Practical Restoration Handbook

Vegetation Clearance

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CONTENTS

1. Definition of Vegetation

2. Preliminary Planning

3. Nature Conservation Survey

4. Timing of Clearance

5. General Safety and Safety Equipment for Volunteers

6. Hand Tools

7. Site Visit

8. Methods of Removal and Disposal

9. Chainsaws

10. Brushcutters/Strimmers/Clearing Saws

11. Stacking Timber

12. Sale of Timber

13. Transplanting

14. Re-planting

15. Follow up Work

16. Further Reading

1. DEFINITION OF VEGETATION

1.1 Vegetation includes anything from grass to large trees, which has grown in the line of the cut and towpath and is required to be removed to reinstate the waterway. On a derelict canal, the size of the vegetation is dependent on how long the waterway has been idle. No trees above the size of saplings should be cut down with hand tools on grounds of safety. A rough guide to the diameter of a sapling is about the same size as your wrist i.e. 75mm. Any bigger than this and consideration should be given to it only being felled by a competent chainsaw operator who has passed the recognised safety courses.

2. PRELIMINARY PLANNING

2.1 The following areas must be looked into before starting work

- Conservation area consents
- SSSI's
- Listed Building consents
- Tree Preservation Orders
- Consider liaison with the Conservation Officers of the Local Authorities
- Will damage occur to canal structures if the vegetation is removed (i.e. winching a stump out of a wall)

3. NATURE CONSERVATION SURVEY

3.1 Before carrying out any vegetation clearance on a section of canal it is advisable to have an independent environmental survey carried out on the area concerned. This can show any sensitive areas where special care must be taken and additional information can be obtained e.g. working around badger sets, any poisonous or harmful plants and plants and trees to retain and protect. There is a wide range of consultants and Wildlife Trusts (Regional offices across the country) who carry out such surveys and these can be a valuable tool particularly if they find that the canal will benefit from full restoration, as they often do. Surveys are generally carried out in the spring with a follow up survey one year after the restoration has been completed. The cost of a survey is approximately £200 (dependent on the size of area concerned) for which grants can be obtained (see TRH "Funding Sources").

4. TIMING OF CLEARANCE

4.1 Vegetation clearance should only be carried out from August to early March to avoid disturbance to nesting birds and other wildlife. The working day is also limited to the short daylight hours of the season, which also avoids excessive disruption to any local residences.

5. GENERAL SAFETY AND SAFETY EQUIPMENT FOR VOLUNTEERS (non-power tools)

5.1 As with all sites a scrub clearance site should be treated as a building site with respect to safety. If the public have right of way through the site then warning signs should be placed at intervals before they get

to the working area (e.g. Tree felling, Brushcutters in Operation). The work site should be cordoned off with tape or fencing. If large trees are being felled then the public should be escorted through after ensuring the chainsaw operator is aware of their presence. A designated safety hat site should be established if there is any chance of a head injury occurring from falling material. This is particularly relevant in scrub clearance, as there is a strong likelihood of dead branches falling when trees are disturbed. If the site is a designated safety hat site all volunteers must wear a hardhat to BS 5240 Part1 1987 at all times. Goggles and ear defenders respectively should be available to the volunteers if there is any risk of eye injures (e.g. When chopping with an axe, hatchet or billhook) or noise (e.g. When working around motorised equipment i.e. raking up after a brushcutter). Some of the plants, weeds and fungi may well be poisonous and special care should be used in their removal (wearing rubberised gloves and washing hands, arms and face after it has been removed and before taking any tea/lunch breaks). These can be highlighted in the survey, take care of saps and berries. In addition there are however many common sense items which should be worn or available.

