

agreed by the Engineer in exceptional situations where the geometry is complex.

### **9.3.9 Repair Using Shotcrete**

- A. Spraying equipment, nozzles, assemblies, equipment, tools and accessories shall be regularly checked for working efficiency, freedom from leaks and that worn parts are regularly replaced. The air supply shall be adequate in volume and pressure and be dry and free from pressure fluctuations.
- B. The Contractor or his sub-contractor shall demonstrate his ability to satisfactorily spray cementitious mortars and concrete. He should also be fully conversant with the relevant codes of practice relating to the spraying of mortars and concrete.
- C. The Contractor shall employ operatives who are competent and experienced in spraying. Nozzle men shall have at least 3 years of experience in spraying concrete. Moreover, they will be subject to qualifying tests as directed by the Engineer.
- D. Profile guides shall be used to ensure that concrete is placed to the required thickness, uniformity and texture with minimum surface trimming or finishing work.
- E. Interfaces shall be dampened for at least 12 hours, with no excess free water, prior to commencement of spraying. During spraying operations, interfaces, joints and subsequent layers of sprayed concrete shall be subject to continuous removal of trapped rebound, overshoot and laitance.
- F. Spraying shall commence at the bottom of vertical panels and progress upwards. The position and type of construction joints shall be approved by the Engineer.
- G. For each particular area, the maximum thickness of each layer shall be determined beforehand to avoid slumping. The surface of each layer shall be dampened again upon initial set before the application of the next layer.
- H. Sand pockets and laminations are not acceptable. The finished surface shall not deviate from the required plane by more than 3mm per metre in any direction when measured with a straight edge 1m long.
- I. Uninterrupted wet curing for at least 10 days shall be ensured. Means of curing shall vary depending on condition on site, size, shape and position of the concrete in question. Wet hessian with polyethylene cover as a minimum shall be used throughout the curing period.
- J. Cracks appearing in the new works are not acceptable and shall be repaired at the Contractor's own cost and to the Engineer's satisfaction.

### **9.3.10 Repair Using In-Situ Concrete**