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Tractor units in tree work
Extraction by skidder
Extraction by forwarder
ATV quad bikes
All-terrain vehicles
Emergency planning
Electricity at work: Forestry and arboriculture
Training and certification
First aid at work: Your questions answered
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AFAG804
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Winching operations in forestry
(Forestry Commission Technical Guide FCTG001) 085538638X

Notes

Name:.....
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Further information

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

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Debogging and recovery of forestry machines



Introduction

This leaflet covers the safe working practices to be followed when recovering machines that have become bogged down during forestry and other tree work.

You can use this leaflet, along with the machine and equipment manufacturer's handbook(s), as part of the risk assessment process to help identify the controls to put in place when recovering or debogging machines.

For guidance on using chainsaws during recovery operations see AFAG leaflet 301 *Using petrol-driven chainsaws*. When using quad bikes and ATVs see AFAG leaflets 701 *ATV quad bikes* and 702 *All-terrain vehicles*. For use of wire-handling safety gloves see AFAG leaflet 104 *Fencing*. When working near power lines, see AFAG leaflet 804 *Electricity at work: Forestry and arboriculture*.

All operators must have had appropriate training in how to operate the equipment and how to carry out the tasks required (see AFAG leaflet 805 *Training and certification*).

For further information see Forestry Commission Technical Guide FCTG001 *Winching operations in forestry*, which includes information on how to calculate winch forces.

Personal protective equipment (PPE)

- 1 Use the following PPE:
 - Safety helmet (complying with EN 397), if identified as required by the risk assessment.
 - Hearing protection (complying with EN 352), where the noise levels exceed 85 dB(A) (see HSE pocket card INDG363 *Protect your hearing or lose it!*).
 - Eye protection (a mesh visor to EN 1731 or safety glasses to EN 166).
 - Suitable protective gloves when handling materials such as fuel, ropes or chemicals.
 - Protective boots with good grip and ankle support (complying with EN 20345).
 - Non-slag outer clothing appropriate to the prevailing weather conditions. High-visibility clothing (complying with EN 471) should be worn when the risk assessment identifies that it is needed.
- 2 A first-aid kit should be available in site vehicles, however personal first-aid kits including a large wound dressing should be carried if working away from the vehicles (see HSE leaflet INDG214 *First aid at work: Your questions answered*).
- 3 Hand-cleaning material such as waterless skin cleanser or soap, water and paper towels should be readily available.

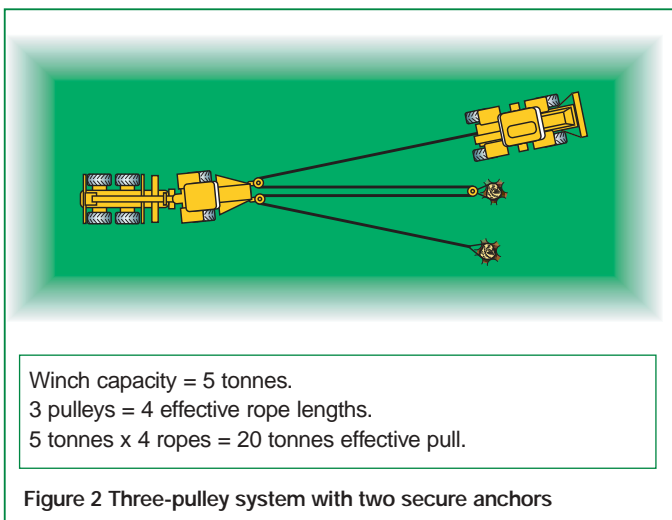
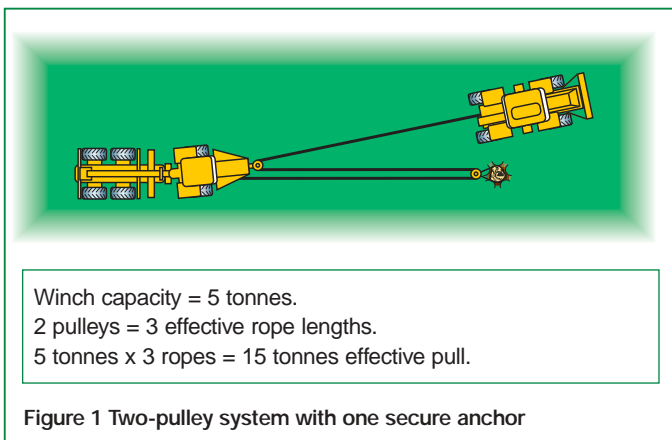
General advice

