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Closing Ceremony of the 14th IABSE Congress

Cérémonie de clôture du 14e Congrés de l'AIPC

Schlusszeremonie des 14. Kongresses der IVBH

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Final Comments

Commentaires finals

Schlussbetrachtungen

T. N. SUBBA RAO
Chairman, Scientific Committee
New Delhi.

Mr. President, Delegates to the Congress, Ladies and Gentlemen.

We have now come to the end of the 14th Congress of the IABSE. It is now my pleasant task to offer some brief comments on this Congress.

When the title for the Congress was proposed, it was the intention that the Congress should highlight the role played by the civil engineering discipline in promoting the welfare and progress of human kind. I have pleasure in acknowledging before you, that this laudable objective has been, by and large, fulfilled.

The format of the scientific content of the Congress, laid an emphasis on:

Emerging structural horizons,
Structures and environment,
Natural disaster reduction,
Bridge design, construction and management,
Renewable energy concepts,
Project financing,
and Continuing Education

as prime issues. Around this broad spectrum, several sessions were articulated, which were termed Plenary Sessions, Special Sessions, Seminars, Teach-ins and Design Workshop. All these Sessions have been widely attended. The perception and understanding of global developments in structures through a two-way interaction, has been truly realised. I hope the Scientific Committee will endorse these views when it meets in September '92 and IABSE will use the output of this Congress in disseminating information to all those who did not have the benefit of attending this Congress.

For several reasons, the delegate participation has not been as large as originally envisaged but it is to be acknowledged, that it was nevertheless substantial with over 600 members attending. What matters is the sustained interest in the subjects chosen for the delegates; in this respect there is no second opinion. The Indian participants in particular, were keen to learn and be informed of progress elsewhere and they constituted nearly 60% of the total strength.

The Sessions were essentially field oriented and the information fall out is certainly of great value to the profession.

A total of 110 Papers have been presented, divided into invited Lectures from Specialists who gave the state-of-the-art reports, selected paper contributions and Poster Sessions. This Congress has been a unique opportunity for us in India to fuse our thoughts and ideas with those worthy delegates from abroad, and thereby hope to provide in the coming years, a much better service to society.

The Scientific Committee for the Congress, had as members, persons whose experience in their respective fields is widely acknowledged. Several of the members were chosen to organise the Sessions, after the topics had been identified by the Scientific Committee. They in turn assessed the papers received, and took pains to identify and invite specialists from various countries to speak on current topics. In this manner, each one of the Sessions projected distilled information and current status, worthy of the Congress.

I would like to record in brief the coverage of the Sessions:

Emerging Structural Horizons: The most important problem of this planet Earth is one which concerns the rapid growth of the developing nations and those related to the affluence of the developed nations. The moral is that the developing nations should not follow the environmental track record and societal structures of the developed but take a course-correction now itself. Yet, with all this philosophy repeated in many fora, the path followed by the developing countries, under political, social and economical compulsions is the same as that of developed countries, disregarding potential adverse effects in future not only to its citizens but also to everyone globely. There is, therefore, an imperative need for the affluent nations to provide the necessary financial input and statistical evidence to enable the poor countries to pursue policies which do not hurt those beyond their frontiers.

The concentration and migration of population to urban areas, the demand for safe and adequate energy, water, sewage, transport and other infrastructure far beyond what can be practically provided and managed, has given rise to social tensions and psychological frustrations everywhere. New and improved economical solutions need to be evolved by society to meet the growing demands. Human ingenuity and skills appear to be the answer to meet this challenge.

In a rapidly deteriorating environment, the preservation and rehabilitation of existing assets, especially those with a historical and aesthetic record is an obligation today's society owes to future generations. This protection of our heritage calls for new solutions and techniques backed by research and analysis. The Engineers role in this respect is universal and must be proactively responsive to the preservation of civilization.

New forms of power generation, the reduced dependence on fossil fuels, the accelerated exploitation of renewable energy sources (though currently expensive), improvement in the safety levels of nuclear, transport, public health, civil works, etc., are all related synergical systems, wherein the civil engineer's presence and participation for improvement in the quality of life is pivotal. They have much work ahead of them, must develop imaginative solutions, and be more modest in evaluating the consequences of their contribution to the well being of man.

The Sessions covering the above thoughts, related themselves to the many sided structural facets of the problem, often citing case studies of real situations to drive home the point.

