OSHA and Logging Safety

Logging Safety

- According to Bureau of Labor Statistics (BLS), logging is still a high hazard industry.
- The tools and equipment which logging employees use or operate, such as chainsaws, feller-buchers, or others pose hazards whenever they are used in logging operations.
- The hazards are even more acute when dangerous environmental conditions are factored in, such as uneven, unstable or rough terrain.
Logging Safety

- BLS indicated that there were 158 fatalities in the logging industry in 1992, which amounts to a 2 in 1,000 risk of death each year.

- NIOSH estimated that there are 16,500 compensable injuries each year in the logging industry. This amounts to an incidence rate of 1 in every 5 loggers.

- According to the USDA, the accident rate in the logging industry has pushed workers’ compensation insurance to 40% of payroll costs.
Logging Safety

- Two measures of logging injuries and illness are particularly useful:
  - OSHA Incidence Rate
  - Lost Workday Case Rate
OSHA Incidence Rate

\[
\text{OSHA Incidence Rate} = \frac{\text{Number of Injuries and Illnesses} \times 200,000}{\text{Total Hours Worked by all Employees during Calendar Year}}
\]

\[
\text{Lost Workday Case Rate} = \frac{\text{Incident Rate of Lost Workdays} \times 200,000}{\text{Total Hours Worked by all Employees during Calendar Year}}
\]

Both rate formulas use 200,000 as the base for 100 full-time Employees working 40 hours per week, 50 weeks per year.
## Comparison of Incidence Rates

Logging vs. major industries in 1991

<table>
<thead>
<tr>
<th>Industry</th>
<th>Total Cases</th>
<th>Lost Workday Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logging</td>
<td>15.6</td>
<td>9.9</td>
</tr>
<tr>
<td>Agriculture</td>
<td>10.2</td>
<td>5.2</td>
</tr>
<tr>
<td>Mining</td>
<td>7.1</td>
<td>4.4</td>
</tr>
<tr>
<td>Construction</td>
<td>12.8</td>
<td>6.0</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>11.2</td>
<td>5.0</td>
</tr>
<tr>
<td>Transportation</td>
<td>9.1</td>
<td>5.3</td>
</tr>
</tbody>
</table>

## Logging Injury Rates

<table>
<thead>
<tr>
<th>Year</th>
<th>OSHA Incidence Rate</th>
<th>Lost Workday Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1989</td>
<td>19.5</td>
<td>11.7</td>
</tr>
<tr>
<td>1991</td>
<td>15.9</td>
<td>10.0</td>
</tr>
<tr>
<td>1993</td>
<td>13.8</td>
<td>8.4</td>
</tr>
<tr>
<td>1995</td>
<td>10.5</td>
<td>6.7</td>
</tr>
</tbody>
</table>

Since 1989, the OSHA incidence rate for the logging industry dropped from 19.5 injuries per 100 full-time workers to 10.5 in 1995. Injuries resulting in lost workdays fell from 11.7 per 100 full-time workers to 6.7 over the same period. (Source: BLS)
### Logging Fatality Data

<table>
<thead>
<tr>
<th>Year</th>
<th>Annual Rate per 100,000 workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>142</td>
</tr>
<tr>
<td>1993</td>
<td>133</td>
</tr>
<tr>
<td>1994</td>
<td>130</td>
</tr>
<tr>
<td>1995</td>
<td>101</td>
</tr>
</tbody>
</table>

The fatality census has been conducted in all 50 states. Logging fatality rate has declined steadily in recent years. (Source: BLS)
## Causes of Logging Fatality

<table>
<thead>
<tr>
<th>Cause</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Falling objects</td>
<td>636</td>
<td>50</td>
</tr>
<tr>
<td>Machinery</td>
<td>185</td>
<td>14</td>
</tr>
<tr>
<td>Motor Vehicles</td>
<td>183</td>
<td>14</td>
</tr>
<tr>
<td>Caught in/Between</td>
<td>114</td>
<td>10</td>
</tr>
<tr>
<td>Other Causes</td>
<td>64</td>
<td>5</td>
</tr>
<tr>
<td>Environmental</td>
<td>38</td>
<td>3</td>
</tr>
<tr>
<td>Falls</td>
<td>25</td>
<td>2</td>
</tr>
<tr>
<td>Electrocution</td>
<td>16</td>
<td>1</td>
</tr>
<tr>
<td>Unknown</td>
<td>17</td>
<td>1</td>
</tr>
</tbody>
</table>

Causes of Logging Fatality

- 50% of logging fatalities resulted from “being struck by a falling object”.
- The next three groups (machinery, motor vehicle and caught in, under, or between objects) accounted for another 38% of all non-managerial worker deaths.
Logging Fatality Distribution by Region