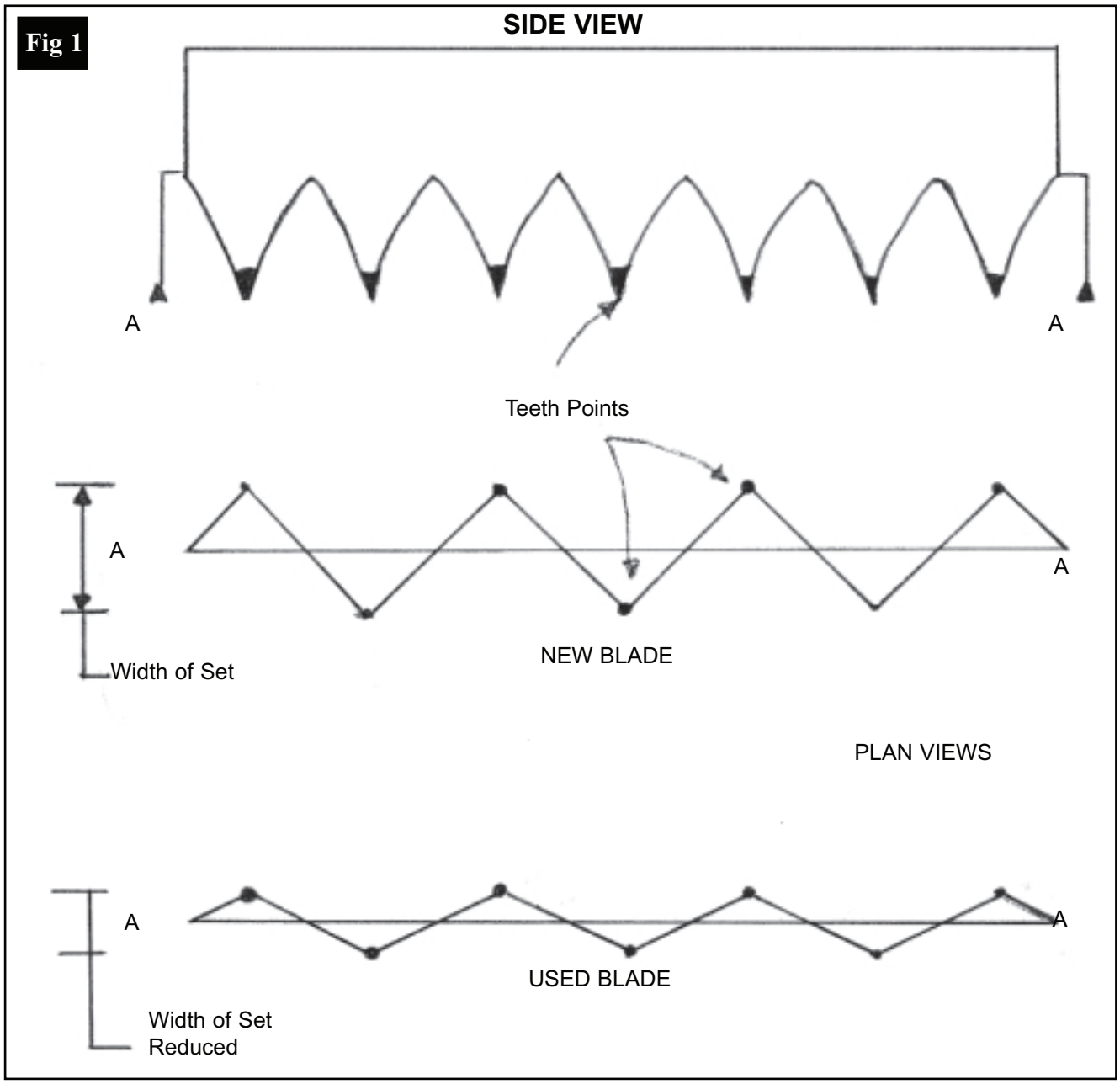
- A first aid kit must be available for use on site, first aid to HSE guidelines for number of people on site, there should be an appropriately qualified first-aider as part of the team.
- Gloves; A strong pair of gloves should be used. Welders' gauntlets offer good protection to the hands and wrists even when handling brambles.
- Steel toe cap boots / wellingtons. These should be worn because crush injuries to the toes and feet can easily occur particularly when stacking timber.
- Non snag outer clothing; Long trousers and long sleeve shirts are advisable in order to avoid cuts and scrapes to the arms and legs.

For further guidance see PRH "Health & Safety Sections 1-4".

6. HAND TOOLS

6.1 All tools should be in good order with no broken shafts, loose heads or missing parts. The operator should check this throughout the working day. Any defective tools should be taken out of service to avoid them being accidentally used. They should be labelled defective listing the reason why. Always make sure your tools are kept sharp, it will save time, effort and make the job safer. Always the correct tool for the job it was intended for.