The very first Session (P1) dealt with some of the issues I have referred to as a part of this wide ranging philosophy. Specific areas of interest to the structural engineer in this emerging scenario were confined to High rise, Off-shore & Tensioned Structures.

The Seminar (S1) on practical applications of creative design was complimentary to the first session. The specific areas discussed were new materials including Aprapree fibres for prestressing, high strength and high performance concrete, use of thick rolled-steel members, application of robots in construction, architectural realisations, safety levels in nuclear secondary containers and others. Much information and discussion was generated during the Seminar.

The Session (R4) on **Highrise Buildings** highlighted the latest construction techniques in vogue in the USA, Japan and India, the use of computers for analysis, maintenance and comfort management, new advanced structural system concepts, urban massing considerations and other informative data.

The Session (R2) on **Offshore Structures** illustrated brilliantly the application of civil engineering on offshore projects covering floating islands for leisure parks, communication through submerged tunnels, wave energy generation, gravity anchors for floating vessels, offshore oil platforms (fixed and semi-submersible type) and the Japanese experience with flexible breakwaters. The increasing use of the oceans for cooling purposes, the incorporation of presentday information technology for quality assurance and life cycle prediction were the other aspects covered. It became evident that oceans are an inspiring environment for the civil engineer. One speaker concluded: "Let your thoughts be as deep as the ocean and as light as foam".

The Session (R1) on **Tensioned Structures,** provided many examples of roof and open area coverage by these light, retractable and quick erection structural forms and their analysis. The availability of durable flexible roof coverings and their easy erection techniques have made them popular. The Japanese, German and English

experience were notable. The applications included sport arenas, swimming pools, supermarkets, atrium coverings, concert pavilions and others, each incorporating its own distinct method of erection. Their use in future appears guaranteed for semi-permanent needs, as they are competitive in cost and facilitate quick erection and removal.

Structure and Environment: A major input of the Congress from Seminar (S7) has been an effort to identify environment as an undeniable parameter in the concept and realisation of several types of projects, since several constructions have a far reaching influence on nature and thus on Man's life. The need to provide education in this discipline to the engineer within the bounds of reasonable economic parameters, as also to realise a new role for him as an important constitutent in the global effort to reach a **sustainable environmental balance,** is an important outcome.

The Session (P3) dealt with the problems and solutions when structures have to be built to meet national demands like tunnels, dams, harbours, bridges, nuclear power stations, urban transport structures and the like. The cry for **'Structural art'** in the search for economy and elegance, the need to redefine perspectives as embodied in codes, regulations, education and practice, a preaudit and surveilance environment programme for any project, maintaining bio-eco system equilibrium in harbours, criteria for safety factors in nuclear containers and transmission systems and finally the integration or urban bridges into the cityscope as a thing of beauty and art with a built-in environmental consistency, are some of the important issues discussed at the seminar. What is most satisfying is the awareness and conviction engineers are showing by way of pooling their efforts with other specialists, so that today we all act as trustees for tomorrow's society.

Natural Disaster Reduction: The current decade has been dedicated by the United Nations as the period for focussing world attention in preventing and mitigating disasters caused by natural forces, so that humanity can feel safe from the recurring calamities being faced. In harmony with this laudable mission, the Sessions (P2 + S3) covering this subject, have evoked much interest and discussion. The impact of storms, cyclones, tidal waves, earthquakes, wind and others have been discussed at length, and economic and novel solutions for damping through passive and active controls and/or for developing substantial safety against damage, were projected.

The need for good quality control during construction, conscious detailing and connections and a measure of ductility were emphasized. The fact that the science of natural disaster prognosis, mitigation and control, extended beyond the realm of civil and design engineers to scientists, meteorologists, seismologists and others involved in information technology was effectively focussed, in order that a co-ordinated endeavour could result for the protection of 'wealth' on our plantet.

Renewable Energy: India is a country with much sunlight and fairly good winds. The importance of utilising these natural phenomena, as an alternative source of energy, was seriously discussed in Session (R3) and the possible solutions of various types and their limitations were dealt with. These types of energy, if properly harnessed though plants of small magnitude, could, when widely used, result in cumulatively large power generation and help reduce the demand on non-renewable source of energy and rapid depletion of global inventory.

The engineering discipline is now aware of the fact that several other types of energy such as the OTEC approach are actively under research and that it is not long before renewable energy systems will become a major source of power supply everywhere.

