Structural Concrete

Textbook

on behaviour, design and performance

Second edition

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### 4.2.2 Safety concept

(Theoretical background – Frequently used distribution functions – Failure probability and reliability index – Relation between reliability index and safety factors – Determination of failure probability – Determination of partial safety factors)

### 4.2.3 Design format

(General – Design format for ultimate limit state – Design format for serviceability limit state)

### 4.3 Serviceability Limit States principles

#### 4.3.1 General

#### 4.3.2 Crack control

#### 4.3.3 Deformation

(Introduction – Criteria for deflection control – Basic equations for the calculation of deflections – Calculation of deflection by numerical integration – Calculation of the deflection of indeterminate beams by numerical integration – Long term deflections – Accuracy of deflection calculations – Simplifications to the calculation of deflections – Span/depth ratios – Deformations and stresses due to temperature change)

### 4.4 Ultimate Limit State principles

#### 4.4.1 Basic design for moment, shear and torsion

(Purpose and place of ultimate limit state design – Structural modelling – Limiting stresses for static design – Axial load and flexure – Combined shear and flexure – Torsion – Plates and slabs)

#### 4.4.2 ULS of buckling


#### 4.4.3 Fatigue

(Problem statement – Fatigue verification in CEB-FIP Model Code 1990 – Stress calculations under cyclic loads – Fatigue resistance of steel and concrete – Application example)

#### 4.4.4 Nodes

(Introduction to the design of nodes – Principles for the verification of singular nodes and anchorage – Typical nodes – References and indication of numerical examples)

### 4.5 Anchorage and detailing principles

#### 4.5.1 Reasons and background for detailing rules
4.5.2 Arrangement of reinforcement
(Minimum concrete cover – Spacers – Single bar spacing – Bundled bars spacing – Skin reinforcement for large concrete covers and thick or bundled bars – Allowable mandrel diameter – Minimum reinforcement ratio)

4.5.3 Anchorage regions
(Anchorage of reinforcing steel – Anchorage of prestressing reinforcement – Anchoring devices)

4.5.4 Detailing of tensile bending reinforcement
(Envelope line of the tensile force and the load balancing mechanism in members subjected to bending and shear – Anchorage out of support – Anchorage over support – Distribution of the reinforcement in the cross-section of box girders or T-beams)

4.5.5 Splices in structural members
(Lap splices in tension – Lap splices in compression – Lap splices of welded fabrics – Splices by welding – Splices by mechanical devices – Lap splices of bundled bars)

4.5.6 Detailing of shear reinforcement
(Efficiency of anchorage of shear reinforcement – Distribution of shear reinforcement)

4.5.7 Industrialisation of reinforcement

Annex: List of notations

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