- 4 Plan travelling routes and avoid, or thatch, any wet or rutted areas. If in doubt, use an alternative route where available and be prepared to stop work if the site becomes too wet.
- 5 **When traction is lost, stop the machine sooner, rather than later.** The deeper you are bogged in, the greater the forces needed for recovery and as a result the greater the risk of injury, equipment failure or damage.
- 6 If a machine becomes bogged the operator should do the following:
 - Stop all drive to tracks and/or wheels.
 - Make the machine safe.
 - Dismount the machine safely (eg climb off it on the high side when on a slope, if practicable).
 - Assess the situation. Advise the 'site safety co-ordinator' and arrange for any assistance that is required.
 - Consider anything that may help with recovery (eg partial or full unloading).
 - Consider emergency drainage, if safe to do so, where the engine or its components may be damaged by ponded water.
- 7 An emergency pollution kit should be available for spills of fuel, oil or chemicals.

Equipment

- 8 Inspect equipment in accordance with the manufacturer's instructions. Always check for damage or 'end of life' condition before use. Destroy and discard equipment that is not serviceable.
- 9 Ensure all ropes/cables, strops, hooks, eyes, shackles and winches are compatible with each other and suitable for the intended operation.
- 10 Ensure all the debogging components, eg pulleys, shackles, hooks and strops have their safe working load (SWL) clearly marked. Keep a certificate (or copy) with the debogging kit stating the SWL of the wire ropes. Ensure any safety devices such as shear pins are correctly fitted.
- 11 Check that all components of the debogging system and all other necessary aids such as tool kits are present before starting a recovery or debogging operation.
- 12 The debogging system set-up must be able to safely generate enough force to move the weight of the machine plus any other calculated factors such as rolling resistance, gradient resistance and locked wheel resistance. Examples may be calculated to determine the force required for typical scenarios but an on-site calculation should be made once all factors have been assessed.

- 13 Do not exceed the SWL of the set-up under any circumstances. Where necessary use appropriate calculations to ensure this does not happen (see Forestry Commission Technical Guide FCTG001 *Winching operations in forestry*). Note that the use of multiple pulley set-ups can expose components to loading greater than the rated capacity of the winch (see Figures 1 and 2). Load monitoring devices can be used in the system where load assessment is difficult to establish.



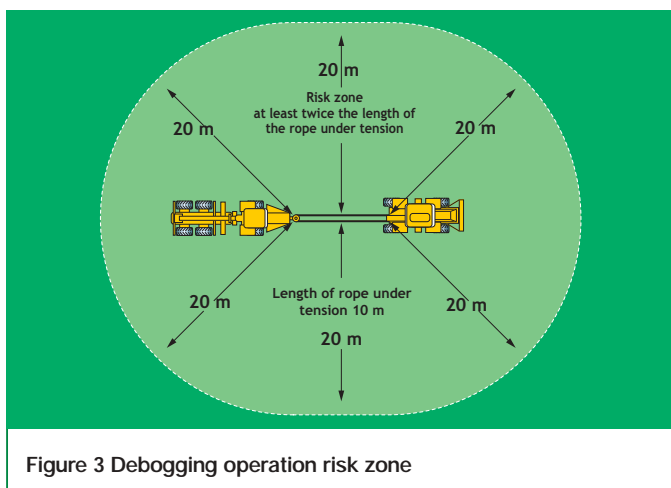
Wire ropes

- 14 The rope size and lay must be to the winch manufacturer's recommendations. Do not join ropes of different diameters.
- 15 Hauling ropes must be securely fastened to the winch drums. At least three full turns should remain on the drum at all times.
- 16 All ropes should be terminated in a suitable way, eg splicing, soft eye loops or swaging – do not use knots.

- 17 Check ropes for signs of wear and tear, eg broken wire, distortions and corrosion. Repair or replace broken or damaged ropes before further use. Any joins in the rope must be made using a suitable splice, or the rope should be replaced.
- 18 Replace ropes when their nominal diameter falls below 90% of the original. BS ISO 4309: 2004 provides information on the examination, maintenance and discard criteria for wire ropes.

Risk zones

- 19 During winching a risk zone of twice the length of the rope under tension should be set up (see Figure 3).



