



t r e e w o r k



a c c i d e n t s



**a n a n a l y s i s o f f a t a l
a n d s e r i o u s i n j u r i e s**



tree work accidents

tree work accidents

Tree work is dangerous work. The Health and Safety Executive (HSE) has published this booklet to highlight the high level of injuries in forestry and arboriculture. It describes some of the all too common accidents HSE has investigated and how, by taking simple precautions, employers, employees and the self-employed can protect against risks to health and safety.

The immediate pain and trauma of an incident are obvious, but it is the long-term consequences that really hurt. Serious injuries can result in lifelong disability and temporary or sometimes permanent loss of income. Where the injuries are fatal, family and friends also have to deal with the severe emotional trauma of suddenly losing a loved one.

HSE has completed an analysis of injuries reported from the forestry and arboriculture industries between 1990 and 1996. During those 6 years, 38 people were killed (an average of 6 per year). We also estimate that in those 6 years:

- there were 1800 major injuries (an average of 300 per year); and
- a further 4800 injuries (an average of 800 per year) which were not major injuries but resulted in workers having to take 3 days or more off work.

Major injuries include: fracture other than to fingers, thumbs or toes; amputation; dislocation of shoulder, hip, knee or spine; any other injury requiring admittance to hospital for more than 24 hours.

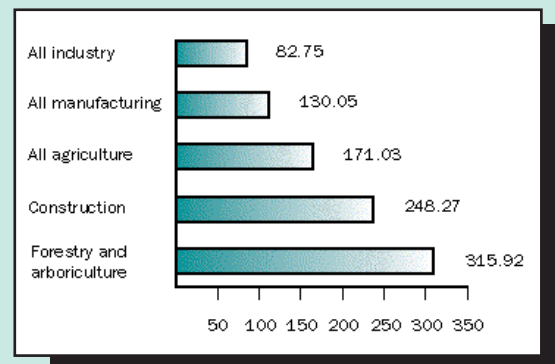
The odds of someone in forestry and arboriculture sustaining a fatal or major injury in any one year are now estimated to be worse than 1 in 120.

As shown on the chart below, the full seriousness of the situation is revealed when this is compared with other industries.

It is time for everyone who works or has an interest in forestry and arboriculture to ensure that adequate resources (ie time, money and effort) are devoted to health and safety. Make this a lifelong priority - not a lifelong regret.

Comparison of industry injury rates

Average fatal and major injury rates per 100 000 employees (1990/91 - 1995/96)



Labour Force Survey indicates under-reporting of non-fatal accidents to be 75% for employees and at least 90% for self-employed workers.



dangers of chainsaws



tree work accidents

*Chainsaws have the potential to cause horrific injuries. By law, chainsaw operators must have received adequate training relevant to the type of work they undertake. They are also required to wear appropriate chainsaw protective clothing **whenever** they use a chainsaw.*

An employee of a landscaping company cut his left leg with a hired chainsaw while felling trees on a fencing job. He had not received adequate training in the use of a chainsaw and had declined the offer of chainsaw protective clothing made by the hire shop.

Anyone who uses a chainsaw at work must be trained. No matter how small the job, always wear the correct chainsaw personal protective equipment.

A self-employed forestry worker was struck in the face by a chainsaw. He was snedding windblown trees and stumbled as he moved position. In bracing himself for the fall he squeezed the throttle trigger; the guide bar tip touched a tree and the saw kicked back up under his helmet.

Always apply the chainbrake on the chainsaw when moving between tasks.

A trainee arborist needed 35 stitches to his left arm after it came into contact with the running chain on a top-handled chainsaw. He had failed to position himself correctly in the tree. To steady his position, he placed his free hand below and in line with the cut he was making on the branch. When the saw completed the cut, it dropped through onto his arm.

Top-handled chainsaws should only be operated by arborists who have undergone specific training in their use. Where possible, top-handled chainsaws should always be held with both hands. Poor positioning in the tree is not an excuse for one-handed use.

A self-employed arborist cut the tendons and artery in his forearm when he tripped while de-limbing a felled tree in a domestic garden. He was using a top-handled chainsaw one-handed.

Top-handled chainsaws are designed to be used up in trees. He should have used a conventional chainsaw when working on the ground.

An employee arborist suffered a chainsaw laceration to the back of his left leg during tree pruning work. His employer had provided him with chainsaw protective trousers which only had protective material on the front of the legs.

