



Report of fib Commission 9 Reinforcing and Prestressing Materials and Systems

fib Commission 9

• Areas of interest:

- Reinforcing and prestressing steels
- Reinforcing and prestressing systems
- Non- metallic reinforcement , tendons and systems
- Quality and protection for materials and systems
- Stay cable systems
- Ground anchor systems
- Construction / installation of materials and systems



• Organisation:



- 45 members from 23 countries
- PT suppliers, consultants, laboratories, universities
- C9 Meetings
 - Shizuoka, Japan (2007)
 - Madrid, Spain (2008)
 - Cracow, Poland (2009)
 - Washington, USA (2010)
 - Paris, France (2011)
- Task Groups (9)

• Organisation:



- TG 9.3 Fiber Reinforced Polymer (FRP) reinforcement for concrete structures (Matthys)
- TG 9.5 Durability of prestressing materials (Elices)
- TG 9.7 Reinforcing steels and systems (Bowsher)
- TG 9.9 Manual for post-tensioning materials and systems (Bastien)
- TG 9.11 Testing the bond capacity of tendon anchorages (Galvez)

• Organisation:



- TG 9.12 Ground Anchor (Niki)
- TG 9.13 External tendons (Theryo)
- TG 9.14 Extradosed and stay cable bridges (Mutsuyoshi, Poser)
- TG 9.15 Behavior under cryogenic conditions (Poser)
- AD Hoc Group Galvanized steel (Ganz)

• Publications 2000-2006:



- Bulletin 7 : Corrugated plastic ducts for internal bonded post-tensioning
- Bulletin 11: Factory applied corrosion protection of prestressing steels
- Bulletin 20 Grouting of tendons in prestressing concrete
- Bulletin 26 Influence of material and processing on stress corrosion cracking of prestressing steel /case studies

• Publications 2000-2006:

- Bulletin 30 Acceptance of stay cable systems using prestressing steels
- Bulletin 33 : Durability of post-tensioning tendons (collaboration with C5)



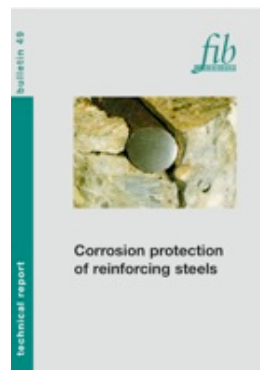
• Publications 2007-2010:

- Bulletin 40 FRP reinforcement in RC structures
- Bulletin 49 Corrosion protection of reinforcing steel (2009)

– Participation to fib New Model Code

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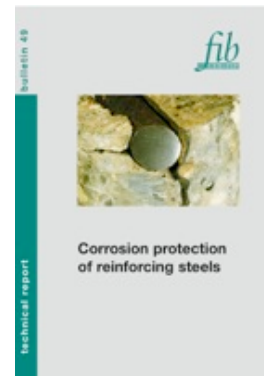
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Context:

- Corrosion of steel is extremely costly and affects many industry sectors, including concrete construction. The cost of corrosion of steel reinforcement within concrete is estimated at many billions of dollars worldwide.
- The corrosion of steel reinforcement represents a deterioration of the steel which in turn detrimentally affects its performance and therefore that of the concrete element within which it has been cast

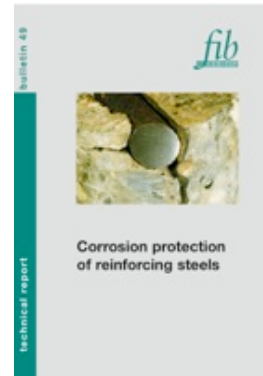


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Contexte:

- A great amount of work has been undertaken over the years concerning the prevention of corrosion of steel, including the application of coatings, which has included the study of the process of corrosion itself, the properties of reinforcing steels and their resistance to corrosion as well as the design of structures and the construction process.



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Aim

- To provide readers with an appreciation of the principles of corrosion of reinforcing steel embedded in concrete and to describe the behaviour of particular steels and their coatings as used to combat the effects of such corrosion.
- These include galvanised reinforcement, epoxy coated reinforcement, and stainless reinforcing steel. It also provides information on the relative costs of the materials and products which it covers.

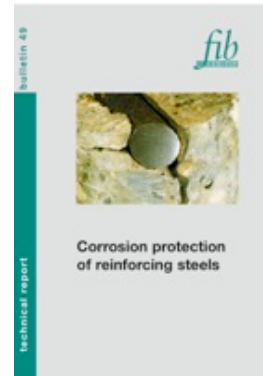


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Aim

- It does not deal with structure design or the process of construction or with the post-construction phase of structure management including repair.
- It is hoped that it will nevertheless increase the understanding of readers in the process of corrosion of reinforcing steels and the ability of key materials and processes to ~~reduce its harmful effects.~~



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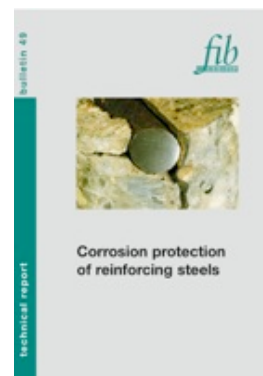
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- 3 Galvanized steel reinforcement
- 4 Epoxy-coated reinforcement
- 5 Stainless steel reinforcement
- 6 Cost aspects



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• Publications under preparation:

- Bulletin XX FRP strengthening for rehabilitation of concrete structures (TG 9.3)
- Bulletin XX Manual for prestressing materials and systems (TG 9.9)

• Ongoing work:

- Ground Anchor
 - Preparation of Bulletin XX Design and Construction of Prestressed Ground Anchor - TG 9.12 Mr T. Niki
 - FIP Recommendations for the design and construction for prestressed ground anchorages published in 1996
 - FIP Recommendations for the design and construction of prestressed ground anchor (FIP/2/7) published in May 1982
 - Guide to planning, installation and testing/monitoring of permanent and temporary ground anchorage bonded to the ground by cement grout

• Ongoing work:



– External tendons

- Preparation of Bulletin XX External tendons Bridges -TG 9.13, Mr Ted Theryo (USA)
- Mr Kasuga (Japan); Glaeser (Germany), Ramirez (Spain), Boitel (France), Kuilboer (Netherlands), Piekarski (Poland), Weiher (Germany), Changoda (Slovakia) , Chabert (France), Husan (China), Windish (Germany), Della Vedova (Italy), Niki (Japan), Brand (Germany)
- Guidelines for Design approach and specifications, Corrosion protection, Construction and installation, Testing, Dismantling and Replacement, Quality control, inspection and monitoring, Application to repair

• Starting work:



– Extradosed and Stay Cables

- Preparation of Bulletin XX– TG 9.14, Mutsuyoshi & Poser
- 23 members
- FIB Bulletin 30 Acceptance of Stay Cables Systems using Prestressing Steels (2005)
- PTI Recommendation for Stay Cable Design, Testing and Installation (2007)
- Guidelines for Actions on tendons (loads), Systems requirements, Detailing and design, Testing, Installation, Monitoring inspection and maintenance, Repair and replacement (with Commission 1)

• Starting work:



– Cryogenic conditions

- Preparation of Bulletin XX Concrete structures behavior under cryogenic conditions - TG 9.15 Mr Poser
- 11 members
- FIP State of the art report , edited in 1988
- In the literature there is also some other codes like (BS 4741, BS 5387 and BS 7777) which has recently become (or will be shortly) overdue.
- New document which not only will summarize the state of the art of the mechanical behavior of materials under cryogenic conditions but also provide recommendations for the design, execution, testing and control/monitoring of such a type of structures.



Thank you for your attention

