

Specialist Contractor's View

Construction

(Glen Wakefield VSL Australia)

History

- Reported to be a patent from 1888
- In 1908 the Veudre Bridge (France) used PT
- Most early developments were failures due to poor concrete
- The realisation of concrete creep lead to the further development of Prestressing - Eugene Freyssinet (France) & WH Glanville (GBr).
- Eugene Freyssinet was first to capitalise and further developed prestressed concrete

PT in the UK

- Bonded PT had become banned between 1992 & 1996 by the Highways Agency
- Poor quality grouting
- PT companies did not do their own grouting
- Main contractors were left to grout the stressed tendons
- During this period unbounded PT was allowed to continue

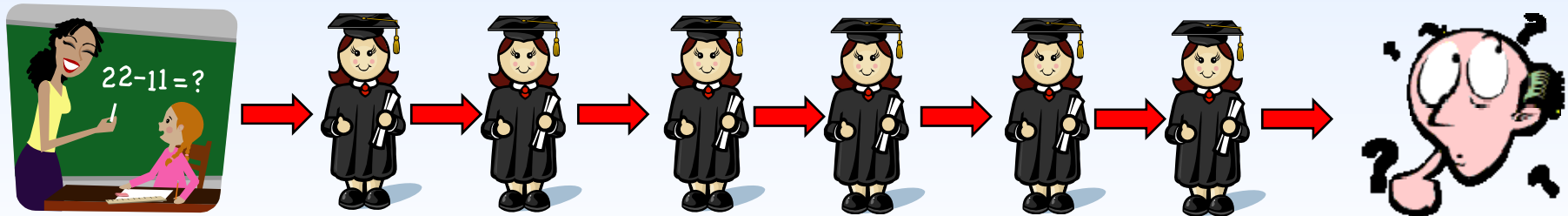
A Complete System

- Internationally, similar issues were being paralleled to the UK
- In recent times the whole PT system has been subject to review
- The realisation of PT being a complete system



Complete System Overview

- People
- Training & qualifications
- Design & detailing
- R&D
- Certifications



Operator train new operator, that train new operators, that train new operator

Very often, procedures and trade workmanship that has been taught out from the beginning from senior technicians, is not the same as being applied today

Certification & Recognition

- Through R&D in the pursuit of quality
- ETAG
- Euro norm
- RTA, Vic roads or equivalent

Service d'études techniques des routes et autoroutes 45 avenue Aristide Briand BP 100 F 92225 BAGNEUX CEDEX Tel : + 33 (0)1 46 11 31 31 Fax : + 33 (0)1 46 11 31 59	 <p>Authorized and notified according to Article 10 of the Council Directive of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products (89/100/EEC)</p>	Sétra service d'études techniques des routes et autoroutes
MEMBRE DE L'EOTA MEMBER OF EOTA		
European Technical Approval No ETA-06/0006 (English translation, the original version is in French)		
Nom commercial : Trade name :	Procédé de précontrainte VSL VSL Post-Tensioning System	
Détenteur de l'ATE : ETA Holder :	VSL INTERNATIONAL Ltd. Scheibenstrasse, 70 CH - 3014 BERNE	
Type générique et utilisation prévue du produit de construction : Generic type and use of construction product :	Procédés de précontrainte des structures par post-tension (communément appelés procédés de précontrainte) Post-Tensioning Kits for Prestressing of Structures (commonly called Post-Tensioning Systems)	
Valid from : to :	31-07-2006 30-07-2011	
Producteur du Procédé : KIT Manufacturer :	CTT- Stronghold, SA Ribera del Congost, s/n SP - 08520 Les Franqueses del Vallès (Barcelona)	
Cet Agrément Technique Européen contient : This European Technical Approval contains :	8+(4+40+28) pages incluant 3 annexes (0, 1, 2) faisant partie intégrante du document 8+(4+40+28) pages including 3 annexes (0, 1, 2) which form an integral part of the document.	
 EOTA Organisation pour l'Agrément Technique Européen European Organization for Technical Approvals		

