



National Unit specification

General information

Unit title: Mobile Sawmills

Unit code: H69X 46

Superclass: SG

Publication date: January 2014

Source: Scottish Qualifications Authority

Version: 01

Unit purpose

This Unit will provide learners with knowledge and understanding of the use of mobile sawmills in the production of added value to small scale woodland timber harvesting. It will also establish the associated practical and organisational skills which will empower the learner to apply knowledge and skills to operate and maintain a mobile sawmilling Unit.

Outcomes

- 1 Plan and set up mobile sawmilling operations.
- 2 Maintain and set up a mobile sawmill.
- 3 Operate a mobile sawmill to produce materials to specification.

Credit points and level

1 National Unit credit value at SCQF level 6: (6 SCQF credit points at SCQF level 6)

Recommended entry

While entry is at the discretion of the centre, learners would normally be expected to have attained one of the following, or equivalent: practical skills at SCQF level 5 in Forestry or other land use areas.

National Unit specification: General information (cont)

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Core Skills

Opportunities to develop aspects of Core Skills are highlighted in the Support Notes of this Unit specification.

Context for delivery

If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes.

Equality and inclusion

This Unit specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence.

Further advice can be found on our website www.sqa.org.uk/assessmentarrangements.

National Unit specification: statement of standards

Unit title: Mobile Sawmills

Acceptable performance in this Unit will be the satisfactory achievement of the standards set out in this part of the Unit specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

Outcome 1

Plan and set up mobile sawmilling operations

Performance Criteria

- (a) Identify a suitable site for timber processing using a mobile sawmill.
- (b) Create a working plan for a mobile sawmill working site.
- (c) Set up timber materials for efficient processing.
- (d) Work safely within industry best practice guidelines.

Outcome 2

Maintain and set up a mobile sawmill.

Performance Criteria

- (a) Carry out routine maintenance of mobile sawmill power Unit.
- (b) Sharpen saw blades for mobile sawmill.
- (c) Set up mobile sawmill for operation according to suitable work plan.
- (d) Work safely within industry best practice guidelines.

Outcome 3

Operate a mobile sawmill to produce materials to specification.

Performance Criteria

- (a) Set up timber for safe and efficient milling.
- (b) Operate mobile sawmill to produce materials to specification.
- (c) Organise cut materials for continuing processing.
- (d) Work safely within industry best practice guidelines.

National Unit specification: statement of standards (cont)

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Evidence is required to demonstrate that learners have achieved all Outcomes and Performance Criteria.

Evidence Requirements for this Unit

Outcome 1

Written and/or recorded oral evidence is required to demonstrate the learner's ability to:

- ◆ Produce a map of the site identifying the location of:
 - Round timber delivery route
 - Stacking
 - Milling
 - Product areas
 - Waste materials areas
- ◆ Select machinery, tools and equipment appropriate to the:
 - Site
 - Product specification
- ◆ Produce a plan of operation in relation to health and safety and environmental risk assessment.

Additional performance evidence is required to demonstrate the learner's ability to:

- ◆ Set up timber materials for efficient processing.
- ◆ Work safely within industry best practice guidelines.

Outcome 2

Performance evidence is required to demonstrate the learner's ability to:

- ◆ Sharpen sawmill blades correctly prior to set up.
- ◆ Adjust sawmill table and/or bed for correct operation.
- ◆ Set up the sawmill in the correct position.
- ◆ Carry out routine maintenance checks for:
 - Fuel
 - Lubricants
 - Coolants
- ◆ Carry out maintenance schedule according to manufacturer's specifications and codes of practice.
- ◆ Carry out routine testing of sawmill safety features.
- ◆ Carry out routine checks for and maintenance of site safety including as relevant:
 - Personal Protective Equipment (PPE)
 - Trip and dust hazards
 - Anti-pollution equipment
- ◆ Adjust the set up according to site conditions and timber sizes.
- ◆ Work safely within industry best practice guidelines.

