

**“Design of Concrete Buildings” - Workshop with worked examples**  
**Brussels, 20-21 October 2011**

**PROGRAMME**

**Thursday, 20 October 2011**

	9:00 – 9:30		Participants registration
Session S0	9:30 – 10:00	<b>M. Fuchs</b> <i>DG ENTR, European Commission</i> <b>A. Pinto</b> <i>JRC, European Commission</i>	Welcome address
Session S1	10:00 – 10:45	<b>G. Mancini</b> <i>Chairman CEN/TC250/SC2 Politecnico di Torino</i> <b>F. Biasioli</b> <i>Politecnico di Torino</i>	<ul style="list-style-type: none"> <li>• Durability</li> <li>• Materials</li> <li>• Actions</li> </ul>
	10:45 - 11:00		Discussion
	11:00 – 11:30		Coffee
Session S1	11:30 – 13:15	<b>G. Mancini</b> <i>Chairman CEN/TC250/SC2 Politecnico di Torino</i> <b>F. Biasioli</b> <i>Politecnico di Torino</i>	Conceptual design: <ul style="list-style-type: none"> <li>• Slabs</li> <li>• Columns</li> <li>• Shear walls</li> <li>• Structural regularity</li> </ul>
	13:15 - 13:30		Discussion
	13:30 – 14:30		Lunch
Session S2	14:30 – 15:15	<b>M. Curbach</b> <i>Technische Universität Dresden</i>	Structural analysis: <ul style="list-style-type: none"> <li>• Load combinations and arrangements</li> <li>• Linear analysis (actions effects)</li> <li>• Redistribution of moments</li> </ul>
	15:15 - 15:30		Discussion
	15:30 – 16:00		Coffee
Session S3	16:00 – 17:15	<b>J. Walraven</b> <i>Delft University of Technology</i>	Ultimate limit states design: <ul style="list-style-type: none"> <li>• Bending</li> <li>• Shear</li> <li>• Axial force</li> <li>• Punching</li> </ul>
	17:15 - 17:30		Discussion

**Friday, 21 October 2011**

Session S3	9:00 – 9:45	<b>J. Walraven</b> <i>Delft University of Technology</i>	Serviceability limit states design: <ul style="list-style-type: none"> <li>• Deflections</li> <li>• Crack width</li> </ul>
	9:45 – 10:00		Discussion
Session S4	10:00 – 10:45	<b>J. Arrieta</b> <i>PROES S.A.</i>	Detailing of the reinforcement: <ul style="list-style-type: none"> <li>• Anchorage and lap splicing</li> <li>• Slabs, columns, beams, walls</li> </ul>
	10:45 - 11:00		Discussion
	11:00 – 11:30		Coffee
Session S5	11:30 – 12:30	<b>R. Frank</b> <i>Université Paris-Est, École des Ponts ParisTech, Navier- CERMES</i>	Geotechnical design: <ul style="list-style-type: none"> <li>• Foundation of a column: bearing capacity, sliding resistance and assessment of settlements</li> <li>• Principles of diaphragm retaining wall design</li> </ul>
	12:30 - 12:45		Discussion
Session S6	12:45 – 13:30	<b>F. Robert</b> <i>CERIB</i>	Conceptual fire design and assessment
	13:30 - 14:00		Discussion and final addresses
	14:00 – 15:00		Lunch

## Brief Description of the Workshop Sessions

### Session S1 (Francesco Biasioli, Giuseppe Mancini)

Conceptual design according to Eurocodes of the main structural elements of a multi-storey residential and office building with reinforced concrete structure. General rules, actions, durability requirements, preliminary design according to serviceability and ultimate limit states of the bracing system, of three different types of horizontal slabs (on beams, flat, with embedded lighting elements) and of columns and walls.

### Session S2 (Manfred Curbach)

The building is exposed to various loading situations during its lifetime. To assure a safe and durable design, all different load cases have to be considered in the structural analysis in order to calculate all possible combinations of loads and to determine the maximum action effects acting on the many structural members. The structure, approximated with a 3-dimensional system, is evaluated with a structural static analysis program. The action effects are passed on for the final design and detailing of the structural members.

### Session S3 (Joost Walraven)

To satisfy the ultimate limit state, the structure may not collapse when subjected to the loads it was designed for. Using the actions from the analysis of the structure, we will look at the typical bending, shear, axial and punching cases and present the design procedures. To satisfy the serviceability limit state criteria, a structure must remain functional for its intended use subject to routine loading. The presentation will be limited to crack width and deflection analysis of critical members.

### Session S4 (José María Arrieta)

General provisions for reinforcement: bar spacing, anchorage and lap splices.

Example of application to the building: taking into account minimum and maximum values of anchorage lengths and special provisions for each type of member, detailing of reinforcement of:

- beams: longitudinal (with curtailment) and shear reinforcement.
- slabs: for each of the three types of slabs, flexural and shear reinforcement (punching reinforcement, if necessary);
- columns: longitudinal and transverse reinforcement;
- shear walls: vertical and horizontal reinforcement;
- footings: main reinforcement, taking into account the effect of the inclined cracks in the anchorage of the bars.

### Session S4 (Roger Frank)

Overview of foundation and retaining wall designs on the basis of the three different design models in Eurocode 7. Bearing capacity design for a column and a shear wall, accounting for horizontal loadings and covering; sliding resistance design; assessment of settlements and limiting values. General principles for the design of the retaining wall.

### Session S5 (Fabienne Robert)

A fire is a definite danger to any construction that needs to be prevented and fought by all possible means. The fire may occur anywhere, in any session and in any phase in the lifetime of a building (construction, service, refurbishment or demolition). The presentation will be limited to the effects a fire has on structures and as such cover: materials, sectional analysis, structural analysis, connections and assessment after fire.

For more information on the Eurocodes, visit the European Commission's website "Eurocodes: Building the Future" at [eurocodes.jrc.ec.europa.eu](http://eurocodes.jrc.ec.europa.eu)