- Bowsaws: come in many different sizes (30 cm, 54 cm, 60 cm and 75 cm), biggest is not necessarily the best as bigger blades tend to twist and stretch more easily than shorter sizes. The key to productive work is having a good blade. It is not the sharpness of the teeth that is lost first but the set of the teeth. Each tooth on the blade alternates slightly left or right of centre, and as the blade is used, this set is lost. The teeth become more in line with each other (see Fig 1). A tool is available to reset the teeth on a saw and this can be done very quickly on site. It is worth doing if dealing with large volumes of scrub as this increases the efficiency and reduces operator fatigue. Harden tip blades can not be sharpened once they are blunt they must be replaced. There are different types of blades available with different teeth patterns, number of teeth and size of teeth. The correct type of blade should be chosen depending on the material to be cut (dry Hardwoods such as Hawthorn require a 'Peg' toothed blade which has finer teeth. The course 'razor' tooth provides a faster cut on green softwoods such as Pine or Alder)



- Loppers: are used for pruning back branches to the trunk of trees. They leave a clean cut edge which is good if the tree is not going to be removed. There are many styles, which have various length handles , none of which should be used to cut through anything bigger than possible with a single cut.

- Slashers: there are many types of slasher available (e.g. axe back, Dunse, Irish). Slashers are intended for use on a vegetation clearance site to cut down bramble and other light scrub. They should not be used as an axe. The axe back version is not suitable for use by inexperienced volunteers due to it having two sharp edges. Attention should be given to the working area when using slashers. People should be kept clear to avoid any risk of injury from flying material and being accidentally struck. The safest working method is to keep the blade in sight i.e. not raising it above shoulder height and not swinging it round behind the legs.

- Axes: there are many types of axe (e.g. felling, splitting and hatchets). In skilled hands, an axe can fell a tree quicker than it can be sawn down. In most cases the volunteers are unskilled and

therefore axes should not be used for scrub clearance on grounds of safety. They use more energy than a bowsaw and also leave a messy stump.

- Billhooks: can be used to remove small branches from trees. However they can leave a sharp, pointed piece of branch behind. This is unsightly and unsafe, if the tree is to be left. Loppers should be used as an alternative.

- Rakes and Pitchforks: are useful for dealing with brambles and for raking up the small debris. A tarmac rake is useful around the fire as the head has a metal shaft before the wooden handle and helps to avoid the handle getting burnt.

- Mattocks: will be required to assist the removal of stumps when they are winched out. See later Winching

7. SITE VISIT

7.1 Visit the work site in advance of the work being carried out to assess what needs to be done:

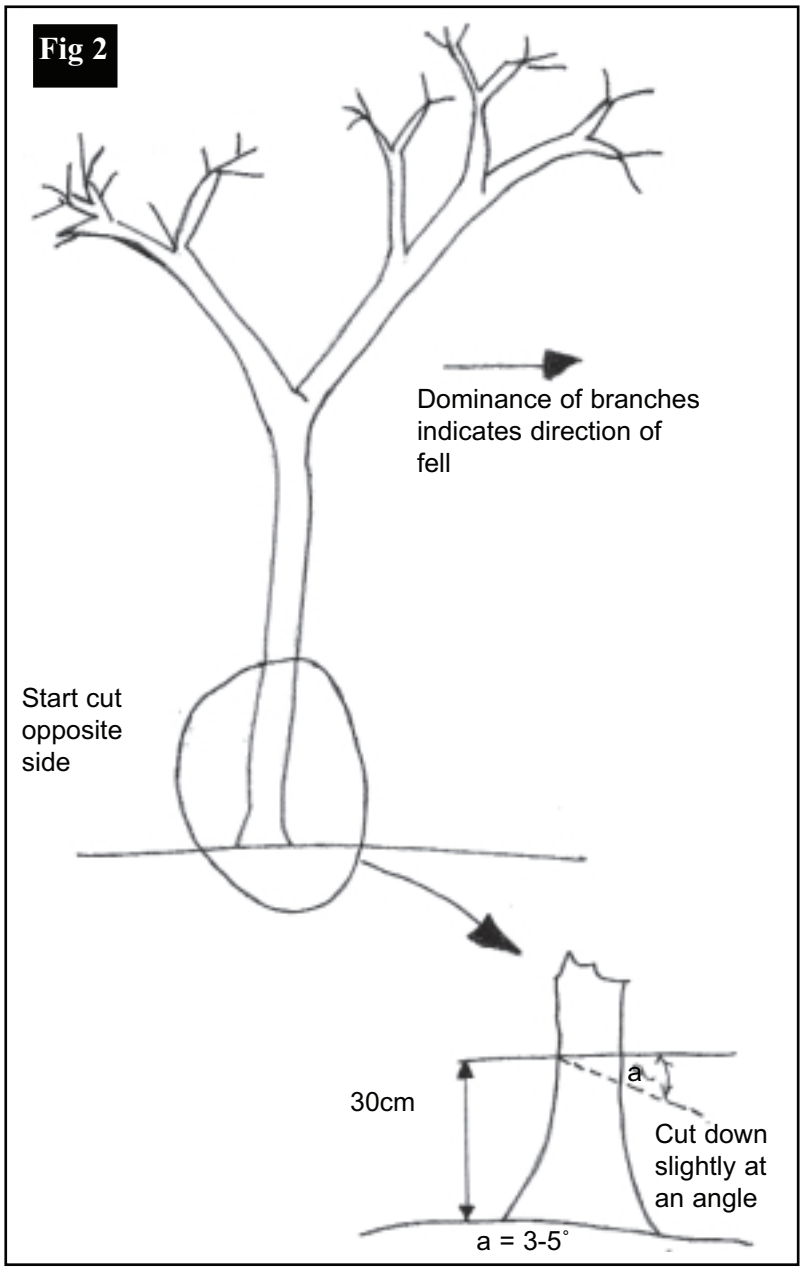
- Hand tools required
- Method of disposal of materials
- Use of power tools
- Dangerous areas on site, banks, infirm ground, overhead cables, rights of way/public access, buildings and roads
- Sensitive areas on site i.e. badger sets
- Marking of large trees for felling
- Landowner liaison, who may have special requirements for the work to be carried out on his land.