Arborists working in trees should always use chainsaw protective trousers with protective material covering the full length of both the front and back of the legs and extending up to the waist at the front.





preventing falls from trees

tree work accidents

Working in trees requires specialist training and a disciplined approach to the work. A full risk assessment needs to be made of each work site. Appropriate use of mobile elevated work platforms can reduce the risks to which climbers are exposed. Where ropes and harnesses are used, the equipment needs to be in first-class condition.

An experienced employee arborist was off work for six months, having suffered a fractured and dislocated right shoulder, a dislocated left shoulder and breaks to his jaw, ribs, wrist, kneecap and leg when he fell 10 m out of a tree on to a road. He cut through the branch to which he was anchored.

He should not have anchored himself to the branch on which he was working.

A self-employed arborist was working alone felling a large fir tree in a private garden. He was found with multiple injuries at the base of the tree, without a harness or other protective equipment. He never regained consciousness and died four days later in hospital.

Never 'free climb' trees. Always ensure that your means of access is secure. There should always be at least two trained climbers for any tree work involving access by rope and harness.

A trainee arborist on college placement damaged his back when he fell 10 m out of a tree, having cut through his climbing rope with a chainsaw.

Keep climbing ropes and equipment clear of chainsaws. Use supplementary anchor points where possible.

A local authority arborist fell from a ladder when removing the lower limbs of a tree during dismantling. The ladder was supported on the branch he was cutting. As he cut through a section of the branch, it swung down and knocked the ladder away from beneath him. The ladder was not secured to the branch, nor was the chainsaw operator roped into the tree.

Both the arborist and the ladder should have been secured to the tree.

A self-employed arborist fell 11 m out of a tree and fractured his pelvis when the branch he was using as his primary anchor point broke. The branch clearly showed signs of decay.

When planning work on trees, they must be assessed for disease and decay. A mobile elevating work platform should be used for trees that are not safe to climb. When climbing, always assess the reliability of an anchor point before use. If a reliable anchor point is not available, do not climb.



processing and landscaping work



tree work accidents

Processing timber products (both wanted and unwanted) often involves using machines with high-speed cutters that saw, chop and grind wood. Although not often fatal, injuries on processing equipment often involve the amputation of fingers and toes. Operators need to be trained in the dangers associated with a particular machine and the precautions which need to be followed to reduce the risk of injury. This includes the setting and use of guards, and the use of safety devices such as log grippers and push sticks.

He was able to touch the blades because the guarding on the chute had been removed. Keep guards in place.

A stump grinder operator required extensive surgery following severe lacerations to the instep of his left foot when it contacted the grinding wheel of a stump grinder. The guard of the grinding wheel was not fitted, the brake was incorrectly adjusted and no stopping device was provided at the operating position.

Make sure that guards stay in place and that equipment is properly maintained.

A 17-year-old casual worker sustained serious injuries to his left leg and ankle from a clearing saw operated by a fellow employee.

He had not received any instruction about the dangers of clearing saws and how to approach people using them.

A self-employed forestry contractor amputated the tips of three fingers on his right hand when sawing logs for fencing stakes on a circular saw bench.

No push stick was available to guide the fencing stakes through the saw blade.

A self-employed forestry contractor required skin grafts to lacerations on the base of his right foot. He used it to push brush into the feed chute on a wood chipper.

Always use another piece of wood to feed short brush into wood chippers.

An employee of an arboriculture company had to have the index and middle fingers of his right hand surgically removed, following contact with the rotating blades of a wood chipper.





falling trees and branches

tree work accidents

Falling timber is a major cause of serious and fatal injuries in forestry and arboriculture. Training in, and practice of, correct felling techniques would have meant that many of the dangerous situations described here would not have occurred in the first place. When they do occur, it is vital that people are trained to recognise the risk they pose and use safe systems of work to deal with the danger. Failure to do so often results in people being killed.

A self-employed forester was killed trying to dislodge a hung-up tree by felling another tree on top of it. When the second tree struck the hung-up tree it slid down the trunk and knocked him to the ground, crushing his chest.

Felling another tree to dislodge a hung-up tree is a recognised dangerous procedure - use a winch or cant hook to dislodge hung-up trees.

A forestry chainsaw operator who had been trained in safe felling of hung-up trees suffered a broken back and broken cheekbone while working beneath a tree. It had been left in a hung-up position when it fell on top of him.