- 20 Powered winch operators and drivers working within the risk zone must have suitable operator protection fitted to the cab (eg wire mesh screens, polycarbonate windows). All other staff with certain exceptions (see paragraph 23), should be outside the risk zone when the rope is under tension.
- 21 The debuggging risk zone must not be confused with the safety distances described for working near overhead power lines. **Always observe the power line safety distances and work outside the risk zone for ropes under tension.**
- 22 Do not operate a machine if any part of the debuggging/recovery operation can come within a minimum of 15 m of energised overhead power lines. If any part of a machine or equipment can come within this distance, then the Distribution Network Operator (DNO) must be consulted and a safe working procedure agreed. Take into account the risk that any tree used as an anchor could fall onto a power line and ensure safety distances are set accordingly (see AFAG leaflet 804).
- 23 Operators using manually powered winches and some types of remote-control winches (eg electrically powered winches and capstan winches) where the controls are located outside a protected cab, need to take special precautions when working within the risk zone, including the following:

- Do not use ropes or slings that have high stretch characteristics, because energy stored in them when they are stretched can be released during equipment failure, causing 'whiplash'.
 - Offset the winch where possible, so that the operator is not standing in line with the direction of pull. Do not stand within the angle formed by a rope passing through a guide or pulley during offset winching.
 - If no offset can be rigged, avoid standing directly in line with the line of pull.
- ☐ 24 Risk zones will need to be increased to include any trees or back anchors that are incorporated into the winching operation (trees that break or are uprooted can fall in any direction).

Emergency procedures

- ☐ 25 Ensure a designated and responsible person knows the daily work programme and agree with them a suitable emergency contact procedure. Where reasonably practicable use a mobile phone or radio and a pre-arranged call-in system.
- ☐ 26 Ensure the operators can provide the emergency services with enough detail for them to be found in the event of an accident, eg the grid reference, the distance from the main road, the type of access (suitable for car/four-wheel-drive/emergency service vehicles). In urban areas street names are essential. Know the location details before they are needed in an emergency (see AFAG leaflet 802 *Emergency planning*).

Setting up

- ☐ 27 Before setting up, a 'site-specific' risk assessment must be carried out to identify on-site hazards and specify the necessary controls. The assessment will need to include standing/damaged trees and ground conditions, machine conditions, and manual handling of debogging equipment.
- ☐ 28 Assess the position of the machine to be recovered and whether it is carrying a hazardous load such as pesticide or diesel. Incorporate the necessary controls in the risk assessment.
- ☐ 29 Reduce the weight of the machine to be debogged or recovered by unloading or releasing the load where it is safe to do so.
- ☐ 30 Where appropriate, dig out wheels in the direction of pull to reduce as far as possible the force required to break out the vehicle.
- ☐ 31 Calculate the force required to recover or debog the machine. Once the force has been determined the equipment and set-up can be assessed and implemented.
- ☐ 32 Select suitable anchorage points and ensure recovery operators are in a safe position when operating winches and machines. If pulling directly with another vehicle, select secure attachment points on each machine.

- ☐ 33 Trees, stumps or other anchors used to secure the winch and/or pulley blocks must be assessed and reinforced where necessary. Risk zones may need to be increased to accommodate these.
- ☐ 34 Attachment to the anchor point should always be with an appropriately rated strop to prevent damage to and weakening of the wire winch rope.
- ☐ 35 The strops and pulley blocks should be set up so that the winch has a straight pull on its anchor point.
- ☐ 36 The winch cable should be free from obstruction and abrasion and in a direct line to the winch or to an intermediate pulley.

Operation

- ☐ 37 One person should be in charge of the operation.
- ☐ 38 Where two people are involved in the operation, both should wear high-visibility clothing and have an agreed communication and signalling procedure in place. In all instances personnel not within a protective cab should be outside the risk zone, except for operators of manually powered winches and some remote-controlled winches.
- ☐ 39 When pulling a machine on sloping ground, never pull from directly below, always offset.
- ☐ 40 Winch and machine operators should remain in the safety cabs of their machines when the wire rope is under tension.
- ☐ 41 During manual recovery with a hand-operated winch, ensure the correct safety device is used, eg the correct shear pins or operating handle.
- ☐ 42 Identify an agreed escape route before the operator uses a hand-operated winch.
- ☐ 43 If the bogged machine will not move, then reassess the situation to recalculate forces and reconfigure the set-up.
- ☐ 44 All staff, apart from the machine operators and operators of manually powered winches or some remote-controlled winches, must remain outside the risk zone (see Figure 3) during winching. Operators in the machine cabs must be protected by approved safety cab structures fitted with safety glass or mesh.

After recovery

- ☐ 45 Ensure all vehicles used in recovery are in a stable and safe condition. Ensure machines are not adversely affected by water and/or mud. If a machine has been involved in an overturn, it should be checked by a mechanic before it is started.
- ☐ 46 Clean and check the condition of all equipment after use and store correctly.
- ☐ 47 Tape off the affected part of the route to prevent a repeat incident. Make sure all other drivers are informed.