7.2 Before work commences ensure that all the volunteers know the work the dangerous and sensitive areas on site and the scope and boundaries of the worksite. It is well worth a walk through the area with them at the start of the first day.

8. METHODS OF REMOVAL AND DISPOSAL

8.1 Felling – Method for saplings up to 75mm Dia.

The trees which are to be removed by hand (outlined above) can be felled quickly and simply with a bowsaw. It should be possible from looking at the tree to see which way it is likely to fall due to a lean or more branches on one side. The tree should be felled in this direction. These trees only require one cut, it is not necessary to remove a wedge first as this is only required when a chainsaw is used. Make the cut 30cm above the ground on the opposite side to the way it will fall. The cut should start with the bowsaw level and run slightly down by 3-5˚. (see Fig. 2) As the cut begins to close on the saw due to the weight of the tree then it can be pushed over with one hand while sawing with the other. Once the tree is over the cut can be finished off, removing the tree from the stump. The material should then be stacked for disposal. The stump can either be trimmed to ground level with handsaw or chainsaw (minimising trip hazard) or winched out (see later paragraph on winching). Make sure that the volunteers work at a safe distance apart.



8.2 Burning

8.2.1 Burning is one method of disposal of unwanted vegetation. If the material has been stacked overnight then the fire should be made next to it, this allows the material to be checked for hibernating hedgehogs and other animals before it is burnt. It is essential that you read PRH "Health & Safety Section 2" if you intend to light fires on your site.

8.2.2 **Precautions and safety rules**

- Never light a fire with petrol
- Never light a fire under trees or power cables and on areas likely to catch fire e.g. dry grass
- Never light a fire in strong wind, as it may get blown out of control
- Discourage the volunteers from lighting a fire on the base of trees even if they are for removal as this will look unsightly even when the tree is felled

- Never over-stack the fire due to risk of it toppling over
- Have means of putting out a fire should it start to spread
- Monitor the wind direction and strength and take appropriate action
- Site the fire so that the smoke from it won't be a nuisance to the volunteers and local residences where possible
- Watch that sparks and flying embers don't set light to anything
- Allow time for fires to burn down before darkness.

8.2.3 Method

Start small, using paper, firelighters and dead wood. Lay all the material one way (making wigwams is not appropriate, see below) and continue to lay everything you put on the fire the same way, with the thick end of the branches at one end (towards the wind where possible). This makes the fire self-feeding. As the material burns away at the bottom the weight of the pile on top keeps the heart of the fire fed. Many fires fail as they get too big too quickly so gradually increase the size, when it is burning well then the green wood can be included. Material that has been put on randomly can support itself which then let's the middle of the fire burn out. Appoint a person to feed the fire to ensure control and supervision. Don't overstack the fire. As the work progresses then separate fires will be required to avoid excessive carrying of the material. Use the same method as above. A good base can be made for the new fire by using some shovel-loads of hot ashes to give it a good start. If the fires are to be used the next day then they can be restarted by stoking the ashes and using any left-over twigs which were on the fire the previous day as these will be dry and burn easily.