Always bring down hung-up trees as soon as possible and never work beneath them.

A self-employed chainsaw operator died when trying to fell the supporting tree on which another tree had become hung-up.

This is a recognised dangerous practice. Using a safe system of work would have saved this man's life.

A ground worker in a tree surgery team suffered a broken leg when dragged into a tree while lowering timber on a rope. The branch was too heavy for him to control safely.

Always plan a system of work for lowering cut branches. Using a mechanical (eg a capstan) lowering system would have allowed the branch to have been lowered safely.

A forestry worker member of a team undertaking sample felling had his shoulder broken when he was hit by a tree as it was felled by a fellow worker.

If they had followed the two tree length rule the worker would not have been in the danger zone when the tree was being felled.

An untrained employee of an arboricultural company sustained six fractured vertebrae when struck by a hung-up tree. He had felled the tree earlier in the day but it had failed to fall cleanly to the ground and he left it hung-up. When working beneath it later in the day it suddenly fell. He was off work for six months.

Accurate felling is a skilled job. Had the employee received adequate training in correct felling techniques, it is more than likely that the tree would not have become hung-up in the first place.

A self-employed forestry contractor was killed by a falling tree during felling operations. The tree was hung-up and he tried to dislodge it by felling a second tree on top of the first. This failed to bring down the first tree and ended up on the ground beneath the hung-up tree. While he was snedding the second tree, the first fell on top of him.

Do not try to dislodge hung-up trees by felling another one on top of the first. Never work beneath a hung-up tree.



o v e r h e a d p o w e r l i n e s



tree work accidents

Electricity supply lines represent a particular danger for people working in forestry and arboriculture. In some of the examples below no one was hurt, but in others, workers were killed outright.

An 11 000 V power line was brought down during work to keep the lines clear of trees. The operator tried to top a tree without assistance.

He failed to follow established procedures and put himself and others at risk.

A self-employed tree surgeon was electrocuted when the hydraulic platform he was using contacted 11 000 V overhead power lines as he manoeuvred it into position.

Never operate machines with extending hydraulic arms within 9 m of overhead power lines on wooden poles, or within 15 m of lines on steel towers, unless they have been specially adapted for protection against electrical hazards.

The operator of a tree harvester brought down two conductors of an 11 000 V cable when moving his machine from one site to another. Luckily he was not injured.

Landowners should maintain accurate maps showing where power lines cross their land and, where necessary, liaise with the managers of contractors to ensure that adequate protective measures are taken to avoid contact.

A forestry contractor felling a standing sale site received severe burns to his hands and feet when he tried to remove a tree that he had felled onto a 33 000 V overhead power line.

The purchaser of the standing timber on the site should have specified the precautions to be taken to avoid risks from the power line.

A tree surgeon was electrocuted when pruning trees in a private garden, using an aluminium ladder for access. The branches of the trees were within 2 m of an 11 000 V overhead power line. A 2.5 m section from the top of the tree fell against the lines and he was electrocuted.

The power should have been disconnected while the work was being carried out.





forestry sites on slopes

Much forested land in Great Britain is located in upland areas. Often the terrain is boggy and strewn with rocks. Machines need to be well maintained to remain safe and viable in these conditions. Those responsible for planning work on forestry sites need to assess slopes, select equipment which can safely work the site and designate safe routes of access across the area.

A forwarder operator suffered a broken arm and broken ribs as he was thrown out of the cab door of his forwarder. He lost control when taking a short cut down a 10-15° slope. Faults found on the equipment included no seat belt, controls not clearly marked in English, a window missing from the cab door and minimal tread on the tyres.

Keep to agreed routes when working on slopes. Ensure that your equipment can cope with the conditions and is well maintained.

A self-employed timber merchant suffered a fractured skull, punctured lung and broken bones when his skidder overturned on a 26° forest slope which had been recently clear felled. The handbrake was disconnected and both the footbrakes were ineffective, nor was a seat belt fitted.

It is vital to have well-maintained brakes. Wearing a seat belt ensures that you stay in your seat if the machine were to overturn.

A forestry contractor sustained a broken pelvis and ribs after his ATV somersaulted forward after hitting an obstruction at low speed on a 30° slope. The machine was being used for transporting fence stakes to a remote area.

Ensure that operators are trained and that any loads which are carried or towed are within the capabilities of the machine.

