

It has been stressed that in the design process new guidance on layer thickness and as-placed density, especially of individually placed armour layers, as presented in Section 3.5.1, should be adopted in finalising design profiles. The mass of armourstone that the contractor has purchased and placed in the armour layer is then more likely to be close to the designer's estimate of required mass calculated from the design volume. The designer or client requires quality workmanship without liability for paying for fluids when rock was wanted, and without liability for paying for overly tight armourstone when less material was intended. The contractor wants speedy execution and full recouping of the cost outlay on materials. It is important to recognise a balance between the two parties' legitimate concerns. This requires that the designer's assumption for the armour layer porosity, n_v , applicable to the spherical probe survey method, is known, and that the validity of this assumption is checked during approval of the test panel.

It is recommended that the client declares in the contract:

- the payment rate for the mass of armourstone placed in each class of armourstone
- the assumed armour layer porosity, n_v , in each class of armourstone
- the assumed design layer thickness coefficient, k_t , for armour layers.

The test panel should form part of a larger completed section within realistic boundaries. Blocks falling on the boundaries of the panel are treated appropriately so as not to bias results. Particular care should be taken to ensure the test panel armourstone is representative of the specified grading. If necessary, adjustments to the trial panel are made until:

- grading is within specification
- final survey heights are within tolerance limits of the design drawing heights. Any serious difficulty in meeting these tolerances suggests that stone shape characteristics have not been accounted for and/or that inappropriate estimates of the k_t factor were assumed in the design. These problems can be resolved by rebuilding, resetting the design drawing surface levels or resetting tolerances
- in the eyes of the engineer, the visual appearance reflects the designer's intention as implied by the placement methods referred to in the contract and classified as random, standard, dense or specific.

This trial panel is then termed visually accepted and is subject to further analysis.

Given the placement method referred to in the contract on the one hand, and the blend of on-site factors (materials characteristics, placement machinery, operator training and experience, working conditions, time constraints) on the other, the trial panel exercise may point to a need to revise the most appropriate layer (or volumetric) porosity assumption for use in the payment calculation if payment is on a basis of armourstone tonnages deduced from surveyed volumes and target layer porosity.

Data obtained from the visually accepted test panel include:

- individual masses of all blocks in the panel. This provides further on-site control of heavy gradings. Individual weighing is preferred to the alternative of mass estimation from density and volume assessment using suitable block dimensions and shape factors. The total mass of armour in the panel is divided by apparent rock density, ρ_{app} (kg/m³), to give the volume of armourstone in the panel, V_r (m³)
- the surveyed armour layer volume, V_{bs} , corrected to spherical end $0.5D_{n50}$ probe method. The chainage length is multiplied by the average area enclosed between the upper and lower surveyed surface of the armour layer (see Equation 3.24, $V_{bs} = A_{cs}L$). Normally it should be sufficient to have four profile lines surveyed across the structure at 2.5 m intervals, making sure the end points of the survey line are included