Conclusions to seminar IX: developments in the design of reinforced and prestressed concrete structures

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Conclusions to Seminar IX
Developments in the Design of Reinforced and Prestressed Concrete Structures

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Five papers were presented orally at this session by Messrs. M. Fukuhara, Japan; R. Favre, Switzerland; J. Schlaich, Federal Republic of Germany; G. Causse, France; and R. Green, Canada. The session had a good success with 200 participants. The call for papers based on Mr. Wicke's general report had provoked 46 responses which had to be reduced to 8 contributions for the Final Report. The design of reinforced concrete and prestressed concrete structures remain among the most attractive topics.

It is clear that concrete structures, with their enormous economic impact, with sophisticated methods of construction, with time-dependent effects such as creep and shrinkage, give rise to a lot of interesting problems. In recent years, the public was especially confronted with the serviceability, the durability and aesthetical aspects. Engineers have the bad feeling that a considerable part of their analysis is useless and does not help to design the desired good and economic structure, and that many important aspects are not considered in the analysis because of lack of knowledge.

This session has contributed to fill some gaps. Detailing, one of the most important parts in the design process, has generally been treated in a subjective way. A consistent design of reinforced concrete structures, as already developed by the author within CEB, has been presented. Use of concrete columns in tall buildings, associated with big earthquake loads, needs shear reinforcement which can be realized with stirrups made of high resistance steel. The long term behaviour of columns has a big impact in the case of second order problems. Also in the usual case of braced columns in a building, normally with a moderate slenderness ratio, one has to take into account the long-term behaviour for the serviceability limit state. It has been shown how a design procedure, based on a verification of the section resistance of a column under the combined action of a normal force N and a bending moment M, should advantageously be replaced by a procedure based on N and imposed angle deformations at both ends of the column.

Finally, the excellent behaviour of model test scale 1 : 1 of a bridge girder with spatial truss similar to the Bubiyan bridge construction in Kuwait was presented.

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