The speakers brought out that photovoltaic systems and solar chimneys are the answer for medium and large solar energy conversions and that this form of energy, widely available, is the answer to large scale local and isolated power generation. The statistical assessment that power consumption, living standard and population control are related parameters was highlighted as general information input into the discussions.

Bridge Design, Construction & Management, Urban Transport Structures: The Seminar (S2+S5+S6) dealt with large span cable-stayed bridges and their aesthetics, construction techniques used in India for floating complete spans into position, solutions for foundations in water, special urban transportation systems, rehabilitation and finally inservice management of structures from a optimised and economical standpoint. The participants felt that condition assessment, data collection and research on bridge rehabilitation should be elevated to an international level. The concept that assets should be protected consciously over their service life and how, was the topic of discussion covering different problem areas.

A special feature of the presentations on bridges was aesthetics as related to cablestay bridges, a reflection on how complicated and highly sensitive quality controlled fabrication coupled with simple erection techniques, is realised in India. Thermogradients in segmental box type decks and other case studies were presented.

An insight into duo-mode o-bahn system adopted in Essen, monorail systems in steel and concrete, multi-voided boxes and box girder units for dual rail tracks and road networks, have been the main contributions. They reflect innovation, architechnical sufficiency and different solutions conditioned by economy, each tailor made to suit specific locations and functional demands.

Project Financing: Several projects around the world are now given industry status, inasmuch as they are conceived, planned and executed by promoters through self-financing schemes and the cost thereof recovered through tolls, advertisements and other types of mechanisms. Many innovative methods have gained currency and major projects like the Euro-Tunnel Project, the Great Belt Crossing in Denmark, the North-South Highway in Malaysia have all been privatised. Methods and practices followed in developing such self-financing schemes to ensure their viability have been the subject matter of intense discussion. A panel discussion held also gave the participants some idea of the state-of-the-art status to guarantee lender's recovery of investment and ensure success of such ventures.

The legal aspects involved in meshing complicated financial networks, the responsibility of the sponsoror vis-a-vis the promoter and eventual owner and vice-versa, and many other intricate facets of this fast growing financing mechanism were debated at length. The question of government guarantees to lenders, concessions to the sponsoring agencies and their legal character, were among several other important criteria in project funding, it was stated. This subject is very relevant to India; at present statutory laws are being enacted to encourage this funding process.

Continuing Education: This has been one of the main aims and objectives of IABSE. The Session (S4), including the panel discussion held, generally debated the many avenues available to keep the knowledge of engineers up-to-date and help disseminate such information through distant education processes, inhouse training, workshops, well defined short term courses and other modes. The practice in Poland to stimulate this recurring educational process was most impressive and could well serve as a model.

A few of the various views expressed during the panel discussions were:

- IABSE Centres everywhere should be a repository of data on various subjects, stock audio visuals, provide library facility etc.

- Short courses, workshops and Teach-ins, conducted in less developed countries with the help of international experts would help in knowledge sharing on topics most vital to the profession and industry locally.

- Recognition with a qualification title would act as a catalyst in attracting talent and interest, as is evident from distant learning courses in the U.K. and such courses need to be prepared indepth beforehand by experts.

- Inhouse training programmes by industry would meet specific demands and they need to be pursued on a continued basis.

The Teach-in Session (T1+T2+T3), which are a part of this ongoing objective, were widely attended, and endorsed the view of the Sub-Committee to include Teach-ins in the Technical Programme. They covered a updated insight of stress flow and related visualisation of Truss systems as simplified analytical tools, a design and construction basis to assure longterm durability, and the emerging development of expert systems associated with rapidly expanding computer facility. In brief, these Sessions served their intended purpose admirably.

Design Workshop: Keen interest was evinced in the Design Workshop, with quite a few participants taking up the challenge. I am sure this provocation to creative thinking will, in the years to come, help attract the interest of young engineers. In order to ensure that the competition is among equals, it would perhaps be appropriate to let this Design Workshop be thrown open for two or more age groups and judged accordingly.

The exhibition projected mainly some of the equipment and products used at work sites and manufactured in India. The Poster Session was well laid out and provided an excellent forum for interaction with the authors of some selected projects. Both were sufficiently visited by the delegates.

