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## About the Colloquium

### Technical Programme

#### Theme 1: Structural Concrete

This theme encompasses the definition of Structural Concrete, the role of active and passive reinforcement, the positive control of structural behaviour through prestressing, and possible benefits through harmonization of practices. This theme also includes a critical review of current state-of-design practice and deals with the inconsistencies in codes, education, technical societies and research. The critical review is also extended to observations of structures in service and lessons learnt from structural failures.

Further, this theme addresses the needs of designers and the questions of how to select the most appropriate structural solution for a certain case, of how to judge when certain effects are significant, and finally of how to choose an approach that is both adequate and simple for the design and detailing of structural concrete.

*Invited lectures by:*

J. E. Breen, Austin, TX, USA

A. S. G. Bruggeling, Nootdorp, Netherlands

#### Theme 2: Consistent Models for Design, Analysis and Detailing

This theme is the major portion of the Colloquium. It focuses on the technical developments achieved or requiring future development to introduce a comprehensive rational, consistent approach to structural concrete design. Such a concept emerges from the present design methods and maintains continuity. The following sub-themes will illustrate the interaction of analysis, dimensioning and detailing and will cover the total range of structural concrete.

##### Sub-Theme 2.1: Performance Requirements

This sub-theme gives the definition of the basic performance requirements expected of structural concrete both at the serviceability limit state and the ultimate limit state. It focuses on the presentation of a consistent concept for control of cracking, deformation, time-dependent effects and vibrations, all supplementing strength and safety requirements.

*Invited lectures by:*

M. Wicke, Innsbruck, Austria

H. Trost, Aachen, Germany

##### Sub-Theme 2.2: Modelling of Structural Concrete

This sub-theme emphasizes the necessity for consistent and transparent models to cover the full range of structural concrete. It examines the level of accuracy required and simplicity desired for practical structural concrete design models, evaluates the role of experiments and empiricism in producing misleading and confusing design approaches and suggests practical models for designing structural concrete.

*Invited lectures by:*

J. Schlaich, Stuttgart, Germany

T. P. Tassios, Athens, Greece

J. Eibl, Karlsruhe, Germany



### **Sub-Theme 2.3: Analysis**

This sub-theme deals with the various types of analytical model including traditional analysis, finite element analysis and stress-field-design resp. strut-and-tie models as related to the different stages in structural design. It includes elastic and plastic methods, the necessity to consider compatibility effects, time-dependent effects, restrictions on theory of plasticity applications, roles of linear and nonlinear finite element analysis in practice vs. more simple manual methods. Papers will deal with structural problems and the analysis of specific structures, applications of nonlinear finite element analysis and the development of computer-aided methods.

#### ***Invited lectures by:***

A. Scordelis, Berkeley, CA, USA

M. Menegotto, Rome, Italy

### **Sub-Theme 2.4: Dimensioning and Detailing**

This sub-theme deals with general procedures for dimensioning sections, and for selecting and detailing the reinforcement. A broad, consistent framework will be developed for such important decisions. Models will treat geometrical and statical discontinuity regions including interconnection of both cast-in-situ and precast elements. Further, the uniqueness and applicability of the models suggested, the effective concrete strength and the necessity of compatibility considerations as well as of strain limits at the ultimate limit state will be treated. Detailing procedures will indicate the applicability at the serviceability limit state as well as at the ultimate limit state and any limitations on adequately reinforcing for compatibility effects are discussed. This theme deals especially with the ductility and rotation capacity, the effective concrete strength, the consistent treatment of shear, the dimensioning of nodes and the design of discontinuity regions and plate elements.

#### ***Invited lectures by:***

J.G. MacGregor, Edmonton, AB, Canada

P. Marti, Zurich, Switzerland

R. Park, Christchurch, New Zealand

### **Sub-Theme 2.5: Reliance upon Concrete Tensile Strength**

This sub-theme questions the fundamental assumption in most present design methods, that concrete tensile strength should not be relied on in strength calculations. In many areas tensile strength is relied on, either directly or implicitly through surrogate expressions like the  $V_c$ -term. In unreinforced concrete and in slabs without shear reinforcement substantial reliance is placed on concrete tensile strength. This sub-theme treats the relevant models for all these cases within a consistent design concept and deals with the uses and admissible values of concrete tensile strength, reflecting fracture mechanism approaches as well as more traditional methods. Papers presented deal with traditional and finite element models for members without shear reinforcement, hollow-core slabs and planks, punching of flat slabs and the design of joints. The direct use of the tensile strength is discussed and its application in fastening techniques is demonstrated.

#### ***Invited lectures by:***

A. Hillerborg, Lund, Sweden

G. König, Darmstadt, Germany

T. Tanabe, Nagoya, Japan

### **Theme 3: Implementation in Codes of Practice**

In this theme attention is given to the development of a consistent approach to the design of structural concrete in future codes; technical and legal aspects for the structural concrete construction industry are addressed. It is proposed that code formats should be structured from general requirements to more specific «deemed to satisfy» approaches. Discussion shall concentrate on how future codes could facilitate rather than hamper new developments, and should strengthen the responsibility and evoke the creativity of engineers.

#### ***Invited lectures by:***

R. Walther, Lausanne, Switzerland

T.P. Tassios, Athens, Greece

#### **Theme 4: Impact on Future Structures**

This theme will demonstrate the opportunities for innovative structures, if a consistent design approach for the analysis, dimensioning and detailing of structural concrete is introduced. Future developments will be indicated and the role of structural concrete in competition with other materials will be described.

##### ***Invited lectures by:***

C. Menn, Zurich, Switzerland  
D. Vandepitte, Ghent, Belgium  
M. Virlogeux, Bagneux, France

#### **Concluding Session**

The concluding session aims at a vigorous discussion regarding sensible future developments and will synthesize the main lessons learnt from the Colloquium for application to practice by various groups throughout the world.

##### ***Summarizing statement by:***

B. Thürlimann, Zurich, Switzerland

#### **Location and Date**

The Colloquium takes place in the ETI-Building at the University of Stuttgart, Germany, from April 10 to 12, 1991.

#### **Scientific Committee**

J. Schlaich (Chairman)	Germany
J. E. Breen (Chairman of WC III)	United States of America
A. S. G. Bruggeling	Netherlands
V. Cervenka	Czechoslovakia
E. Hampe	Germany
G. Somerville	United Kingdom
R. Suter	Switzerland
T. Tanabe	Japan
J. P. Teyssandier	France
B. Thürlimann	Switzerland
R. Walther	Switzerland
H. Wittfoht	Germany

#### **Organizing Committee**

Institut für Tragwerksentwurf und -konstruktion  
(Institute for Structural Design)  
Universität Stuttgart  
K.-H. Reineck (Chairman)