8.3 Stacking

Stacking is the environmentally friendly alternative to burning. However it is only suitable for dealing with small volumes of material and where the canal runs through a rural area. With this method the material is stacked in small piles on the non-towpath side of the canal and left to let nature to take its course. The material will rot down over a number of years, at the same time providing a habitat for wildlife.

8.4 Chippers and Shredders

Chipping is an alternative method of disposal of material where burning or stacking is unacceptable. A chipper is a machine that cuts the branches into chips. The machines come in different sizes. They can be mounted on a tractor which provides the power or self contained with their own engine. The larger the unit the quicker it chips and the larger the diameter of branches it can take. The chips can be left on site to break down naturally or the outlet of the chipper can be played into a trailer and the chippings taken off site for storage and possibly sold as gardener's mulch. Only trained volunteers should use them. All the safety precautions listed on the machine and in the handbook should be followed. All personnel in the working area of the chipper should wear ear defenders as the machine generates a lot of noise when in use. This also should be taken into account if working in a residential area and the working day should be adjusted accordingly. Chippers and shredders are expensive units to buy or rent and this should be taken into account when choosing this method. Chippers can only be used on clean waste. If the material is contaminated with stones, soil, nails etc. this will damage the rotating knives or if it is wet or soggy green material it will cause the cutting area to clog up. Shredders however can handle all forms of green

waste as the waste is flailed rather than cut, producing a mulch rather than a chip. However a shredder is not as efficient as a chipper. Shredding material probably requires up to 300% more horsepower per ton than chipping.

