



Liaseal Design Concept - A new era of more durable and reliable segmental post-tensioned construction

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Abstract

The construction of prefabricated segmental viaducts in the United Kingdom are subject to a ban following major incidents (collapse) on structures due to anticipated corrosion problems of internal prestressing tendons. On the HS2 project, the Client's specifications opened the possibility of deviating from this ban by specifying the highest level of protection against stray current induced corrosion to the prestressing tendons according to engineering industry standards such as FIB Bulletin 33.

The highest protection level specified as PL3 requires the non-destructive monitoring of tendons against corrosion, by monitoring the impedance current levels of each tendon. To obtain high level results, each duct must be completely insulated to any other metallic components of a reinforced concrete structure and to avoid any leakage current in the concrete surrounding the tendon ducts.

The standard solution adopted on the prefabricated segmental viaducts (the use of a foam/silicone seals at the joints between segments) and the use of steel corrugated ducts, were therefore not suitable for PL3 level requirements because they do not provide an Electrically Insulated Tendon (EIT) system. To achieve an ETI system is to use electrically isolating materials not only for the duct (normally polypropylene (PP) or high-density polyethylene (HDPE)), but also at the PT anchor head using an isolation plate and encapsulating the strand within a plastic duct with an alkaline, cement-based grout with limited chloride content.

Freyssinet provided an electrical isolated PT anchor, adopted to connect with the HDPE duct but to further ensure continuity between the precast segments developed a duct coupler seal called "Liaseal" in compliance with FIB bulletin 75, to ensure a sealed polymer-duct system for internal bonded post-tensioning tendons to PL3 requirements.

Keywords: Post-tensioning; Liaseal; PL3; Electrically Isolated Tendons (EIT); PSV; Freyssinet.