve overall motor vehicle safety and lessen distracted driving. Some examples of efforts across the Complex include periodic presentations at all-hands meetings at the Office of River Protection, which focus on distracted driving and other driver safety topics, and informal qualitative field surveys conducted in site parking lots to evaluate cell phone usage. At DOE Headquarters, corporate management for the Office of Information Technology distributed messages to both its Federal and contractor employees regarding motor vehicle safety, including notifying them about the Maryland ban on hand-held cell phone use and texting while driving. Other DOE program offices have used newsletter articles, e-mails, intranet websites, posters, screensavers, safety shares, and similar communications to disseminate information on distracted driving.



## Eliminating Distractions

Curbing distracted driving is an important priority for Federal and state government and for employers across the country. In October 2009, President Obama issued an [Executive Order](#) restricting Federal employees from texting when using government-provided cars or cell phones and when using their own phones and cars to conduct government business, and U.S. Secretary of Transportation Ray LaHood has made distracted driving a top safety priority. As of June 2011, 9 states and the District of Columbia prohibited talking on a hand-held cell phone while driving, 30 states and the District of Columbia prohibited all use of cell phones by novice drivers, 34 states and the District of Columbia prohibited texting while driving, and 7 additional states prohibited texting by novice drivers. Also, according to the National Safety Council, thousands of companies across the country have banned employees from using their cell phones while driving in an effort to improve safety, help limit the liability of employers when accidents do occur, and free employees from feeling pressure to respond to work issues while they are behind the wheel.

As a driver, the most effective way to avoid distracted driving accidents is to stay focused and pay attention while driving. Taking the following precautions while driving will help eliminate distractions.

- Do not use the cell phone while driving. If the phone rings while driving, let it go to voicemail. If the call is urgent, pull off the road and make or take the call. (Note: Some drivers use hands-free devices, but their use is not recommended as it can still be distracting.)
- Do not eat and drink while driving. Eating/drinking is not just one distracting activity, but involves other activities that diminish concentration (e.g., unwrapping food, wiping up any spilled food).

- Do not have lengthy conversations or arguments with passengers. Listening and talking to passengers is a huge distraction. Also, if you have pets in the car, place them in portable pet carriers so their movements are restricted.
- Do not attempt to consult a map, tune the radio, make new entries in a GPS, adjust climate control, or perform similar activities while driving. Wait until you can stop at a traffic light or pull over to a safe location to make the necessary adjustment.

Most importantly, remember that you are accountable not only for your own safety, but for the safety of your passengers, other drivers, and pedestrians. Drive responsibly.

## Recommendations

Managers and supervisors should clearly communicate that safe driving is an essential part of worker safety and point out all forms of risky behaviors behind the wheel. In addition to developing distracted driving policies and programs, it is important to evaluate the effects of such programs on employee knowledge, behavior, and accidents. Although an essential element of any distracted driving program is addressing the dangers of using cell phones while driving, it is equally important to remind drivers that the most effective safe driving measure is to focus solely on driving when they are behind the wheel.

Communications on safe driving should point out that distractions both inside and outside the vehicle (e.g., reaching for an object or focusing on ruts in the road, as was the case in two of the Hanford events) can also lead to accidents. Sites should review their ORPS reports on vehicle incidents to identify where “lack of attention or driver awareness” is a significant contributor to such occurrences. The use of periodic all-hands meetings to reinforce that distracted driving events can and do “happen here,” as well as frequent communications through





methods such as e-mail, newsletters, and posters helps to remind workers of the dangers of distracted driving and reinforces applicable regulations. Safe driving communications should stress that ensuring their own safety, as well as the safety of passengers, pedestrians, and other drivers, whether on a work site or on public roadways, is each driver's responsibility and that even a brief lack of focus while behind the wheel can result in serious injuries or fatalities.

**KEYWORDS:** Distracted driving, vehicle accident, cell phone, texting, talking, state laws, Executive Order, National Safety Council, Governors Highway Safety Association, GHSA

**ISM CORE FUNCTIONS:** Analyze the Hazards, Develop and Implement Hazard Controls, Perform Work within Controls, Provide Feedback and Continuous Improvement



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