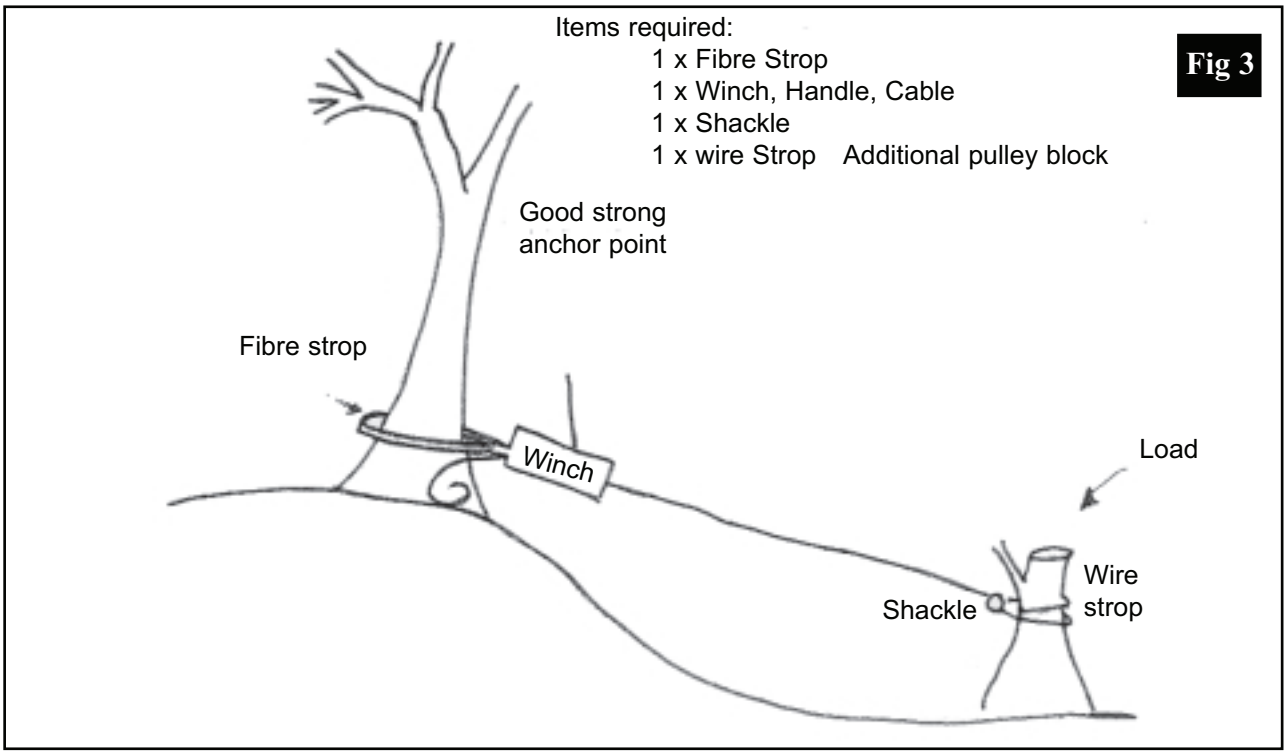
8.5 Removal of stumps

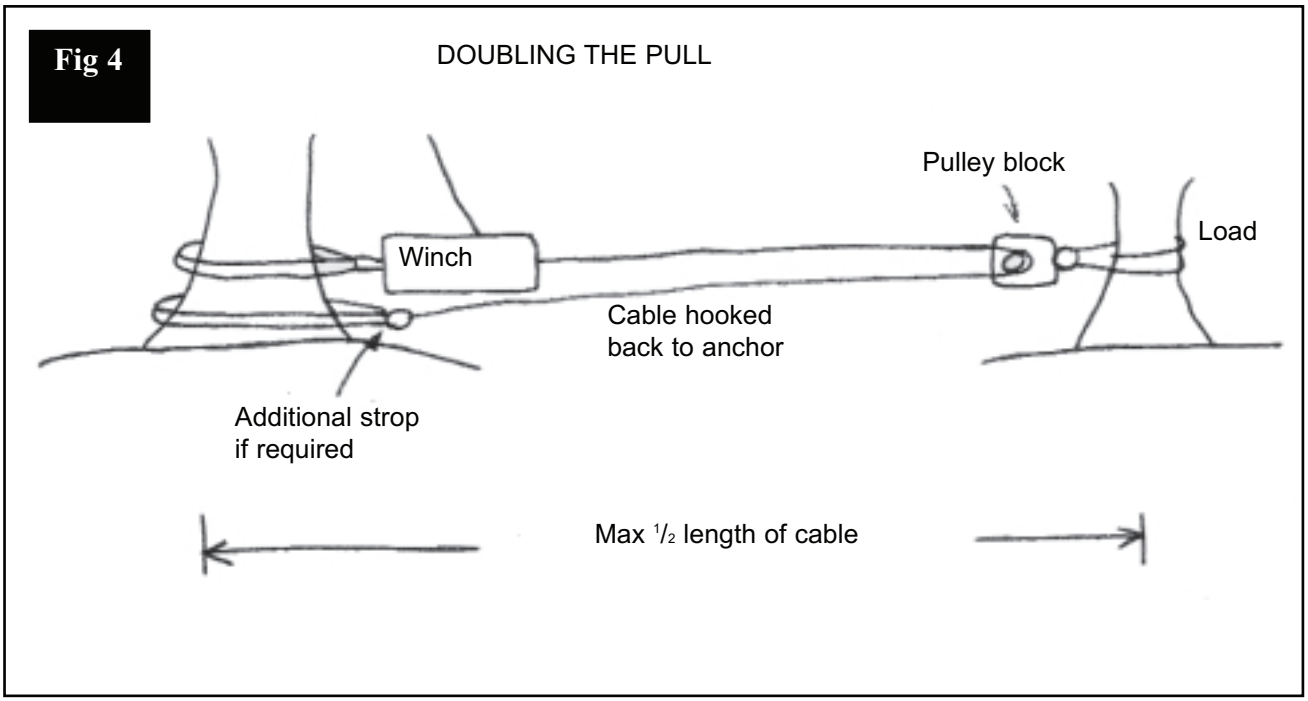
8.5.1 If a tree is cut down and the stump is left then it will start to sprout and grow the following year. This is called coppicing. This can be avoided by: cutting the stump down to ground level and treating it with a coating of diesel, 'Root Out' weedkiller (Amcide, 2,4,5-T) or the stump can be removed by winching. Care must be taken if it is decided to winch it out. If the stump is from a large tree it will leave behind a large hole taking with it the clay puddle (the waterproofing layer of the canal). If as in many cases, the canal is not put back into water until some years later then the location of the hole maybe lost (due to filling up with leaves and other debris) and may cause the canal to leak. It is better to cut the stump off at ground level and leave it until the canal is re-profiled where it can be removed by an excavator and the hole re-puddled at the same time. The other problem with removing a large stump is what to do with it. They are very difficult to burn and can not be sawn up easily making disposal a problem. When tackling the problem with chemicals ensure that the volunteers using them have adequate safety equipment for the chemical being use as per the manufactures recommendations. All weedkillers must be mixed up in the workshop and transported to site in clearly identified containers, any unused chemical must be returned back to the workshop for safe storage and not left on site. All stumps must be treated within 24 hours of cutting to allow maximum effect.

