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expressions

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Listed in order of affiliation

U.S.A.	**U.S. Association for Computational Mechanics (USACM)**
Argentina	**Asociacion Argentina de Mecanica Computacional (AMCA)**
PR China	**The Chinese Association of Computational Mechanics**
Italy	**Gruppo Italiano di Meccanica Computazionale (GIMC)**
Denmark, Estonia, Finland, Iceland, Latvia, Lithuania, Norway, Sweden	**The Nordic Association for Computational Mechanics (NoACM)**
Japan	**The Japan Society for Computational Engineering and Science (JSCES)**
Spain	**Sociedad Española de Métodos Numéricos en Ingeniería (SEMNI)**
Germany	**German Association of Computational Mechanics (GACM)**
France	**Computational Structural Mechanics Association (CSMA)**
U.K.	**Association for Computer Methods in Engineering (ACME)**
Greece	**The Greek Association of Computational Mechanics (GRACM)**
Austria, Croatia, Hungary, Poland, Slovakia, Slovenia, The Czech Republic	**The Central-European Association for Computational Mechanics (CEACM)**
Poland	**Polish Association for Computational Mechanics**
Bulgaria	**The Bulgarian Association of Computational Mechanics (BACM)**
Israel	**The Israel Association of Computational Methods in Mechanics**
Portugal	**The Portuguese Society of Theoretical, Applied and Computational Mechanics**
Australia	**Australian Association of Computational Mechanics**
S. Africa	**South African Association for Theoretical and Applied Mechanics (SAAM)**
Turkey	**Turkish National Committee on Computational Mechanics**

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The annual fee for direct individual membership of IACM is 25 US dollars. For affiliated organisations the membership fee is reduced to 10 dollars for the first fifty members, 7 dollars for the next one hundred and fifty members and 10 dollars for any member exceeding two hundred. The Bulletin and a discount on IACM supported activities (congress, seminars, etc.) are some of the benefits of the membership. For further details contact IACM Secretariat.

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IACM members are invited to send their contributions to the editors.

Views expressed in the contributed articles are not necessarily those of the IACM.

contents

editorial

Impressions of Expressions

It is very satisfying to learn of the forthcoming publication of IACM Expressions, soon to become the official bulletin of the IACM. I have always said that the health of an organisation, particularly in an International Society, depends strongly on its ability to communicate with its members. IACM Expressions, thus becomes a vital and essential organ of the IACM, one that is destined to not only inform its members of the activities of the association but also to pull the organisation more tightly together, allow for freer communication among its members, and inform the membership of important developments and opportunities internationally and in broader areas of computational mechanics.

The ability to publish this bulletin is, in no small measure, due to the hard work and creativity of Prof. Eugenio Oñate, Secretary of the IACM and a long-term proponent of producing such a good bulletin. I am sure that you will join me and other members in thanking Professor Oñate for his hard work and for bringing this important publication to fruition. Without it, I am quite sure the IACM would gradually decline and never reach its full potential; with it, I am equally convinced that it will continue to grow, to become stronger, and to be a pubication of which we may all take pride.

I certainly hope that each of the members of IACM will take the time to contribute something to this new enterprise and that we will all attempt to ensure its success.

J.T. Oden
Past President IACM
1991 - 1994

A Brotherhood in Computational Mechanics

Editorial letter from
A. Samuelsson
IACM President

The first international conference in Mechanics was held in Innsbruck, Austria in 1922. It was initiated and organised by Theodore von Karman, the great pioneer in aerodynamics. The circumstances are described in the book 'The Wind and Beyond' by von Karman and Lee Edson. After the first world war scientists from countries on the two sides could not meet, sometimes not even correspond. Van Karman, then a young Hungarian professor in the German Aachen, close to the border of neutral Holland, opened his house for scientists from all countries. The Innsbruck conference which was arranged by von Karman and the Italian mathematician Levi-Civita, was a big success and 'the brotherhood of science' was never more apparent. In 1924 the next meeting was held in Delft, Holland with two hundred attendants. It was then called The International Mechanics Congress. After the second world war, the Congress has always been arranged by IUTAM, the International Union of Theoretical and Applied Mechanics. The Union, created in 1946, grew very fast. Scientists in mechanics from all countries have met every fourth year for a General Congress and a great number of Symposia on different special subjects have taken place.

During the sixties and seventies fast computers came into general use offering the possibility to analyse and solve mechanical problems of high complexity. For young students and engineers this was a great challenge. They now had a tool that revolutionised research in mechanics and engineering design. They were guided by senior colleagues as Ray Clough, John Argyris, Olek Zienkeiwicz and Dick Gallagher. The number of people involved in Computational Mechanics increased very fast and the need for meetings where common problems could be discussed became evident. Early on such meetings were organised by the ASCE, Division of Structural Mechanics in Kansas City (1958)

and in Pittsburg (1960) They were announced as conferences on 'electronic computation'. From the proceedings of the 1958 conference can be noted the 'Introductory remarks' by N.M. Newmark. He writes "In the history of Civil Engineering no single development has had as far reaching consequences as appears to be inherent in the electronic digital computer". A lecture by Ray Clough on 'Structural Analysis by Means of a Matrix Algebra Problem' can also be noted.