A self-employed forestry contractor was killed clearing brush from around a timber stacking area. He reversed over the boundary of the area and overturned down a 35° slope. The tractor was not fitted with any roll-over protection.

Only forestry tractors which are fitted with roll-over protection should be used for working on or near slopes which pose a risk of overturn.



mechanical harvesting and extraction



tree work accidents

Modern forestry machines are highly complex pieces of equipment. Make sure they are properly adapted for the forest environment. Operators should be trained to safely operate and maintain their machines. Main contractors need to co-ordinate the activities of their sub-contractors on forestry work sites, so that no one's health and safety is put at risk.

A machine operator had his left leg fractured in three places while operating a 360° excavator fitted with a log grab, when a log was ejected into the cab.

The machine had no windscreen and was not fitted with falling object protection. Make sure machines are properly adapted.

A skyline chokerman sustained multiple injuries when he was struck by two trees when he was radioing to the winchman to haul-in. He did not check the risk zone created by the movement of the trees.

Always position yourself away from moving timber and wire ropes, and assess the likely path of materials before hauling-in.

A self-employed forwarder operator trying to de-bog a fellow contractor's tractor and winch had his leg drawn into the revolving rear wheel axle as he sat in the driver's seat. His leg was pulled in by a log he had chained to the wheel. The injuries were so severe that his lower leg had to be amputated.

The tractor was in an exceptionally poor state of repair with no mudguards or roll bar.

A self-employed forestry contractor was killed while attempting to replace one of the two electrical sensors inside the measuring wheel on the head of his tree harvester. He caused a short circuit, which activated control valves of the knives causing them to close, crushing him to death.

Always turn the machine off, set the controls to neutral and dump the hydraulic pressure before working on any control system on a forestry machine.

A lorry driver suffered two broken ribs after falling 4 m from the operating position. The king post failed on his lorry loader while loading logs from the side of a forest road.

The king post had already been welded. Make sure that any alterations or repairs to the structure or fabric of forestry machines is done by competent welders/engineers and the machine is re-examined before use.





fu r t h e r r e a d i n g

tree work accidents

HSE publications

Chainsaws at work INDG317
HSE Books 2000

Farm and estate forestry operations
AS15 (rev) HSE Books 1996

Working alone in safety INDG73 (rev)
HSE Books 1998

*Watch your back: avoiding back strain in
timber handling and chainsaw work*
INDG145 HSE Books 1993

The future availability and accuracy of the references listed in this publication cannot be guaranteed.

AFAG forestry leaflets

A new range of forestry and arboriculture leaflets produced by the Arboriculture and Forestry Advisory Group (AFAG) has been published by the Health and Safety Executive.

AFAG was set up by the Health and Safety Commission's Agriculture Industry Advisory Committee (AIAC) to deal specifically with arboriculture and forestry. Members are from across the forestry and arboriculture industry, with representatives from major industry bodies and organisations. AFAG agreed to take on aspects of the work that would have disappeared with the loss of the Forestry and Arboriculture Safety and Training Council (FASTCo), in particular to update and replace the series of free FASTCo safety guides.

The new AFAG leaflets are designed to give the same practical guidance as the old guides, now revised and updated, and to operate as checklists for employers, supervisors and the self-employed. The FASTCo numbering system has also been retained, but with the prefix 'AFAG' (eg AFAG301), so everyone who was familiar with the old series should be able to easily identify the relevant new leaflet.

Single free copies of the leaflets are available by mail order from HSE Books. They are also available in priced packs of 15 or can be printed direct from HSE's website at www.hse.gov.uk/pubns/forindex.htm.



further information



tree work accidents

HSE priced and free publications are available by mail order from HSE Books, PO Box 1999, Sudbury, Suffolk CO10 2WA
Tel: 01787 881165 Fax: 01787 313995
Website: www.hsebooks.co.uk (HSE priced publications are also available from bookshops and free leaflets can be downloaded from HSE's website: www.hse.gov.uk.)

For information about health and safety ring HSE's Infoline Tel: 08701 545500
Fax: 02920 859260
e-mail: hseinformationservices@natbrit.com
or write to HSE Information Services,
Caerphilly Business Park, Caerphilly
CF83 3GG.

This leaflet contains notes on good practice which are not compulsory but which you may find helpful in considering what you need to do.

© *Crown copyright* This publication may be freely reproduced, except for advertising, endorsement or commercial purposes. First published 6/98. Please acknowledge the source as HSE.