National Unit specification: statement of standards (cont)

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Outcome 3

Performance evidence is required to demonstrate the learner's ability to:

- ◆ Handle timber safely and in accordance with Manual Handling Regulations.
- ◆ Operate a sawmill using the correct techniques for the timber being processed.
- ◆ Maintain the correct feed speed and pressure required for efficient and safe cutting.
- ◆ Use appropriate aids to ensure safe processing of timber.
- ◆ Stack cut materials safely and to facilitate the next stage of the process.
- ◆ Ensure product quality meets specification.
- ◆ Dispose of waste materials ensuring maintenance of site hygiene.
- ◆ Work safely within industry best practice guidelines.



National Unit specification: support notes

Unit title: Mobile Sawmills

This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this Unit

This Unit is aligned to National Occupation Standards (NOS):

LANTw 40 Process Timber using Hand-fed Machinery

Outcome 1

The increase in small woodland management in public, private and community ownership has led to the development small scale processing machinery and systems to ensure cost efficiency whilst at the same time offering opportunities for added value to woodland management. The cost of transportation of round timber is high and the amount of timber produced in small woodlands makes it an unattractive enterprise for timber processors. Mobile sawmills have increasingly become a viable option that can utilise reasonable quality timber on a small scale and contribute to the sustainable management of woodlands.

With that in mind it is important that the milling of timber is planned and organised as cost efficiently as possible. Whilst being a more cost effective method of processing timber mobile sawmills do require a considerable financial outlay both in capital expenditure and maintenance/running costs. Because of this cooperative purchases and partnership working are common ways of sharing costs. The hiring of specialist operators for small scale working is also a common method of achieving a supply of useable timber for sale or for organisational use.

On-site conversion using a mobile sawmill provide these benefits:

- ◆ Provide added value to your timber for sale to secondary processors.
- ◆ Make small parcels of timber economical to process.
- ◆ Supply materials for your own use to your own specification
- ◆ Reduce road transport traffic and costs by on-site conversion.
- ◆ Produce a diverse range of items, eg planks, beams, gateposts, flooring, cladding boards and post and rail fencing which can be used to suit your needs and reduce costs and reliance on non-local products.
- ◆ Gives flexibility in producing individual timber products, eg uncommon species, non-standardised sizes and character wood.
- ◆ Makes woodland management more cost effective and therefore more likely.
- ◆ Allows for the selection of individual trees with specific properties which can supply a rewarding niche market.

National Unit specification: support notes (cont)

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When planning a site for mobile sawmilling it is important that risk assessments are carried out to ensure that there are no health and safety problems to the operator, others working in the vicinity and the public who will have access to the immediate area or who may be affected by the operation at some remove from the operational site. It is important that the risks to the environment are also assessed and the planned operations offer no threat to the ecological value of the site. This will be as much to do with the timing of operations as the placement of the processing site within the woodland.

Site analysis is essential and the identification of the working site for milling must address the issues of site protection and sound logistical planning to ensure site health, best working practices and operational efficiency.

Any site, therefore must have sufficient space that the operation phases can be carried out safely and efficiently.

Space is required for distinct operations:

Round timber

Storage space for round timber will be dependent on work methodology, eg hot logging will not require as much space as the processing of whole parcels of timber because the extraction of the timber and the processing of the material will be an almost continuous process. It is critical that round timber is stored in such a way that it will allow for easy handling for milling. With small and medium sized timber this will involve stacking timber with runners that will allow a continuous productive process.

Larger sized logs, eg the product of restoring coppice with standards or small parcels of mature trees will require individual processing or machine handling, ie hydraulic cranes for lifting logs into position. It is important therefore that there is sufficient space allowed for machine manoeuvring. Space must also be available for any smaller scale machinery, eg ATV with trailer to drive through and unload without requiring to turn. A circular extraction route is both efficient and environmentally advantageous.

This route should, wherever possible, follow an existing route with high resistance to erosion and ground damage. In some instances where repeated mill operations will occur in the same area a semi-permanent milling site can be prepared and set up.

