

# **IABSE fatigue of steel and concrete structures colloquium, Lausanne, 24-26 March 1982**

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### 3. IABSE Fatigue of Steel and Concrete Structures Colloquium, Lausanne, 24-26 March 1982

#### 3.1 Closing remarks at the Colloquium

Dear Friends and Colleagues,

Considering the almost 900 pages of the Proceedings, and in view of the large amount of information contained in it, it is an impossible task to summarize the past two and a half days in a few minutes. It will be necessary to prepare various state-of-the-art reports in order to analyse and to highlight the most important conclusions of this Colloquium.

Let me recall some of the milestones that have permitted us to meet here in Lausanne. The idea of an International Colloquium on Fatigue in Structures had been proposed in 1978 by Prof. Thürlimann, on the occasion of the Bridge Engineering Conference in St. Louis, organized by the American Transportation Research Board. This idea was submitted to the Technical Committee of IABSE, with final approval at the Vienna Congress in September 1980. A call for papers yielded the unexpectedly high number of 150 proposals. The Scientific Committee had the difficult task of selecting the papers — the Local Organizing Committee had not disclosed the names of the authors at the time of the review —: 117 authors were asked to submit a complete contribution. We were quite impressed by the fact that about 85% of the papers arrived in time or not more than two weeks late. One major task in the preparation of the Proceedings was the checking of the translation of the summaries in French, German and English.

As you may have seen from the list of participants, you represent 30 countries from all continents: 300 scientists and engineers, working in different fields! I wish to express my sincere thanks to all persons of the local arrangements, present or behind the scenes, the members of the Scientific Committee, the chairmen, the speakers, and above all, my thanks to all of you for your readiness to share your knowledge with others. We are also most grateful for the facilities provided free by the Swiss Federal Institute of Technology in Lausanne.

From the programme of our Colloquium, one observes that much importance was given to a balance between steel and concrete structures. Aluminium was somewhat under-represented in terms of papers. The sessions of our Colloquium treating materials and their structural applications were framed by common sessions, one on codes and concepts at the beginning, and one on loads at the end of the Col-

loquium. As said before, it is extremely difficult to summarize this Colloquium. However, one or two problems have become apparent concerning the fatigue design concepts.

Over the past twenty years we have seen a tremendous increase in research in the domain of the constitutive materials of structural elements. However, it should be stressed that fatigue strength and cumulative damage are only a part of the problem. This becomes even more obvious when considering all the other assumptions with regards to loads and impact factors. The description of loads has long been a neglected part of fatigue codes area, and this, incidentally, is equally true for statically loaded structures. Nevertheless it seems now possible to describe generalized load models for railway bridges, highway bridges and crane gantry girders, among others.

It should be recognized that it is much more sensible to define loads and load models instead of directly imposing stress range spectra. In fact, a given load, say a train, will cause completely different stress spectra when crossing long or short span bridges. Thus for any given bridge, different stress spectra will be obtained for different structural elements. The same is true for highway bridges where sometimes the total vehicle weight, sometimes the axle loads, or a combination of both become dominant. The most difficult problem of modern fatigue codes is a good safety concept. Much research has recently been done in the fields of safety and reliability of statically loaded structures. However, only a little information is available for structures under fatigue loading. Early attempts to solve the problem have used statistical distributions of equivalent stress ranges and fatigue strength. Recent studies should provide us with additional information to specify numerical values for load and strength factors applicable for fatigue design.

As Dr. Carpena, ECCS, said at the very beginning of this Colloquium, it is of prime importance that we are not flooded with a multitude of different, or different looking codes, edited by various groups or organizations. The task of design engineers has to be simplified. One way of achieving this goal is to reinforce international cooperation. We hope that IABSE may continue to provide an adequate platform for discussion.

*Prof. M. A. Hirt*  
*Chairman Local Organizing Committee*



### 3.2 Proceedings

#### Fatigue of Steel and Concrete Structures

Proceedings — Colloquium  
Lausanne 1982

##### IABSE REPORTS VOLUME 37

890 pages, 790 illustrations  
size 170 x 240 mm  
ISBN 3 85748 030 0  
Issued: March 1982

89 contributions in English, 5 in French, 12 in German. Summaries in English, French and German.

Fatigue is the cause of numerous damages in civil engineering structures. New recommendations including fatigue design are under preparation and will be based on a modern philosophy of structural safety. The "Proceedings" present the most recent developments in the field of structural fatigue. They will be of interest to government agencies, transport authorities, consulting engineers, industry, universities and specifications writing bodies.

##### The themes

- fatigue codes and design concepts
- base material, structural elements and connections in steel, plain concrete, reinforced and prestressed concrete, aluminium
- case studies
- measured loads and load models

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Order: IABSE Secretariat

#### Fatigue des structures en acier et en béton

Proceedings — Séminaire  
Lausanne 1982

##### RAPPORTS AIPC VOLUME 37

890 pages, 790 illustrations  
format 170 x 240 mm  
ISBN 3 85748 030 0  
Parution: mars 1982

89 contributions en anglais, 5 en français, 12 en allemand. Résumés en anglais, français et allemand.

La fatigue est la cause de nombreux dégâts dans les structures de génie civil. Des recommandations pour un dimensionnement à la fatigue sont en cours de préparation et sont basées sur une philosophie moderne de la sécurité. Les "Proceedings" présentent les développements les plus récents dans le domaine de la fatigue des structures, et concernent les administrations, services publics, bureaux d'ingénieurs, industrie, universités et commissions de normes et de règlements.

##### Les thèmes

- normes et concepts de dimensionnement à la fatigue
- matériau de base, éléments de construction et assemblages en acier, béton armé et précontraint, aluminium
- études de cas
- charges mesurées et modèles de charge

Prix: SFr. 144.—  
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#### Ermüdungsverhalten von Stahl- und Betonbauten

Proceedings — Kolloquium  
Lausanne 1982

##### IVBH REPORTS BAND 37

890 Seiten, 790 Bilder  
Format 170 x 240 mm  
ISBN 3 85748 030 0  
Herausgabe: März 1982

89 Beiträge in Englisch, 5 in Französisch, 12 in Deutsch. Zusammenfassungen in Englisch, Französisch und Deutsch.

Viele Schäden an Ingenieurbauten sind auf Ermüdung zurückzuführen. Neue Empfehlungen für das Bemessen ermüdungsbeanspruchter Konstruktionen sind zurzeit in Bearbeitung und basieren auf einem modernen Sicherheitskonzept. Die "Proceedings" fassen die letzten Entwicklungen auf dem Gebiet der Ermüdung zusammen und sind von grossem Interesse für Verwaltungen, Verkehrsbetriebe, Ingenieurbüros, Universitäten, Normkommissionen und Industrie.

##### Themen

- Normen und Konzepte für die Ermüdungsbemessung
- Grundmaterial, Bauteile und Verbindungen aus Stahl, Beton, Stahl- und Spannbeton, Aluminium
- Fallstudien
- Gemessene Lasten und Lastmodelle

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