

Grouting post-tensioned ducts

A major concern with existing bridges and some post-tensioned floors has been quality of grout and protection of tendons. A properly grouted duct will protect tendons from corrosion by providing an alkaline

environment around and between the tendons. However, such factors with the grout as poor flow, segregation, air entrapment combined with procedural problems such as maintaining pumping

pressure, protection of end plates and correct choice of ducting have led to many challenges facing the industry.

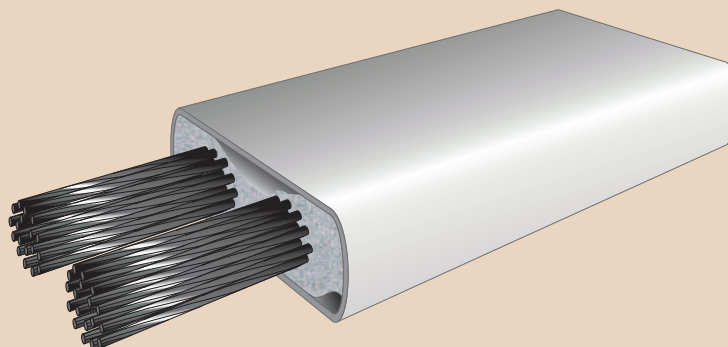
1 Choosing the right grout



The selection of a suitable duct grout has been simplified by the introduction of the CARES Appendix PT10 that now recommends solely the use of a pre-bagged premixed grout for use in post-tensioning ducts. This in a way supercedes BS EN 447: *Specification for common grout*, which allowed the use of site-mixed grouts. **weber.cem duct grout** was developed several years ago

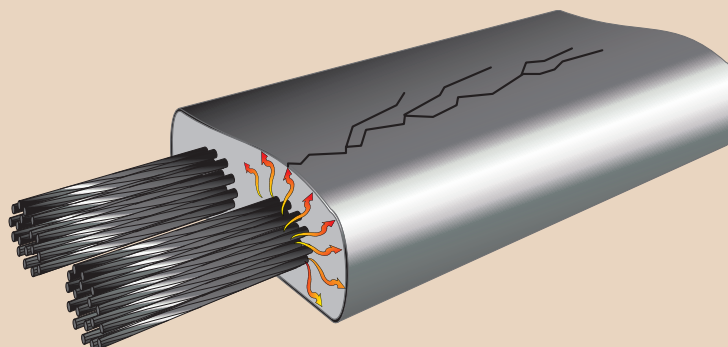
in conjunction with the work done in the preparation of Concrete Society Technical Report TR47: *Durable Post-tensioned Concrete Bridges*. It has been used successfully on many major civil engineering and building projects without any problems.

2 Voids in ducts



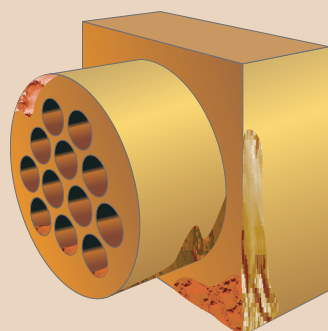
The best way to ensure complete filling of the ducts and hence protection of the tendons is to use a top quality grout. The favoured option is to use a combined colloidal mixer and pump with a constant pressure monitoring system. This ensures a steady flow of grout with a measured quantity of water without segregation and without air entrainment. BS EN 446 provides directions on the correct grouting procedures to be adopted by the specialist grouting contractor.

3 Chemical reaction within the ducts and tendons



Incorrect selection of ducting material can lead to chemical attack as well as swelling of the grout. Recent tests carried out on galvanised steel ducts have shown that gas evolution as a result of a chemical reaction between zinc or aluminium and the alkaline grout can result in swelling of the ducting and possible disruption of the concrete surrounding the ducts. Plastic ducting has been in favour in many countries worldwide.

4 Corrosion of the end anchorages



End plates can be susceptible to corrosion as they are exposed to the elements. They can be coated with a resin coating such as **weber.tec EP bonding aid** to resist formation of anodic sites on the steel.



Correct grout selection and application

Recent moves by Authorities to improve quality of both post tensioned bridge and floor construction have established a number of specifications that define

grouting procedures, test methods and specify the grout material to be used. These have now been published and the grout can be certified under the CARES scheme.

Because post-tensioned grouting is a specialised and critical operation it should only be undertaken by approved and trained operatives and contractors.

Product required

weber.cem duct grout is a quality-controlled premixed cementitious grout developed for the grouting of tendons, bars and anchors in internal prestressing ducts. **weber.cem duct grout** complies with the special requirements

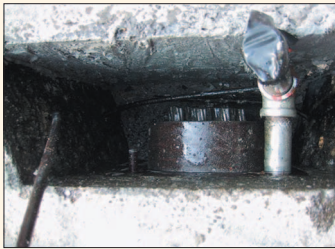
of clause 8 of Concrete Society Technical Report No 47 *Durable Bonded Post-tensioned Concrete Bridges*. **weber.cem duct grout** is a pre-bagged special non-shrink grout which does not segregate or bleed.

Standards

- TR 47
- BS EN 445
- BS EN 446
- BS EN 447
- ETAG
- CARES UK Appendix PT10

Applications

- Floor slabs
- Bridge beams
- Cement silos
- LNG tanks



Mixing

weber.cem duct grout needs only to be mixed with clean, potable water to give high flow consistency required. Add up to 7.75 litres water per 25 kg bag. Do not over-water. Mixing should be carried out in a high-shear, specialist grout mixer. Water is added to the mixer, followed by the dry powder and mixed until a homogeneous grout consistency is achieved. Keep the mixed grout in slow, continuous agitation until it is pumped into the duct. The temperature of freshly mixed grout shall be between 5°C minimum and 30°C maximum.



3.1