Water courses are highly vulnerable to any woodland operations both by direct influence through intrusion or by indirect influence through pollution (oil, petrol, sawdust, air borne pollution, seepage from residues). It is critical that water courses both major and minor are mapped accurately and buffer zones of suitable dimensions identified on the map and on the ground. These buffer zones should be a minimum of 5 metres wide and physically marked out prior to operations. Pollution kits should be on site to allow for early intervention in the event of a pollution incident.

Essential to this water course management is the identification of the relationship of the site's water course to the wider water catchment area and to wider public and conservation values placed on the water course.

National Unit specification: support notes (cont)

Unit title: Mobile Sawmills

The area of the working site occupied by the sawmill should be selected with the following criteria in mind:

- (i) Spacious enough to accommodate the whole machine and its operations, ie enough space for at least 2 people working safely.
- (ii) Flat enough to allow for setting up the machine for level working and secure footing without the need for complex manouvering.
- (ii) Obstacle free, ie no trip objects. Cut stumps are major trip objects in such sites therefore it is essential that milling sites should be in open areas.
- (iv) Below any water courses to minimise the risk of pollution.
- (v) Oriented to minimise the health and safety risk from wind borne sawdust for mill operators.
- (vi) Set out to allow continuous processes for round timber, cut material and residues wherein each operation allows for the smooth operation of each successive phase of the operation.

The plan for the operation of the mobile sawmill should be drawn up, to scale, and areas determined for particular activities marked out and the process shown.

These criteria should be used in each site used for the milling of material. On some larger sites it may be beneficial and cost effective to have multiple sites rather than one site wherein larger amounts of residues may be created and have to be disposed-of. The production of chip material from such materials maybe utilised for fuel wood. Alternatively such materials can be burnt on site and in exceptional circumstances this can be part of a charcoal producing process.

The setting up of the mobile sawmill will be a practical operation and the procedure determined by the make and model of the mill being used. It is essential that the manufacturer's handbook is used as a reference and all directions followed. Common mills include Woodmizer, LumberMate, Logosol, Lucas, and Stihl Chainsaw Mill but these may be replaced by other makes as this type of operation continues to develop with the forecast of continuing growth in small wood management and mobile saw mill processing.

The setting up, maintenance and operation of a mobile sawmill should only be carried out by trained personnel. With a site suitably selected for safe working, access should be assured and the machine used to transport the mill should have no difficulties in completing its function. Unfavourable factors, eg heavy rainfall causing soft ground with a potential for 'bogging' or significant ground damage will result in the delay/re-scheduling of operations. These operations will only take place when there is no conflict with the conservation value of the site, in particular ground nesting birds and botanical and biological interests.

The sawmill should be put in place on a firm and stable site and levelled using either the machines own levelling device or a spirit level to ensure the carriage runs true and planking is facilitated by the degree of run set up which will avoid the plank sitting back on the log. Jacks/legs should be on firm footing, taken to site if suitable platforms not available. These articles should be assessed for wear and risk of failure and replaced on a regular basis. The set up the mill should be such that stacked timber can be ergonomically moved onto the table for sawing.

National Unit specification: support notes (cont)

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Cooling/lubricating water should be transported to the site. The removal of water from on site water courses for operational use should be avoided on environmental protection grounds.

All materials should be stored in a safe place following the general rules for the prevention of pollution guidelines for all woodland operations. On less secure sites all materials including machinery may have to be removed and set up on a daily basis. Fast efficient set-up and take down of machinery is essential to ensure the efficiency and cost effectiveness of the operations.

Outcome 2

Maintain and set up a mobile sawmill.

Performance Criteria

- ◆ Carry out routine maintenance of mobile sawmill power unit.
- ◆ Sharpen saw blades for mobile sawmill.
- ◆ Set up mobile sawmill for operation according to suitable work plan.

