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ALERT

MORGAN SINDALL CONSTRUCTION

Concrete Cubes for Testing

Cubes have a vital role to test that the concrete strength meets the specification requirement. However, the cube results will be meaningless unless the sampling and testing procedures as described in BS EN 12390-2, are followed. Failure to meet specification can result in the need to spend even more money undertaking complicated calculations to prove compliance with British Standards or even drilling and crushing cores to prove design and reliability. We waste so much time and money in doing this when it goes wrong. More worryingly if concrete doesn't meet requirements, and incorrect cube sampling methods have been used, it could result in catastrophic failures, which could lead to loss of life. So lets do it properly and 'get it right first time'.

A number of our sites recently have had observations raised in the methods of taking samples, making of concrete cubes and storing them for testing. This was also raised in 2018 in a very similar situation regarding creation of cube for testing. Before any cube can be made you must carry out a Slump Test – always do your slump test before making your cubes to ensure the concrete is usable. If the slump test fails to meet the range limit as dictated by the British Standard, and indicated in your design, then the load should be rejected. Slump is often effected by 'wetting up' at source or in waiting time on or off site. This practice weakens concrete and adversely impacts on the intended design purpose..

Cubes should be made in accordance with BS EN 12390-2, Testing hardened concrete. Making and curing specimens for strength tests. Never take a sample from the first or last section of the pour, it won't be a true representation of the batch. The concrete is usually sampled after the 1st metre of concrete has been poured to ensure a good sample is taken. As said in BS EN 12350-1, take a few samples throughout the pour for the best representation of the batch and make sure you take 150% of what you think you'll need. (dependent on specification/contract requirement) The sample is taken and used to make the cubes. The sample must be a good cohesive mix, it may require some mixing once taken from the concrete batch to be suitable for a slump test and cubes. They should be cast as soon as the concrete has been sampled and made as near to their final storage position as is practicable. The sample should be re-mixed thoroughly on a steel sampling tray, or if not available, it should be tipped onto a heavy plastic sheet, or similar impermeable material.

The cube mould should be clean and lightly oiled. It should be filled in 50 mm layers and compacted, with a steel tamping bar, with a minimum of 25 or 35 tamps per layer for a 100 or 150 mm mould respectively. After tamping each layer, the mould should be lifted slightly and dropped or the sides tapped, to close the top surface of each layer. The final layer should slightly overfill the mould. Finally the top layer should be trowelled off, level with the top of the mould. All sampling and test equipment should be cleaned immediately after use.

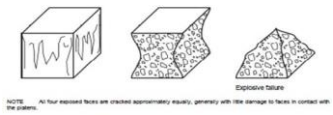

Figure 1 – Satisfactory failures of cube specimens

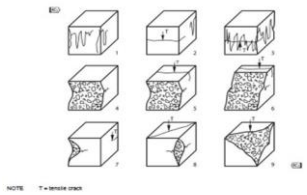

Figure 2 – Some unsatisfactory failures of cube specimens

The fresh cube should be kept away from extremes of heat and cold. Ideally they should be covered to prevent surface evaporation and stored as close to 20C as possible until the moulds are stripped and the cubes placed into the curing tank, which will be maintained at the required temperature, a record of which, taken daily. If the ambient temperatures are very high, it may be advantageous to place the freshly made cubes, in their moulds, into the curing tank. Cube mould baseplates can be used as lids. This should be done after initial stiffening of the concrete and care should be taken to avoid disturbing the surface or washing out some of the sample.

Independent testing contracts exist with ACS testing, ESG and CET. Please contact your regional buyer for more information on this.

This advice should be used, where the above is applicable, and the information discussed with your team highlighting the following points:

- Verify the requirement for cubes to be taken, by who, for who, frequency and process for publishing results
- Have the right tools and equipment on site before pouring, encompass this into pre pour checks
- Sampling should be from the correct part of the batch
- Always ensure the slump test is carried out
- Record all aspects of the process in SIMS
- Ensure cubes are referenced to delivery ticket, pour location, time, and weather effects
- Follow up on results and notify all parties affected, if in doubt, ASK!

SHEQ Alert date:	04/2020			Display until:	30/04/2020				
Distribution:	Morgan Sindall	Y	Supply Chain	x	Plant Hire Desk	x	Morgan Sindall Group	x	
Communication:	Toolbox talks / briefings	x	Noticeboards	x	SHEQ update	x			

Everyone has the right to be 100% Safe