R&D

- Procedures
- Materials



Optimised Grout

Common Grout



Common Grout



Optimised Grout

Training and Competency

- PTIA training = quality & safety
- In house training = quality & safety
- Procedures = quality & safety

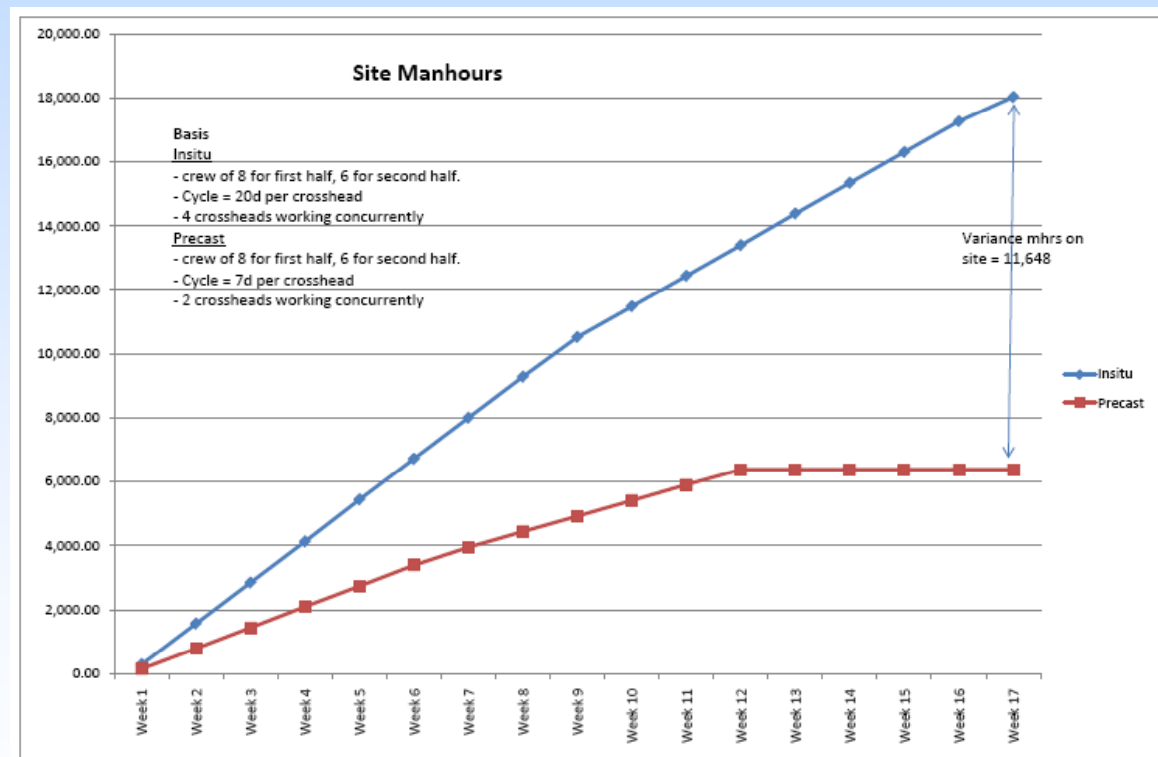


International View

- USA** : **Site Staff requires ECS or PTI P-T Cert. + PTI Grout Cert. (1+1 day Training)**
- Canada** : **Site Staff requires Post Tensioning Ironworkers Cert. (1 day Theoretical)**
- U.K** : **Site Staff requires Post Tensioning UK-Cares Cert. (1 day Safety Training)**
- Asia** : **None..... (HKG Site staff requires CITA Trade Test / 0,5 day)**
- Australia** : **Site Staff recommended PTIA training (2 days training)**
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- Europe in general** : **CWA 14646, European Workshop Agreement specifies specific requirements for qualification and training of P-T personnel**
- Scandinavia** : **In addition to CWA, Site Staff requires 2,5 years documented P-T experience under supervision of experienced Post Tensioning Technician**
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- Good Practice** : **Regular internal training and supervision**