8.5.2 Any chemical used to kill stumps must be suitable for use next to a watercourse and will not adversely affect fish and wildlife.

8.6 Winching

Winching is required not only for the removal of stumps but also for the extraction of felled timber where it has been felled across a water-filled canal. The principles of winching operations are the same. A good anchor point is required. This can either be a large tree, or if removing stumps, another stump which is to be removed (they can be winched together until one or the other gives). However, caution must be advised here that the anchor may start to give first (if this happens then the winch must be swapped around). The anchor should be close to the work (the object to be moved) as most winches only have a cable of approximately 20 – 25M. If the anchor point is a tree which is to remain then the winch should be anchored using a fibre strop as if a cable strop is used it will ring bark the tree (cut the bark due to the load) and it will eventually die. The winch should be attached to the load using a wire strop, which when put under strain will cut into the material, lessening the chance that it will slip off (see Fig. 3). When winching stumps put the strop as high up as possible on the stump so as to maximise the leverage. A good place to put the strop is below a branch or fork in the work. When winching stumps the base will need to be dug out, with as many of the roots being cut as possible, a good use for Mattocks. Do not use the winch cable itself to wrap around the load and hook back on itself as damage will result to the cable, which could result in it failing its next safety test. There are many types of cable winch on the market such as Tirfor. These are available in different sizes, with the load on the side indicating a dead lift, a pull load is equal to twice that of a lift. Putting in a pulley block at the load end and doubling back the winch cable to the anchor point can double the load the winch can pull. This however halves the length of your cable and it could be a problem to find a suitable anchor point (see Fig. 4) The winch is rated for use by a single person. It is possible for two people to stand opposite each other and operate the winch but this





can overload the safety shear pin on the winch handle. Although the shear pins are quite expensive additional pins should be purchased so as to avoid disruption to the work should one break. On no account should anything else be used in place of the correct shear pin for the winch, as damage will occur to the pin assembly, which is expensive to replace, or the winch could be overloaded. Check the cable each day for broken strands and at the end of the day clean the cable by wiping off the dirt ready for use the next time out. When handling wire cables and strops use gloves. All the shackles and strops etc. must be checked with each new pull. The hand winch is technically an item of lifting gear and should be checked over and certificated once a year.

9. CHAINSAWS

In the course of a typical vegetation clearance there will be some trees larger than those suitable for removal by hand. These should be left to be felled by a chainsaw after all the scrub and smaller trees have been removed. Any large trees for **removal** should be marked with either tape or paint (convention) to indicate to the chainsaw operator those which are staying and those to be felled. On no account should any inexperienced people be allowed onto site with a chainsaw. Only those who have undertaken the required competence test approved by the National Proficiency Test Council, NPTC and who have a full set of safety equipment should be allowed to work. A chainsaw should not be used above waist height when the operator is stood on the ground. If there is a need to cut something above this then the operator must again be properly trained and equipped to climb and cut above ground. The chainsaw operators can follow on from the volunteers who are carrying out the light clearance but only if a 'no go' zone has been established between them. The size of this zone is two times the height of the tallest tree being felled. As the chainsaw team pass through the site it will be necessary for the volunteers to go back through after them to tidy up the branches and to stack timber. The same no go zone should be set up. An experienced and vigilant member of the ground staff will need to be appointed to the chainsaw operator to provide support and in the control of people in the safety zone. It is often unavoidable for the chainsaw operator to fell the tree anywhere else apart from over the canal due to the lean. If the canal is filled with water then a winching team should be set up to extract the tree so that it can be logged up later.