It should not be concluded that a Congress will instantly promote a quantum jump in engineering applications around the world. It is perhaps the best forum for witnessing the profound developments that have taken place or envisaged in different countries, with a view to build more efficient, durable and liveable structures. I am sure the subjects dealt with in the Congress will be discussed in greater detail in appropriate fora by the member countries and thereby enhance the knowledge and information on the subjects.

I would not like to continue more with regard to the scientific content of the Congress. I fervently hope the delegates from abroad have found their coming to New Delhi of great value. They sure have gained not only technically but socially. Many social events that were organized for the delegates and their accompanying persons seem to have been well received. On behalf of the Indian National Group of IABSE, I would like to thank the President and the Executive Committee of the IABSE for having accepted to hold the Congress in India and give us this privileged occassion to host you all in the customary Indian manner. I trust you are satisfied with our earnest efforts to make your visit as comfortable as possible. I would imagine many of you would take advantage of the post-Congress tours and return home with a good impression of what India can offer.

I take this opportunity to gratefully thank the organizers of the various Sessions for giving so much of their valuable time in preparing the Sessions and conducting them during the Congress. I wish to also express my heartfelt thanks to Mr. Alain Golay, Mr. Ninan Koshi, Mr. S.P. Chakrabarti and their backup teams, who have given much thought and effort for the success of this Congress. There are several others, who have contributed silently and I am obliged to them all for their assistance. It is indeed difficult for me to express how I feel towards you delegates at this moment. There are perhaps moments in life when silence conveys deep gratitude more eloquently than words.

I wish you all happy days in India and good tidings when you return home. Thank you all again for attending this fourteenth Congress.

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Closing Speech

Discours final

Schlussansprache

NINAN KOSHI
Chairman, Organising Committee
New Delhi

The President of the IABSE, Prof. Von Gunten,
Chairman of the Scientific Committee, Dr. T.N. Subba Rao,
Chairman of the Technical Committee, Mr. J. Brozzetti,
Secretary of the Organising Committee, Mr. S.P. Chakrabarti, and fellow delegates,

On last Sunday evening I welcomed you all to this Congress at the Inauguration Ceremony. Today, four days later, I stand before you to say a few words as we come to the closing moments of this 14th Congress of the IABSE. A host of activities had been compressed into these four days. Many subjects have been discussed, many lactures delivered, many new ideas exposed, much knowledge exchanged, many associations renewed and many friendships found. On looking back at these four days of intense activity, I feel a sense of satisfaction that we have, in large measure, achieved the goals which we had set ourselves. I have had an opportunity to talk to fair cross section of the delegate and it is very heartening for us to learn from them that the Congress has progressed smoothly, the things have generally been under control and that there have been very few causes of complaint. If at all there have been some shortcomings, I am sure you will be generous enough to forget them and remember only the warmth of welcome and the sincerity of our purpose. I take this occasion also to express my appreciation and thanks to the large number of people who have worked untiringly behind the scenes to make the organisation of this Congress a success. Their numbers are too large to be mentioned individually but I would like to mention the names of Mr. S.P. Chakrabarti, Secretary of the Organising Committee and Mr. Krishan Kant, Deputy Secretary of the Indian National Group for their commendable efforts. I would also like to thank the state Governments, various Institutions and Organisations and our friends from the profession all over the country who have contributed generously both financially and otherwise towards the organisation of this Congress. I close by wishing you all a safe journey back to your homes and with the fond hope that the happy memories of this Congress will remain with you for long time to come.

Thank you.

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Invitation to the 15th Congress of IABSE

Extract from the Invitation Adress by the chairman of the Danish National Group of IABSE, Professor Niels J Gimsing at the closing session of the IABSE Congress in New Delhi:

The very successful 14th Congress of the IABSE has come to an end, so it is time to look ahead to 1996 when the next of the large IABSE Congresses will be held.

On behalf of the Danish National Group of IABSE it is a privilege and a great honour for me to invite you all to come to Denmark in 1996 for the 15th Congress of our association.

For the 1996 Congress it is proposed to use the motto:

ENGINEERING - ENVIRONMENT - ENERGY - ECONOMY

to emphasize these important aspects that should be integrated in the the work of structural engineers as we move into the 21st Century. It is, however,, not the intention to deal with these aspects in a general, talkative way but - where appropriate - to let them form an integral part of the specific sessions on structural engineering and science.

The congress will in 1996 be held in June close to midsummer so you will experience long days and short nights. Thus, at that time of the year there will be almost 18 hours from sunrise to sunset in Denmark. So you can enjoy plenty of daylight even if you are attending all of the technical and scientific sessions of the congress.