Routine maintenance of the mobile sawmill should be carried out in a controlled environment, ie in close proximity to workshop facilities rather than on the working site. Daily maintenance checks can be carried out on site when the mill is in its operating mode but more extensive maintenance should, wherever the condition of the machine permits, be carried out in the more controlled environment of a work yard or depot.

It is essential that both the mill and the vehicle used to tow it or transport it, are in compliance with all road transport regulations and legal requirements and that thorough checks are carried out on a daily basis when the mill is in regular use and on every occasion when it is being transported. Particular care must be taken when there has been an interval between operations.

Essential checks should be carried out on the condition of the wheels and tyres of the mill, the security and quality of the tow hitch and its security, lights, indicators and plating of the mill to ensure legal transportation.

The safety features of the mill require regular checking not only before the start of operations but regularly throughout the working day. It is important that such checks become a normal part of operations. It is a good idea to have quick checks at set times in establishing this as a routine. Visual checks of machine power unit, timber bed and sawmill is part of the operators' working practice.

All tanks containing liquids should be clearly marked to prevent the wrong fuel being used.

The lubrication system for the cutting component should be fully functional and cleaned to ensure that overheating does not occur whilst operating the sawmill. Such overheating can warp the blade or band. With bandsaw mills lubrication will be by an automatic constant water feed.

National Unit specification: support notes (cont)

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The machine controls should be labelled clearly and the emergency stopping device clearly marked and its operation clearly signed.

Sharpening of saw blades or bands should be carried out under workshop conditions and with appropriate mechanical sharpening aids determined by the type of sawmill being used and the manufacturers specification. Mechanical automatic feeding sharpeners are preferred and all sharpening should be carried out by appropriately trained personnel.

All saw blades/bands should be checked for serviceability before sharpening. Any cracks particularly from the gullet or missing teeth, and the blade/band should not be used. Badly damaged teeth may result in the band being discarded depending on the scale of the damage. It is essential that accurate sharpening is done and that all teeth are sharpened to the same size and profile. With uneven sharpening the band will not cut straight or smoothly and increase the stresses on the machine and destabilise the material to be cut, thus increasing risk and waste.

Good lighting conditions are essential for sharpening and sizing of teeth and additional close lighting should be supplied in the workshop.

Narrow bands should not be over-sharpened and after 8–10 sharpenings an assessment should be made as to whether the band was still serviceable.

Sharpening and setting should be appropriate for the material and species being cut.

Spare blades or bands should be available for fitting should the operating blade suffer damage or become too dull for efficient cutting. It must be remembered that dull blades increase the stress and wear and tear on the machine and can result in excess force being used in cutting materials. This excess force increases the risk of accidents and injuries.

On site maintenance including replacing blades should be incorporated into normal breaks where ever possible thus preventing loss of productivity.

The operation of the sawmill will take place on a planned site as detailed above and the sawmill should be fully functional, well maintained and compliant with all health and safety legislation and industry standards, eg Provision and Use of Work Equipment Regulations 1998 (PUWR) and Lifting Operations and Lifting Equipment Regulations 1998 (LOLER.) Any operator should be fully equipped with the appropriate specified PPE.

All materials to be cut should be so organised that if manually fed the load falls within the limits of safe manual handling. Heavy materials should be mechanically loaded or processed in situ.

When cutting the operator should ensure that walking speed and cutting speed are the same and that the lubrication feed and throttle control are working as designed.

The operator should have a cutting list where by the products to be cut are specified and care must be taken that the setting up of the sawmill to cut these is done accurately over the length of the log. With heavy slabbing it might be necessary to wedge the cut open to ensure the weigh to the timber does not lead to reduced cutting speed and overheating.

National Unit specification: support notes (cont)

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Care must be taken to ensure that heavy large sized cut material is appropriately handled by machine or manually with sufficient manpower to ensure safe working loads.

All debris, ie off cuts, slabs, sawdust are removed so as to ensure as far as is practicable a hygienic working site.

The products from the cutting should be stacked in their respective areas ready for drying or transportation to another storage area.

