Size distribution similar to standard gradings – detailed approach for coarse gradings

The first three coarse gradings shown in Table 3.5 have ratios characterised by the following:

$ELL/D_{50} = 0.28$ $NLL/D_{50} = 0.56$ $D_{50min}/D_{50} = 0.79$ $NUL/D_{50} = 1.57$ $EUL/D_{50} = 2.24$

For any user-defined D_{50}, all appropriate limits can be obtained and rounded to available screen sizes.

Mass distribution not similar to standard gradings for Category B – graphical method

If a given design M_{50} requires specification of a non-standard grading wider (easier to produce) or narrower (more difficult to produce) than the equivalent nearest standard grading, the suggested limit requirements in Table 3.7 should be disregarded in favour of limits governed directly by the grading width chosen. Once the user has set the desired NUL and NLL masses, the following graphical method, which assumes a log-linear form to the grading curve, can be used:

- using a log scale for mass and a linear scale for percentage passing, plot the NUL mass point at 70 per cent passing and the NLL mass point at 10 per cent passing
- join the two points with a straight line and interpolate to find the M_{50} value
- linearly extrapolate to read off mass values at 2 per cent (if light gradings) or 5 per cent (if heavy gradings) to obtain ELL. Similarly, read off mass values at 97 per cent to obtain EUL.

Designating a non-standard grading

The EN 13383 gives specifications for a number of standard gradings with both Category A and Category B status, but a producer may wish to declare other gradings for sale. Provided the grading on offer can be tested for conformance using EN 13383 test methods, this is perfectly acceptable within EN 13383 rules, but it must be declared using a labelling system compatible with terms used for EN 13383 gradings: "HM_A declared *NLL-NUL*; extreme limits: *ELL-EUL*; effective mean mass: M_{emll}-M_{emul}. For example: a 2–4 t grading would be declared by inserting the correct figures in place of the italics, eg using guidance from Table 3.7:

"HM_A declared 2000–4000; extreme limits: 1050–5900; effective mean mass: 2500–3000".

A designer wishing to specify limits different to the standard limits in Table 3.5 (Tables 1 to 5 of EN 13383-1:2002) would designate their requirements in a similar way. Note that the prefix letters HM_A, HM_B, LM_A, LM_B and *CP* are used to distinguish heavy mass, light mass and coarse size gradings respectively, where the subscript A refers to Category A, which imposes the M_{em} restriction, while for Category B it is omitted.

3.4.4 Core materials

Core materials are generally used for volume-filling. As such, they do not have requirements for a characteristic size such as M_{50}. The top size is generally indicated and bottom sizes may be controlled. The geotechnical properties required for core materials, typically shear strength, placed porosity and permeability are identified in Section 5.4. These geotechnical properties are greatly influenced by the width of the grading and most notably, the content of fines. The fine material content is closely related to the tail of the quarry yield curve and the fines removal technique. An approach for the prediction of porosity suitable for core materials is given in Section 3.4.4.3.