

## Selection of Ungraded Timber for Shoring Operations

### Introduction

In normal circumstances, the only timber to be used for the construction of shores and cribbing when undertaking shoring operations will be C16 constructional grade or a higher grade material. This is supplied as pre-graded product by timber suppliers and loaded onto USAR Module 1 and USAR Module 5.

However, there may be occasions where only un-graded timber product is available. In these situations, those USAR technicians who have received appropriate training, may grade timber on site. This document forms an aide-memoir for the timber selection process.

### Timber Sizes

The constructional grade timber (C16) supplied on Module 1 and Module 5 has a sawn finish. The sizes are nominal and can vary up to 5mm from the nominal dimension.

Details of the contents of USAR Module 1 and USAR Module 5 can be found in Standard Operating Procedure SHO003 - Graded Timber for Shoring Operations.

USAR technicians should note that:

- All load-bearing vertical supports are 100 x 100 millimetres in cross-section.
- Sole and header plates are 100 x 100 millimetres in cross section where supporting a solid surface, e.g. concrete floor.
- Sole and header plates are 200 x 100 millimetres in cross section where used to support a flexible surface, e.g. timber floor.
- Bracing members are 150 x 50 and 100 x 50 millimetres in cross section.

### Timber Selection

All timbers graded and stamped as C16 (or a higher grade) can be selected as being suitable for use. On occasions where only ungraded timber is available, those USAR technicians who have received appropriate training may grade timber on-site.

Ungraded timber is selected by examination of the grain characteristics and the presence of knots. A further inspection for straightness will determine the type of shoring use to which the timber can be put.

Date	Status	Document Number	Version	Page
Jan 2008	Completed	ND_USAR_SOP_SHO 004	1.0	Page 1 of 4

USAR technicians are to use the following parameters when grading timber for use:

- The timber should be generally dry and free from the signs of rot.
- The grain must have more than 8 rings per 25mm when viewed from the end of the timber.
- The grain should be as parallel as possible to the timber length.

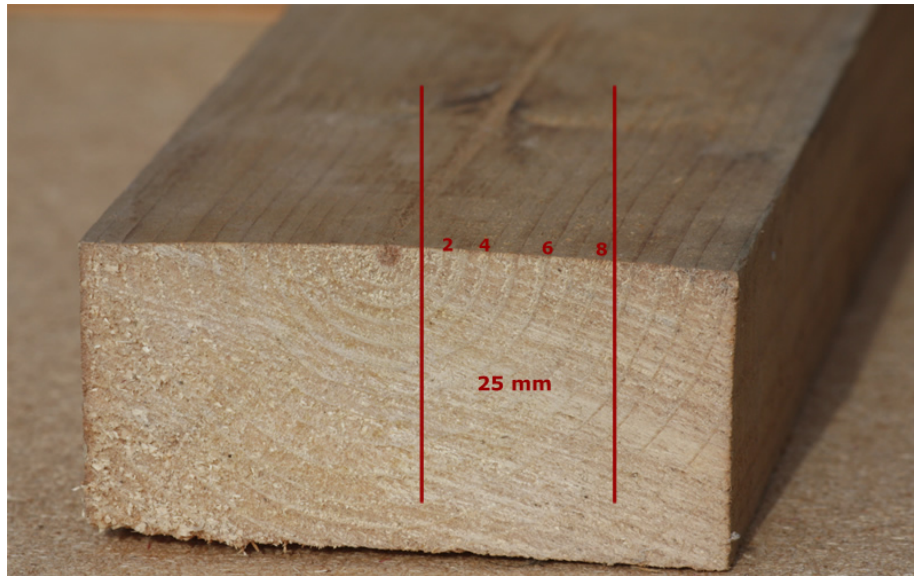


Figure 1: [SOP\_SHO 004]  
Rings in Grain of Timber



Figure 2: [SOP\_SHO 004]  
Grain Parallel to Timber length

Date	Status	Document Number	Version	Page
Jan 2008	Completed	ND_USAR_SOP_SHO 004	1.0	Page 2 of 4

- Where the grain slopes in the timber length this slope is not to exceed 1 in 8.
- Any knots in the timber must not exceed 40mm in diameter.
- Any loose knots in the timber must not exceed 20mm diameter.



Figure 3: [SOP\_SHO 004]  
Maximum size of knots

Where timber properties fall outside those parameters described above it is to be rejected as not suitable for use.

All timbers that pass the grading parameters should then be examined for straightness by viewing along the length of the timber member. Maximum deviation should not exceed 15mm in a 3-metre timber length.

### Strength Properties of Timber

The structural strength of wood is a measure of its ability to resist a load applied to it, such as those which cause compression, tension and shear. The density of wood is a reliable indicator of many of its structural and mechanical properties, particularly strength and stiffness. There is a particularly strong relationship between density and compressive strength, bending strength and hardness, and a fairly reliable relationship between density and stiffness.

Date	Status	Document Number	Version	Page
Jan 2008	Completed	ND_USAR_SOP_SHO 004	1.0	Page 3 of 4

The tensile strength of most timbers parallel to the grain is three to four times the compressive strength. There is a marked difference in all strength properties when measured parallel or perpendicular to the grain.

Features which affect the strength of timber and which are taken into account in grading systems are:

- Knots reduce the tension, compression and bending strength.
- Size, frequency and position of the knots are the main consideration.
- Grain - diagonal, sloping, inclined or spiral grain, reduces the strength of the wood, particularly in bending and stiffness.
- Moisture content - as a general rule timber is more flexible when wet or 'green' but there is an increase in strength as it dries.
- Drying defects.
- Biological degradation caused by fungal decay or insect attack.
- Natural defects resulting from the growth of the tree.

**References**

BS 5268-2:2002 – Structural Use of Timber – Code of Practice for Permissible Stress Design, Materials and Workmanship  
SHO 003 – Graded Timber for Shoring Operations

*Author – K Bellamy*

Date	Status	Document Number	Version	Page
Jan 2008	Completed	ND_USAR_SOP_SHO 004	1.0	Page 4 of 4