Benefits of Post Tensioning

- Reduced materials
- Production
- Quality
- Save costs



Uses of PT

- Slabs on ground
- Residential & Commercial buildings
- Precast bridges
- Precast piers
- Water Retaining Structures



Slabs on Ground

- Reduced materials
- Improved quality through crack control
- Large expansive areas with no joints and no cracks



Slab on Grade

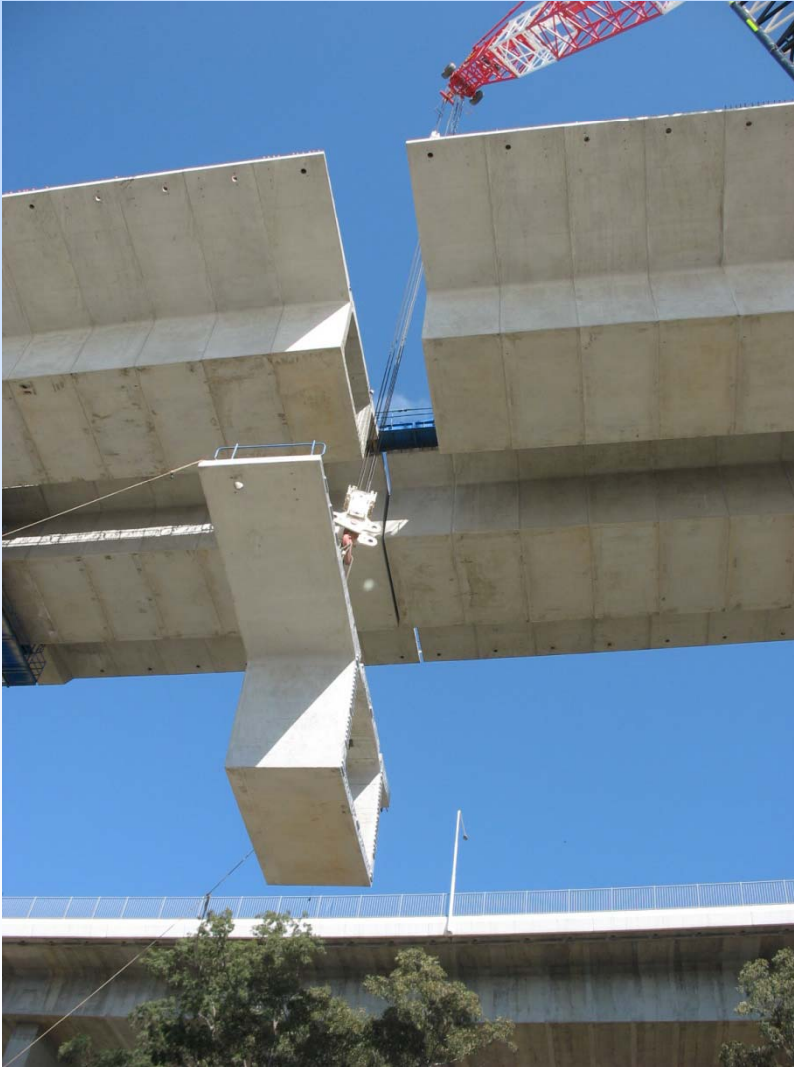


Residential and Commercial

- Greater spans achievable
- Programme and resource saving
- Requires extra co-ordination for restraints



Precast Bridges



- Gateway Upgrade Project : Brisbane

Precast Piers

- Minimise On-site Labour, Materials and Formwork.
- Pre-cast segments can be manufactured at the same time ground works are being constructed.
- Faster construction time than in-situ systems. Approximately 1 to 2 days to complete erecting column and cross-head segments.
- Suitable for “tight” sites in built up urban areas.
- Suitable for remote sites where skill labour and materials are difficult and expensive to procure.
- This construction method is less affected by inclement weather as the pre-cast production is done undercover.
- Minimise environmental impact on site as there is reduced on site materials (e.g. concreting)

Precast Piers



- West Gate Freeway Extension : Melbourne

Precast Piers



- Moorabool River Bridge: Geelong

Precast Piers



Water Retaining Structures



And that is just its use in concrete