To give you an idea of the country you are going to visit in 1996 it could initially be mentioned that Denmark is the oldest Kingdom of the world as there has been a continuous row of sovereign kings - and a few ruling queens - for more than one thousand years, not even interrupted by the Thirty Years War, the Napoleon Wars or the two World Wars.

To-day the history of the kingdom is reflected in the large number of castles spread out throughout the country, but concentrated in North Zealand within reach on a one day tour from the capital, Copenhagen.

In Copenhagen the tourist will, however, also find more modest sights than large castles - such as the famous Little Mermaid at the waterfront.

As most other European capitals Copenhagen has an old city center, and here

the pedestrians have the priority as motor cars are either completely abandoned or subject to strong restrictions.

In 1996, Copenhagen will - besides hosting the IABSE Congress - also be the Cultural Capital of Europe so there will be many opportunities to combine the technical activities inside the conference halls with cultural experiences outside. However, the coincidence between hosting the IABSE Congress and being the Cultural Capital also gives the opportunity to emphasize that the large buildings and structures of our time form a very important part of the culture in the 20th Century.

As in many other countries this fact is illustrated in Denmark by many modern buildings and structures that are designed not only to be functionally efficient but also to be acceptable in the visual environment, as it can, e.g., be illustrated by some of the recent power plants in the vicinity of Copenhagen.

When you come to Denmark you should of course also try to get outside the Copenhagen area to see the countryside with small villages, old churches, farms, fields and forests.

If travelling around you will soon realize that Denmark is a country surrounded by the sea, as you cannot find a spot in Denmark with over 50 km to the sea. Also, despite the fact that the longest distance from one point in the country to another hardly exceeds 400 km, the total coastline is close to 7000 km long.

Being composed of a peninsula and numerous islands separated by water, the Danes have from ancient times been forced to rely on transportation by sea to get from one part of the country to another. Famous were the vikings (that did not really confine themselves to the internal waters) but the seafaring traditions have been kept alive to our times, and when you come in 1996 you will still be able to experience the ferries that have been an important part of the infra-structure for more than a century but are now rapidly being substituted by fixed links in the form of bridges and tunnels.

In Denmark bridges have been built for many centuries, first across narrow streams and small rivers and later across the straits separating the different islands. Initially, these strait crossings were built as pontoon bridges, but in the 1930.es a major bridge building programme was initiated to substitute a number of ferry routes by fixed road and railway links.

The first major bridge from this period was the Little Belt Bridge, opened in 1935, between the island of Funen and the peninsula Jutland. Two years later, the 3.2 km long Storstrøm Bridge, at that time the longest bridge in Europe, was completed to connect the main island of Zealand with the islands of Falster and Lolland to the south, and to improve the traffic route from Scandinavia to the

The prewar bridges were generally constructed with steel superstructures but after the war prestressed concrete became the preferred material for most of the strait crossing bridges. Only when large spans were required, steel superstructures were still used, such as in the Second Little Belt Bridge constructed as a suspension bridge with a 600 m main span or in the Farø Bridges with a 290 m cable-stayed span.

The final link in the Danish infrastructure, the Great Belt Link, will be nearing completion in 1996 when the IABSE Congress takes place in Denmark - so the construction site of this link will certainly be on the list of technical excursions.

The Great Belt Link will comprise

- *the second longest underwater railway tunnel in Europe, the 8 km long East Tunnel, that will be surpassed only by the Channel Tunnel.*
- *the longest combined road and railway bridge in Europe, the 6.6 km long West Bridge.*
- *the longest road bridge, the 6.8 km long East Bridge, with the longest free span of 1624 m in Europe.*

But the Great Belt Link is not going to be the only major bridge and tunnel project to be under construction in the area at that time. Thus, in 1996 Sweden and Denmark are about to establish a fixed link across the 18 km wide Øresund (The Sound) between Copenhagen and Malmö. This link will comprise both an immersed tunnel, a low level bridge and a high level bridge, all for both road and rail traffic.

So it is believed that it will be wortwhile for all members of IABSE to reserve June 1996 for a trip to the 15th Congress of IABSE in Copenhagen, and as chairman of the Organizing Committee I can assure you that we will do our utmost to make your attendance a memorable experience.

Niels J Gimsing

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