

# How to become a competent visual grader

There are many benefits to employers who have a qualified grader on staff. Nick Clifford outlines what visual strength grading is and gives an overview of the specialist training available from BM TRADA.

**T**he days when there were plentiful resources of virgin growth logs from which large, long, near-perfect structural timbers could be cut are long gone. Modern timber markets must use smaller and younger trees grown and harvested sustainably. Yields would be too low if perfect timber was always required for structural applications, so wood with naturally occurring strength-reducing features is used.

## What is strength grading?

Strength grading is the evaluation of these features, either by machine or visually. BM TRADA's Visual Strength Grading (VSG) course teaches delegates how to:

- recognise and measure strength-reducing defects
- apply the appropriate strength-grading rules
- categorise each piece based on its quality.

You might question why trained visual strength graders are needed today when machines can efficiently grade high volumes of timber for structural uses, but there are distinct advantages to both methods. Visual graders can easily switch back and forth between grades, lengths and cross-section sizes, which is an advantage where smaller volumes of timber are needed in a range of sizes and grades. Visual graders are also mobile and have the potential to travel for grading at multiple sites, whereas machine grading needs a significant initial cost outlay and the machines are usually large, immobile and better suited for high volumes of a single grade or cross-section size in a single location.

### Strength-reducing features

A basic principle of visual strength grading is to evaluate the effect of wood's naturally occurring strength-reducing features on the cross-section (width x thickness) at the worst-affected point along the length of an individual piece. Some grading rules



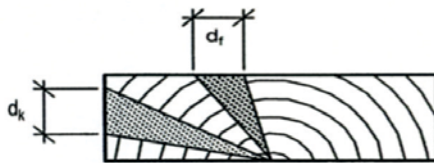
A graded section of timber should display the relevant strength class stamp

change based on the grade or the size of the cross-section. Other rules stay the same for all grades. Knot rules are based on their size as well as their location within the piece. A grader must be able to select the right knot or cluster to assess when there are several to choose from and apply the rules accordingly.

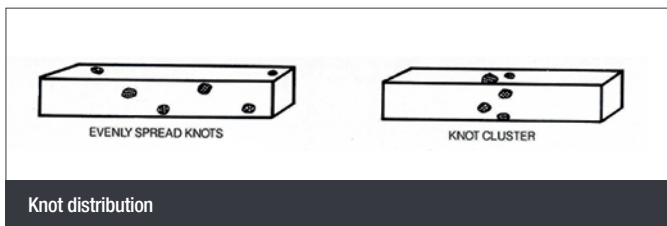
Grain direction is very important as it can significantly reduce strength and must be measured and deemed within (or not) the allowable slope of grain, remembering that the maximum slope limit changes for different grades. Wane, which occurs as a consequence of processing, is also frequently present because square or rectangular lengths are cut from round logs. It reduces the cross-section but it is acceptable, within limits.

### Biological attack

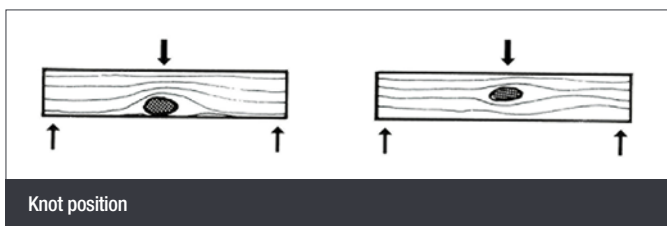
Biological attackers reduce the strength of a piece by an indeterminate amount. Fungal decay and most wood-boring insect damage is therefore unacceptable in structural timbers and is not allowed. However, mould and sap-stain fungi are allowed, since they only affect the aesthetics and not the strength of a piece. >>



Edge and face knots



Knot distribution



Knot position

### Shrinkage

Shrinkage caused by drying (either naturally over time or by kilning) sets up stresses that can cause fissures in wood, particularly in larger sizes, and also distortion such as bow, twist and spring. The depth of splits/fissures/checks/shakes, as well as the length (but not their width), influences loadbearing capacity so there are rules for allowable fissures. Checks or shakes (fissures that do not entirely pass through the whole cross-section) have limits on their length but they are unlimited if their depth is less than half the thickness of a piece. Fissures passing through the full thickness are correctly called splits, and these have much tighter limits as their influence on strength is much greater. Permissible limits for fissures vary for different grades and cross-section sizes.

## Qualification and assessment

Delegates who pass a BM TRADA VSG course and exam are deemed competent strength-graders. They must join a third-party certification scheme to receive their personal grader number and stamp before they can structurally grade timber for commercial use. Certification schemes include regular audits to check grading records are maintained and up to date, and also to regularly assess individual grader performance as part of their ongoing monitoring.

Regular assessments of graders are important not just because good-quality graders often produce higher yields than poor graders, but also because grading skills can quickly become rusty without sufficient practice: incorrectly graded structural timbers potentially carry huge liabilities. BM TRADA consultants have investigated failed timbers that have caused injuries and unfortunately the occasional fatality. We have also been asked to comment when disputes arise over timber quality. One of the first things we check, or are asked, is whether or not the piece met the grade that was stamped on it.

## Visual strength grading courses

The following aspects of visual strength grading are covered by BM TRADA's specialist courses.

### Terminology

Basic terms such as GS or SS, C16 and C24, D24, D30, THA, TH2 that are common for structural timber in the UK will be familiar to those who have attended a VSG grader course. A competent grader must understand the difference between strength grade and strength class. Different timber species have a wide range of properties, including their strength, so categorising the timber by quality (grading) isn't the full picture when it comes to assigning a strength class. It's important to know the species and source of the wood, for example whether it was imported, or grown in the UK.



A piece of timber being visually strength graded



Different types of wood, such as the hardwood pictured, have different properties so it is important to know the species and the source of the wood

### Species recognition

The species recognition aspect of the course helps delegates to begin to separate one timber from another based on macro-features such as knot size, colour and distribution, as well as grain pattern, heartwood/sapwood boundary and rate of growth. This helps to ensure that the correct strength class is assigned and stamped on the wood after grading.

### Examination and assessment

Understanding the principles of strength grading is tested through an exam. If you can identify the defects in a piece and measure them correctly, you have a great chance of passing. The courses are not memory tests and people are not expected to memorise the numerous grading rules and variations between grades – in the real world you can check the rules as you grade using the appropriate standard, so you can refer to the rules that are included in the course booklet at any time throughout the course and exam.

BM TRADA softwood VSG courses run several times each year and the hardwood VSG courses run once or twice annually. Attending a BM TRADA VSG course guarantees an improved understanding of timber. Passing the course and

the exam authorises delegates to carry out strength grading for their company, while all delegates will be better placed to talk to customers and clients with a greater knowledge of not just structural timber, but of wood generally. ■

### About the author



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### Further information

To find out more about BM TRADA's Visual Strength Grading courses, visit [www.bmtrada.com/training/timber-training](http://www.bmtrada.com/training/timber-training)

### Further reading

- *WIS 2/3-10 Timber properties and uses*, BM TRADA, 2021
- *WIS 4-7 Timber strength grading and strength classes*, BM TRADA, 2021