

Box 3.29 *Reselection of armourstone*

Reselection of larger stones can sometimes be at higher outputs than selection at the face because the material is much more single-sized. It should be spread out for machinery to access stones easily. The principle of reselection is that a loader fitted with a weighing device and forks instead of a bucket weighs the stones and transports them to stockpiles of standard gradings. If there is doubt about whether the stock complies with requirements, sub-class stockpiles may be used and the stones placed into 1–2 t, 2–3 t, 3–4 t, 4–5 t, 6–8 t, 8–10 t, 10–12 t stocks etc. An excavator may also be used, but specific attention should be paid to the organisation of the stocks to minimise the travelling distances. Table 3.30 provides the appropriate size of machine and experience of outputs.

Table 3.30 *Relationship between the appropriate machine capacity (t) and size of stone to be reselected*

| Equipment capacity | > 10 t | 6–10 t | 3–6 t | 1–3 t | 0.3–1 t | 60–300 kg |
|---|--------|--------|-------|-----------------|---------|-----------|
| Front-end wheel loader with fork (bucket not appropriate) (t) | 45.0 | 30.0 | 22.5 | Not recommended | | |
| Excavator (t) | 60.0 | 50.0 | 37.5 | 27.5 | 17.5 | 10.0 |
| Powerfork (t) (to be fitted to excavator) | 3.65 | 3.05 | 2.30 | 1.70 | 1.10 | 0.60 |
| Average selection rate (t/h) | 250 | 215 | 160 | 95 | 43 | 15 |

NOTE: The average output of a front-end wheel loader is difficult to determine since it depends on many parameters, eg the travel distance.

The final grading is produced by recomposition during loading at the quarry and not at the delivery stage. Consequently, the final grading may either be a standard or non-standard grading. The proportion of stones required from each sub-class to create a good fit to the average target grading curve is determined. Mixing at the construction site will ensure that the proper grading is available for construction.

Table 3.31 gives an example of how to prepare a quality control guide table for a 6–10 t grading with M_{50} between 8.5 t and 7.5 t. The last two columns can be used as a grading plan for 1000 t used by the machine driver when loading the trains, barges or trucks. The operator keeps a record of the number of pieces loaded from each sub-class and once or twice a day a grading curve is plotted. If sizes are drifting off target grading curves, future loads can be adjusted.

Table 3.31 *Heavy grading quality control plan*

| Sub-class | Cumulative % in sub-class | Percentage in sub-class | Tonnage in sub-class | Average stone mass (t) | Number of stones |
|---------------|---------------------------|-------------------------|----------------------|------------------------|------------------|
| < 4.0 t | 0.0 | 0.0 | 0 | | |
| 4.0–5.0 t | 2.5 | 2.5 | 25 | 4.5 | 6 |
| 5.0–6.0 t | 5.0 | 2.5 | 25 | 5.5 | 5 |
| 6.0–7.0 t | 27.5 | 22.5 | 225 | 6.5 | 35 |
| 7.0–8.0 t | 50.0 | 22.5 | 225 | 7.5 | 30 |
| 8.0–9.0 t | 67.5 | 17.5 | 175 | 8.5 | 21 |
| 9.0–10.0 t | 85.0 | 17.5 | 175 | 9.5 | 18 |
| 10.0–12.0 t | 91.0 | 6.0 | 60 | 11.0 | 5 |
| 12.0–14.0 t | 97.0 | 6.0 | 60 | 13.0 | 5 |
| 14.0–16.0 t | 100.0 | 3.0 | 30 | 15.0 | 2 |
| Total: | | | 1000 t | | 126 |

NOTE: Although permitted according to the standard, at this stage there should not be any piece smaller than the 4 t. This allows for the fragments to be produced during the handling of the materials during transport and placing.