Guidance on approaches to delivery of this Unit

This Unit is designed for the learning and teaching of practical skills but which also incorporates operational site planning. Most of the practical skills will be taught either in a workshop or in a safe working site where the sawmill can be set up and operated. Workshop sessions of demonstration and practice should be used in the maintenance and sharpening of saw blades/bands. The use of demonstration clips and materials placed on a VLE can be used as a reinforcement teaching tool and also as a learning tool being a point of reference in consolidating correct procedures and practice.

The planning and layout of the work area could be taught through a combination of lecture, practical demonstration and supervised practice. Site plans could be designed and produced in IT workshops and tutorials.

Site organisation, system set-up and system operation should be primarily practical demonstration with supervised practice. These sessions can be supplemented with the use of video clips as indicated above. The objective is to ensure that the Unit reflects the field operation of a mobile saw mill to produce added value to small woodland management.

Guidance on approaches to assessment for this Unit

Evidence can be generated using different types of assessment. The following are suggestions only. There may be other methods that would be more suitable to learners.

Centres are reminded that prior verification of centre-devised assessments would help to ensure that the national standard is being met. Where learners experience a range of assessment methods, this helps them to develop different skills that should be transferable to work or further and higher education.

The assessment of the setting up and operation of the mobile saw mill should be practical competence based assessments where performance is assessed against best practice checklists.

The planning and layout of the saw mill site should be a detailed scale plan of an active site identifying the location of the main areas of the processing system, ie mill set up, storage of timber to be processed, stacking processed materials, processing/disposal of waste materials and transportation of products.

The plan should include a detailed description of the processing system.

National Unit specification: support notes (cont)

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Opportunities for the use of e-assessment

E-assessment may be appropriate for some assessments in this Unit. By e-assessment we mean assessment which is supported by Information and Communication Technology (ICT), such as e-testing or the use of e-portfolios or social software. Centres which wish to use e-assessment must ensure that the national standard is applied to all learner evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. The most up-to-date guidance on the use of e-assessment to support SQA's qualifications is available at www.sqa.org.uk/e-assessment.

Given the practical nature of this Unit it does not easily lend itself to e-assessment. E-assessment may be appropriate for some assessments in this Unit. By e-assessment we mean assessment which is supported by Information and Communication Technology (ICT), such as e-testing or the use of e-portfolios or e-checklists. Centres which wish to use e-assessment must ensure that the national standard is applied to all learner evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. Further advice is available in SQA Guidelines on Online Assessment for Further Education (AA1641, March 2003), SQA Guidelines on e-assessment for Schools (BD2625, June 2005).

Opportunities for developing Core and other essential skills

This Unit will offer opportunities to develop *Communication* skills at SCQF level 6 with the requirement for a structured plan and detailed analysis of site layout and production process in Outcome 1. The production of a detailed map of the site is an opportunity to develop and demonstrate *Information and Communication Technology (ICT)* skills in the use of map and plan design software.

Problem Solving and *Working with Others* are Core Skills that can be developed in the organising and operating of a mobile sawmill site and processing system.

History of changes to Unit

Version	Description of change	Date

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General information for learners

Unit title: Mobile Sawmills

This section will help you decide whether this is the Unit for you by explaining what the Unit is about, what you should know or be able to do before you start, what you will need to do during the Unit and opportunities for further learning and employment.

On completion of this Unit you will have developed an understanding of the use of mobile sawmills in woodland timber harvesting, the advantages and limitations of them depending on site and circumstances and how they can be used most efficiently. You will also develop practical skills in the set up, maintenance and use of mobile sawmills with an emphasis on their efficient and above all safe operation.

The assessment of this Unit is likely to be largely practical, based on observation of your ability to safely set up, maintain and operate a mobile sawmill. In addition you will be expected to produce a plan for a mobile sawmill working site. At all times you will be expected to work safely and within industry best practice guidelines.

In addition to the knowledge and skills detailed above you may also have the opportunity to develop the Core Skills of *Communication, Information and Communication Technology (ICT), Working with Others* and *Problem Solving*.