

# ***fib* (CEB – FIP)**

**Fédération Internationale du Béton  
International Federation for Structural Concrete**

## **Commission 5 “Structural Service Life Aspects”**

**Chairman: Steen Rostam. E-mail: [sro@cowi.dk](mailto:sro@cowi.dk)**

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## **Task Groups and Working Parties established 27-28 April 2000, Lausanne**

- **TG 5.1** "Monitoring and safety evaluation of existing concrete structures"
- **TG 5.2** "Service life design concepts"
- **TG 5.3** "Assessment, maintenance and rehabilitation"
- **WP 5.3-1** "Assessment and residual service life evaluation"
- **WP 5.3-2** "Maintenance and Rehabilitation Methods, Materials and Systems "

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**Task Groups and Working Parties  
established 27-28 April 2000, Lausanne**

- **TG 5.4** "Construction for service life, including specifics for prestressed concrete structures"
- **WP 5.4-1** "Construction for service life"
- **WP 5.4-2** "Durability specifics for prestressed concrete structures"
- **G 5.5** "Fundamentals for service life prediction"

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**Task Group 5.1**  
***"Monitoring and Safety Evaluation of  
Existing Concrete Structures"***

**Chairman: Professor, Dr.-Ing. Konrad  
Bergmeister, Institute für Konstruktiven  
Ingenieurbau, Universität für Bodenkultur,  
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## **Task Group 5.2**

### ***"Service Life Design Concepts"***

**Chairman: Professor Eugen Brühwiler, EPFL –  
Ecole Polytechnique Fédérale de Lausanne,  
Switzerland.**

**E-mail: [eugen.bruehwiler@epfl.ch](mailto:eugen.bruehwiler@epfl.ch)**

#### **1. Modelling**

- Initiation phase: Modelling and quantification of ingress mechanisms using probabilistic methods to determine probability of depassivation
- [Propagation phase: Modelling of corrosion process to determine loss of reinforcement cross section]

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#### **2. Limit States and target reliability levels**

- Establish limit states and target reliability levels for evaluation

#### **3. Parametric study**

- Determine service life (limit state = end of initiation phase, for example)
- Identification and quantification of predominant parameters influencing service life of structural elements and details as a function of exposure / action (exposure class)

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#### 4. Optimisation of measures

- Considering economic and environmental aspects

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### **Task Group 5.3**

#### ***"Assessment, Maintenance and Rehabilitation"***

**Chairman:** Steen Rostam. **E-mail:** [sro@cowi.dk](mailto:sro@cowi.dk)

**Terms Of Reference:** Develop reliability based strategy, procedures and criteria for assessment, maintenance and rehabilitation of concrete structures to ensure cost optimal service life, by considering:

- Assessment and residual service life evaluation of maintained and repaired structures
- Maintenance, repair and strengthening methods, and selection of materials and systems
- Selection of durability and structural performance criteria based on life cycle costing
- Execution of maintenance, repair and strengthening, including procedures for quality assurance

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The Task Group comprises two Working Parties:

**Working Party 5.3-1: "Assessment and Residual Service Life Evaluation"** Convenor: Gro Markeset.  
E-mail: [gro.markeset@fbt.mil.no](mailto:gro.markeset@fbt.mil.no)

**Terms of reference: Develop a reliability-based strategy for decisions on assessment, maintenance, rehabilitation and strengthening of concrete structures, by considering:**

- Structural, functional and durability assessment
- Service life evaluation of maintained and repaired structures
- Life cycle cost optimisation
- Uncertainties associated with assumptions made
- Prioritising maintenance and rehabilitation procedures

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**Working Party 5.3-2: "Maintenance and Rehabilitation Methods, Materials and Systems"**  
Convenor: Stuart Matthews. E-mail: [matthewss@bre.co.uk](mailto:matthewss@bre.co.uk)

**Terms of reference: Maintenance, repair and strengthening methods for concrete structures, by considering:**

- Maintenance, repair and strengthening methods, materials and systems related to their effects on structural durability and performance
- Available service life records of prior applications
- Criteria for selection of maintenance and rehabilitation materials and methods considering life costing
- Execution and quality assurance of maintenance, rehabilitation and strengthening materials and systems

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## **Task Group 5.4**

### ***"Construction for Service life, including Specifics for Prestressed Concrete Structures"***

**Chairman:** Jean-Philippe Fuzier.

**E-mail:** [jpfuzier@freyssinet.com](mailto:jpfuzier@freyssinet.com)

**Terms of Reference:** Develop a framework for durable construction requirements by establishing a series of guidelines to be used by owners, engineers and contractors while preparing project specifications.

Durability specifics for prestressed concrete cover the various aspects of the structure life of such structures.

Design, construction, operation and maintenance will be addressed.

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**Two Working Parties have been established:**

### **Working Party 5.4-1 "Construction for service life"**

**Convenor:** Christian Munch-Petersen.

**E-mail:** [chr.munch-petersen@teknologisk.dk](mailto:chr.munch-petersen@teknologisk.dk)

The working programme will cover:

- Materials: concrete and concreting, steel and steel placing.
- Construction methods and systems and related equipment.
- Contractors qualification.
- Quality assurance and control programmes.
- Contractual relationship.

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### **Working Party 5.4-2**

#### **"Durability specifics for prestressed concrete structures"**

**Convenor:** Jean-Philippe Fuzier. E-mail: [jpfuzier@freyssinet.com](mailto:jpfuzier@freyssinet.com)

The working programme will cover:

- **Design**

Deterioration mechanism

Principle of bonded / unbonded / internal and external prestressing

Principle of multi-layer protection

Protective measures and detailing

- **Construction**

Requirements for durable material P/T steel, ducts, corrosion protection

Alternative materials

Requirements for durable P/T installation

Inspection prior to concreting, tensioning, grouting

Precast segmental construction issues

Certification for suppliers and installers

Requirement for durable grout

- **Operations and Maintenance**

Assessment of the residual prestressing force

Non destructive testing

Monitoring (acoustics and fibre optics),

Strengthening.

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### **Task Group 5.5**

#### **"Fundamentals for Service Life Prediction"**

**Convenor:** Lars-Olof Nilsson. E-mail: [Nilsson@bm.chalmers.se](mailto:Nilsson@bm.chalmers.se)

**Terms of Reference:** Develop probabilistic prediction models for deterioration processes and property changes for:

- New structures
- Existing, non-deteriorated structures
- Existing, deteriorating structures
- Repaired structures

The models are foreseen to include:

- Environmental actions
- Synergetic processes
- Model uncertainties due to lacking knowledge, data and verification
- Cracks in concrete ("realcrete")

The deterioration processes foreseen are:

- Corrosion initiation
- Corrosion propagation and consequences of corrosion (e.g. cracking, spalling)
- Frost and salt-frost scaling
- Internal frost damage
- Salt scaling (salt re-crystallisation)
- Alkali-aggregate reactions
- Sulphate attack - Acid attack
- Delayed ettringite formation - Leaching

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## Next Meeting

**The next meeting is scheduled for 26<sup>th</sup> and 27<sup>th</sup> November 2001 at The Technical University at Aachen, Germany.**

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