



Honeycombing Swimming Pool

Site Observation

Initial inspection of the swimming pool walls following formwork removal identified multiple areas of honeycombing and surface voiding requiring further assessment and remedial action.

All affected areas should be assessed by the design team and repaired in accordance with an approved remedial methodology, supported by appropriate inspection and testing requirements.

Causes of Honeycombing

1. Inadequate Compaction

Mechanical vibration is required to remove entrapped air and achieve full compaction of freshly placed concrete.

Insufficient vibration prevents the concrete matrix from fully consolidating around the reinforcement and aggregate, resulting in voids and honeycombed areas.

Attention should be given to:

- Congested reinforcement zones.
- Changes in section thickness.
- Wall bases and kickers.
- Box-outs and cast-in items.
- Construction joints.
- Narrow or restricted areas within the formwork.



Concrete should be vibrated systematically and in accordance with the approved method statement to achieve full consolidation without causing segregation.

Honeycombing was identified at the base of several reinforced concrete wall sections.

2. Formwork Deficiencies

Poorly sealed formwork joints can allow cement paste and fines to escape during placement and vibration.

Loss of cement paste results in exposed aggregate, increased surface voiding and localised honeycombing.

Formwork must therefore be sufficiently rigid, watertight and capable of resisting placement pressures without distortion or leakage.

Applicable Standards

Reference should be made to:

- **BS EN 13670 – Execution of Concrete Structures**
- **National Structural Concrete Specification (NSCS)**
- **BS 8000-2 – Workmanship on Building Sites: Code of Practice for Concrete Work**

These documents set out the requirements for concrete placement, compaction, workmanship, inspection and quality control during construction.

Impact

Honeycombing and voided concrete can result in:

- Reduced durability and long-term service life.
- Increased permeability and risk of water ingress.
- Potential reinforcement exposure and accelerated corrosion.
- Non-compliant surface finish and structural defects.



- Additional remedial works including removal of defective concrete, preparation, repair mortar application, testing and validation.
- Delays to subsequent construction activities and programme impacts.

Key Learning Points

- Ensure the structural design requirements, reinforcement detailing, concrete specification, and construction sequencing are fully understood prior to commencement of concrete works.
- Concrete placement operations must be suitably planned and supervised, with adequate labour resources, serviceable compaction equipment, and personnel competent in the placement, vibration, finishing, and curing of concrete.
- Pre-start briefings should specifically address concrete placement methodology, layer thicknesses, vibrator selection, insertion spacing, duration of vibration, and requirements at reinforcement congestion, construction joints, penetrations and changes in section.
- Defect prevention measures should be reviewed with the supply chain before commencement of works, including the requirements of the project quality plan, Inspection & Test Plan (ITP), method statement and relevant concrete workmanship standards.
- Compliance with compressive strength requirements confirmed through cube testing does not, in isolation, demonstrate that the in-situ concrete is satisfactory. Concrete may achieve the specified cube strength whilst still containing significant voids, honeycombing, segregation or inadequate compaction which can adversely affect durability, watertightness and structural performance.

☐	Brickwork / Blockwork	☐	Design	☐	DFMA (Offsite Manufacture)	☒	Doors & Windows	☐	Drainage	☐	Electrical	☐	FFE (Furnishings, Fixing & Equipment)
☒	Fire & Lightening	☒	Floor Coverings	☐	Frames & Superstructure	☐	Internal Walls, Partitions & Ceilings	☐	Joinery & General Carpentry	☐	Miscellaneous	☐	Painting
☐	Public Health (Water)	☐	Roads, Paths, Paving & Surfacing	☐	Roof	☐	Services & Systems	☐	Site Preparation Works	☐	Substructure	☐	Walling (Tiling & Finished)