10. BRUSHCUTTERS/STRIMMERS/CLEARING SAWS

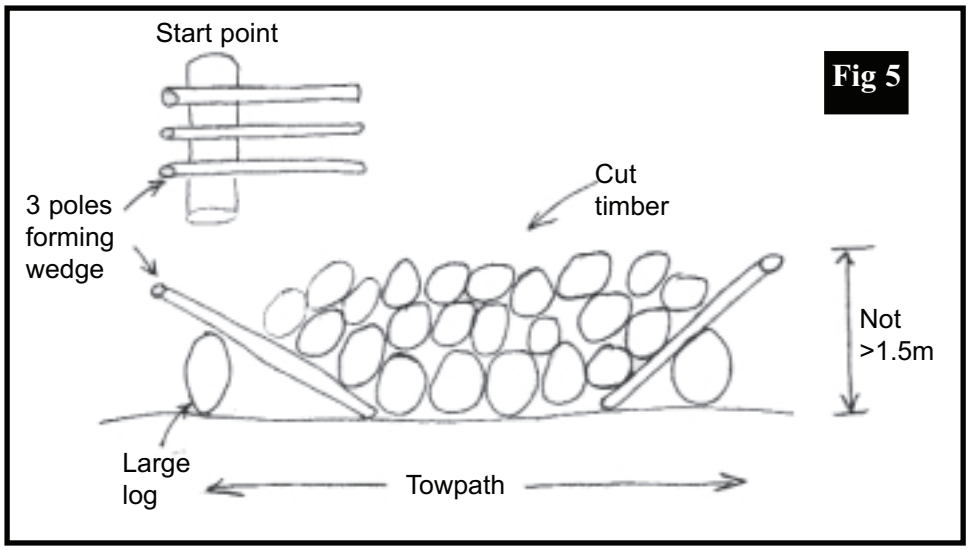
All operators should have been trained in the safe operation and be able to carry out the necessary routine maintenance before being allowed to use this item of equipment. The minimum requirement for safety equipment is goggles and ear defenders, but it is recommended that full face protection is used rather than goggles to prevent misting and provide additional protection particularly when brushcutting. Plastic over trousers are also advisable when strimming grass to avoid contamination of the operators clothes from animal excreta. Brushcutters are used on areas which can not be reached because of the terrain with other types of mowing equipment. Depending on the engine rating different tools can be fitted to handle vegetation from grass to brambles and small trees to a diameter of approx 10mm.

11. STACKING TIMBER

When the chainsaw operator logs up, the logs should be five feet long as this helps with the stacking. Although a five-foot length can be heavy (caution the volunteers about safe lifting and working in pairs) they are easier to transport and require a smaller number of trips to the stack than small logs. To start a pile, place a large log on the towpath at right angles to the canal. Place three poles on it to form a wedge. The logs can be stacked up against this preventing them rolling away. The other end to the pile is also completed in the same way (see Fig. 5). Care must be taken when stacking timber to prevent the pile from toppling over and therefore the height should not exceeded 1. 5 Metres.

12. SALE OF TIMBER

Many of the trees, which grow in old canals like Willow and Alder, have no commercial value and much of the wood is rotten from the inside out. If it is left to dry out undercover it can be sold as logs but does



not fetch the same price as Oak or Ash logs as it is faster burning. The sale of logs provides an income, which can cover the costs of the chainsaw on site. If there are some hardwood trees of a substantial size like Oak it is worth approaching a local timber company for a price. If there is a suitable place to extract it they may fell and take the whole tree as one.

13. TRANSPLANTING

The costs involved with hiring the relevant machinery or engaging a contractor to move and transplant trees is prohibitive. It is not only the costs, which makes this un-viable but access. The location of the trees, which in many cases are on steep banks or in cuttings, means that the heavy machinery is unable to reach them without doing costly damage to the area and the bed of the canal. Small saplings can however be moved by hand but this is only worth doing if it is a deciduous tree like Oak or Ash.

14. RE-PLANTING

Replanting is the cheaper alternative to transplanting. Environmentally for every tree cut down one should be planted to replace it in a suitable area. This can be done by creating a new wood in a corner of a field or along the non-canal side of the towpath. The spacing between the whips (young tree about one metre in length with root) depends on the species of the tree being planted. To avoid the whips being eaten by rabbits and other animals they should be put in a tree shelter (a translucent plastic tube). This should be staked to avoid it being blown away. The stake should be driven into the hole before the whip is planted so not to damage any of the roots.

15. FOLLOW UP WORK

The area that has been cleared if not dredged and put back into water will rapidly return back to being covered with vegetation, this is accelerated by the fact that the whole line of the cut has been opened up to the light. This can happen in a few growing seasons if the area is not maintained. If this is the case then regular maintenance i.e. strimming the grass and an annual trim and cut back will be required to avoid regression. If any trees or vegetation has been planted this will also require regular maintenance.

16. FURTHER READING

Available from HSE Books PO Box 1999, Sudbury, Suffolk, CO10 6FS
Tel: 01787 881165 Fax: 01787 313995

- Management of Health and Safety at Work Regulations 1992
- Provision and Use of Equipment Regulations 1992
- Manual Handling Operations Regulations 1992
- Personal Protective Equipment at Work Regulations

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