

Reinforced Concrete Tanks Can Float or Burst Up in the Middle

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Reinforced concrete tanks recently completed are very vulnerable to damage at present because of the bad weather conditions. Tanks can float or burst up in the middle if the height of water is higher outside than inside. The height of water that will cause floating or bursting depends on the type and dimensions of the tank. Tanks that float are bound to crack extensively when they settle again after the water is pumped out. Slatted tanks are more likely to float than burst up in the middle, whereas, large rectangular uncovered tanks are more likely to burst up in the middle and are more vulnerable than slatted type tanks.

To prevent this happening drain around the outside of tanks at the base or ensure that the water level is equal or almost equal inside and outside the tank i.e. by pumping water into the tank or letting water flow in through the holes for shuttering (so called "divi" holes), until such time as it can be drained. If the lowest line of divi holes is high, water should be pumped in up to this level. If the divi holes are already sealed there is no choice but to pump water into the tank. In freshly constructed tanks ensure that the level inside is not substantially higher than outside.

See section 5 of the Department specification S123 for more information and talk to your Teagasc adviser if in doubt.

On a **safety note**, there is also a danger from drowning in these situations, so extreme care, secure fencing and warning signs are called for.

SEE SECTION 5 FROM S123 BELOW:

5 SITEWORKS

5.1 Site

The site shall be carefully chosen with a view to minimising operational and constructional problems. It shall be well separated from potential fire hazards and sheltered if possible. As a general guide, a storage facility for silage effluent/slurry/soiled water should be located not less than 50m from any water body in the case of new farmyards, and not less than 10m in the case of extensions/modifications to an existing facility. The minimum distance between a storage facility and a public/private water supply source, either surface or ground, shall be 60m. In vulnerable situations this distance shall be increased up to 300m.

Extreme care shall be exercised to prevent any pollutant getting into the backfill around storage facilities.

Note: Any land drains shall be stopped at least 10m on the upstream side of a site and diverted around to re-connect with the drainage system at least 10m on the downstream side of the storage area.

5.2 Site Groundwater

Water table levels shall be checked by digging two holes deeper than the proposed tank floor level and covering them temporarily. After 48 hours the water level is noted. Where this is above tank floor level, flotation and structural problems may occur. Where the groundwater level is a problem, the water table shall be permanently lowered by providing field drain pipes with porous fill around the tank at floor level connected to an outlet drain. Any springs within the floor area of the tank shall be piped to this drain system under floor hardcore. If ground levels do not permit an outlet then a new site shall be sought, or the walls and floor of the tank shall be increased in thickness to counteract the flotation of the empty tank. Engineering advice shall be sought and followed.

5.3 Flooding

Flooding of open excavation around completed tank can cause floatation and extreme structural damage to concrete tank. **Precautions shall be taken to ensure this does not happen**, by preventing flood water from getting into the excavation, or by the addition of an outlet drain, or by partially filling the tank with water.

5.4 Excavation

Excavation shall be to a solid foundation, at least 1000mm beyond the tank wall on all sides. Excavation shall be levelled, and suitable hardcore or gravel to a depth of at least 150mm shall be fully compacted with a plate vibrator over the whole area. In some excavations it may be necessary to lay a 75mm layer of site concrete to provide a working surface before placing steel on the concrete floor.

For all excavations deeper than 1.25m deep, the banks shall be battered back at an angle of at least 45° or supported by suitable shuttering. Excavations shall at all times comply with the relevant Health and Safety requirements.

5.5 Rock

Where solid rock is encountered in excavations it shall be removed below the required depth and a 75mm cushion of broken stone shall be replaced over the bed rock, consolidated with a plate vibrator, and blinded over with gravel or fine sand.