<table>
<thead>
<tr>
<th>Region</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>99</td>
</tr>
<tr>
<td>II</td>
<td>339</td>
</tr>
<tr>
<td>III</td>
<td>143</td>
</tr>
<tr>
<td>IV</td>
<td>394</td>
</tr>
<tr>
<td>V</td>
<td>87</td>
</tr>
<tr>
<td>VI</td>
<td>169</td>
</tr>
<tr>
<td>VII</td>
<td>254</td>
</tr>
<tr>
<td>VIII</td>
<td>167</td>
</tr>
</tbody>
</table>
Logging Fatality Distribution

- Logging industry has an annual fatality rate far exceeds the national average of seven deaths per 100,000 workers.
- Two regions with the highest fatality rates, the Central and East, are areas with a heavy concentration of hardwood sawtimber.
  - Terrain is often sloped and rough
  - The harvesting method is often diameter-limit or single-tree selection cuts
  - Chainsaw felling is a common felling method
### Factors Associated With Logging Safety

<table>
<thead>
<tr>
<th>Lower Risk?</th>
<th>Higher Risk?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Softwood harvesting</td>
<td>Hardwood harvesting</td>
</tr>
<tr>
<td>Pulpwood harvesting</td>
<td>Sawtimber harvesting</td>
</tr>
<tr>
<td>Clearcuts</td>
<td>Selective cuts</td>
</tr>
<tr>
<td>Plantation stands</td>
<td>Natural stands</td>
</tr>
<tr>
<td>Mechanized harvesting</td>
<td>Manual harvesting</td>
</tr>
<tr>
<td>Level terrain</td>
<td>Steep terrain</td>
</tr>
<tr>
<td>Safety regulations</td>
<td>No safety regulations</td>
</tr>
</tbody>
</table>
OSHA

- Safety regulations and training are believed to be the most important factors to influence the logging accidents.
- OSHA (Occupational Safety and Health Administration) is a national logging safety standard.
OSHA

- New OSHA logging standards have been effective since 1995. The old OSHA of 1971 was replaced.
- All logging operations, regardless of the product produced, are covered.
- The new standards do not cover:
  - the construction or
  - use of cable yarding (which are detailed in state logging safety standards in most Western states)
Employer Rights

- Employers must be certain that their workers know their rights under OSHA.
- Two of the most important employee rights are:
  - the right to complain to OSHA about alleged safety or health problems and to request an OSHA inspection
  - the right to be provided a copy of the OSHA Act or the OSHA safety standards on request to the employer.
OSHA Coverage

- All logging operations with employees are covered.
- Employers of eleven or more workers must keep injury records and submit them to OSHA.
Contents of OSHA

- General Requirements
- Hand and Portable Power Tools
- Machines
- Vehicles
- Tree Harvesting
- Training
Personal Protective Equipment

The employer shall assure and provide that:

- **Condition**: the PPE is in a serviceable condition.
- **Inspection, Repair, Replacement**: inspect it before initial use.
- **Leg protection**: especially for chainsaw operator.
- **Foot protection, hard hats, eye and face protection**.
First Aid Kits

- The employer shall provide first-aid kits
  - at each site where felling is being conducted,
  - at each landing, and on each employee transport vehicle
- Minimum contents shall be contained.
- The employer shall maintain the contents of each first-aid kit in a serviceable condition.
Work Areas

- Employees shall be spaced
  - the duties of each employee shall be organized
  - so the actions of one employee will not create a hazard for any other employee.

- Work areas shall be assigned
  - so that tree can not fall into an adjacent occupied area
  - the distance between adjacent occupied work areas shall be at least two tree lengths of the trees being felled.

- Each employee shall work in a position or location that is within visual or audible contact with another employee.
Chain Saws

- Saw chains are in a proper adjustment.
- Chainsaw mufflers are operational and in place.
- Chain brakes and nose shielding devices are in place and function properly.
- Cutting edges are sharp and properly shaped.
Chain Saws

- Each chainsaw shall be equipped with a protective device
  - To minimize chain-saw kickback
  - No chainsaw kickback device shall be removed or otherwise disabled.
- The chainsaw shall be operated and adjusted in accordance with the manufacturer’s instructions.
- The chainsaw shall be started with the chain brake engaged.
Chain Saws

- Prior to felling any tree, the chainsaw operator shall clear away brush or other potential obstacles which might interfere cutting the tree or using retreat path.
- The chainsaw shall not be used to cut directly overhead.
- The chainsaw shall be shut off or at idle before the feller starts his retreat.
- The chainsaw shall be shut down or the chain brake shall be engaged whenever a saw is carried further than 50 feet.
Machines

- OSHA defines “machines” as “a piece of self-propelled stationary or mobile equipment that is operated off-road and used for the movement of material”.

- Machines include but not limited to:
  - Tractors, skidders, front-end loaders, bulldozers
  - Swing yarders, and mechanical felling devices, such as tree shears and feller-bunchers.
Machine Operation

- The machine shall be started and operated by a designated person.
- Stationary logging machines and their components shall be anchored or otherwise stabilized.
- The rated capacity of any machine shall not be exceeded.
- The machine shall be operated at such a distance from employees and other machines such that operation will not create a hazard for an employee.
- No employee shall ride on any load.
Protective Structures

- Each feller-buncher, harvester, skidder, forwarder, loader placed into initial service after Feb. 9, 1995 shall be equipped with:
  - falling object protective structure (FOPS) and/or
  - rollover protective structure (ROPS)
- The employer shall replace FOPS or ROPS which have been removed from any machine.
Protective Structures

- ROPS shall be installed, tested, and maintained in accordance with SAE J1040 “Performance Criteria for ROPS”.
- FOPS shall be installed, tested and maintained in accordance with the SAE J231 “Minimum Performance Criteria for FOPS”.
- ROPS an FOPS shall meet the requirements of the SAE J397 “Deflection Limiting Volume …”.
- Each protective structure shall be of a size that does not impede the operator’s normal movements.
Machine Access

- Machine access systems shall be provided for each machine.
- The walking and working surface of each machine shall be kept free of waste, debris, and any other material which might result in fire, slipping, or falling.
Vehicles

- “Vehicle” is defined by OSHA as “a car, bus, truck, trailer, or semi-trailer that is used for transportation of employees or movement of material.”
- Some standards which apply to machines also apply to vehicles.
Tree Harvesting

- Trees shall not be felled in a manner that may create a hazard for an employee.
  - such as but not limited to striking a rope, cable, power line, or machine.

- While manual felling is in progress, no skidding or yarding machine shall be operated within two tree lengths of trees being manually felled.

- No employee shall approach a feller closer than two tree lengths of trees being felled.
Tree Harvesting

- Similarly, no employee shall approach a mechanical felling operation closer than two tree lengths of the trees being felled until the machine operator has acknowledged that it is safe to do so.
- Each danger tree shall be felled, removed or avoided.
Tree Harvesting

- Felling on any slope where rolling or sliding of trees or logs is reasonably foreseeable shall be done uphill from, or on the same level as previously felled trees.
- Domino felling of trees, including danger trees, is prohibited.
Tree Harvesting

- "Danger tree" is defined by OSHA as:
  - "a standing tree that presents a hazard to employees"
  - "due to conditions such as deterioration or physical damage to the root system, trunk, stem or limb."

- "Domino felling" is defined by OSHA as:
  - "the partial cutting of multiple trees which are left standing and then pushed over with a pusher tree."
Manual Felling

- Before felling is started, the feller shall plan and clear a retreat path.
- Before each tree is felled, the following conditions should be evaluated:
  - snow and ice accumulation,
  - the wind,
  - the lean of tree,
  - dead limbs, and
  - the location of other trees
- Precautions should be taken so a hazard is not created for an employee.
Bucking and Limbing

- Bucking and limbing on any slope where rolling or sliding of trees or logs is reasonably foreseeable:
  - shall be done on the uphill side of each tree,
  - unless the worker demonstrates that it is not feasible to buck or limb on the uphill side
In-woods Chipping

- Infeed and discharge ports shall be guarded to prevent contact with the disc, knives, or blower blades.
- Detached trailer chippers shall be choked during usage on any slope where rolling or sliding of the chipper is reasonably foreseeable.
Skidding

- No log shall be moved until each employee is in the clear.
- No load shall exceed the rated capacity of the machine.
- Each choker shall be positioned near the end of the log or tree length.
- Each machine shall be positioned during winching so the machine and winch are operated within their design limits.
Loading and Unloading

- The transport vehicle shall be positioned to provide working clearance between the vehicle and the deck.
- Only the loading or unloading machine operator shall be in the work area during loading and unloading.
- No transport vehicle operator shall remain in the cab during loading and unloading if the logs are carried or moved over the truck cab.
Training

- Training is an important measure to take to prevent logging accidents.
- The employer shall provide training for each employee, including supervisors, at no cost to the employee.
Training Frequency

- Prior to initial assignment for each new employee.
- Whenever the employee is assigned new work tasks, tools, equipment, machines or vehicles.
- Whenever an employee demonstrates unsafe job performance.
Training Contents

- Safe performance of assigned tasks;
- Safe use, operation and maintenance of tools, machines, and vehicles;
- Recognition of safety and health hazards associated with the employee’s tasks;
Training Contents

- Recognition, prevention and control of other safety and health hazards in the logging industry;
- Procedures, practices and requirements of the employer’s work site; and
- The requirements of this standard.
Training

- The employer shall assure that each employee, including supervisor, receives or has received first-aid and CPR training.