Another early conference on the same theme was held in 1961 in Weimar in former East Germany. Among the participants can be noted Ivo Babuska, Rudofl Zurmühl and Wolfgand Zerna.

In a bibliography by Ahmed K. Noor in Appl. Mech. Rev. 1991 there are listed during the sixties nine other proceedings on finite element technology. From the 14th meeting of the Structures and Materials Panel, ARARD in Paris 1962 there were five important papers published in a book edited by Fraeijs de Veubeke from Liége, Belgium. Among the authors were John Argyris, Fraeijs de Veubeke and M. Turner.

In 1964 a course on 'Numerical Stress Analysis' was held in Swansea. Among the lecturers were Zienkiewicz, Clough, de Veubeke and Massonet. A book came out from the conference called 'Stress Analysis'.

In 1965 the 1st Conference on Matrix Methods in Structural Mechanics took place at the Wright Patterson Air Force Base in Dayton, Ohio (a place known today all over the world for other reasons!) It was arranged by the U.S. Air Force and was attended by scientists and engineers not only from U.S.A. but also from Australia, Belgium, Brazil, Canada, Germany, The Netherlands and U.K. Among the many well-known lecturers were Argyris, Gallagher, Melosh, Clough, Zienkiewicz, L.R. Herrmann and Besseling.

At the same time engineering departments at a few places like Swansea and Berkeley became international centres for Computational Mechanics with students and scholars from countries all around the world. The fast computers and codes based

on new algorithms spread to all production and consulting firms.

During the 1970s an important conference series on different aspects of Computational Mechanics started. Thus, in order to bring together mathematicians and engineers, a conference on 'Mathematics in FE and Applications' (MAFELAP) was arranged at Brunel University near London by John Whitemen. At the first conference in a long series, in 1972, two mathematicians, A.R. Mitchell and M. Zlamal, and two engineers, O.C. Zienkiewicz and J.T. Oden, gave invited lectures.

Other important series of international conferences on special subjects are 'Finite Element Methods in Flow problems' started in Swansea in 1974, 'Boundary Element Methods in Engineering' started in Southampton in 1978, 'Numerical Methods in Industrial Forming Processes', started in Swansea in 1982, and 'Computational Plasticity', started in Barcelona in 1987.

Around 1980 the idea came up to create an 'International Association of Computational Mechanics', (IACM) and in 1981 at a conference in Atlanta, Georgia, a few scientists came together and decided to set up such an association with Dick Gallagher volunteering to take charge of setting up the organisation.

A few joint IUTAM - IACM symposia have taken place or are being organised. In the next IUTAM Congress in Kyoto this year IACM takes part in the organisation of three Pre-nominated Sessions. There is a common interest from the two organisations, IUTAM and IACM, to develop this cooperation. For the future I want to see more countries organised in National Associations for Computational Mechanics. There are still countries with very important activities in this field with only a few individual members of IACM. I will only mention Russia and Canada.

With this new bulletin I have great confidence that IACM will get a forum for the members to develop a 'brotherhood' in the science of Computational Mechanics.

A.f. Samuelson

Aims
and Achievements

Editorial letter from
O.C. Zienkiewicz
*First President of IACM
1986 - 1990*

In 1986 the first World Congress of the Association took place in Austin, Texas, and at the same meeting the first Executive Council was elected. I had the honour of being made the first President and this position was meticulously 'rotated' at each of the subsequent Congresses - 1990 in Stuttgart and 1994 in Tokyo. Indeed, the holding of such Congresses was our major aim when forming the Association and their size and international importance is steadily increasing. The next one, the fourth WCCM, will take place in Buenos Aires in 1998 and will see the establishment of the fourth IACM Presidency. It also promises to be one of the largest Congresses and most embracing. However, what of our other aims?

For some years before the first Congress, and indeed on many occasions afterwards, the essential objectives and aims of our Association were the subject of discussion and the means by which these were to be best achieved are still the subject of experiment. What we aim for is well stated in our Constitution as: *"The objective of the Association shall be to stimulate and promote education, research and practice in computational mechanics, to foster the interchange of ideas amongst the various fields contributing to computational mechanics and to provide forums and meetings for the dissemination of knowledge about computational mechanics."*

As the definition of computational mechanics is not always clear, I attach as a footnote an addendum incorporated in our constitution which clarifies the meaning. However, we all know what it's all about. The Congress, by covering a very wide area of the subject, has already done much to unify it, but a further means of doing this was established by a general Bulletin which would be of interest to all and would be widely circulated. Such a bulletin was indeed started quite early with the help of Messes John Wiley & Sons, but never quite achieved the necessary wide circulation and interest. Now being launched in a new form as *'iacm expressions'*, we hope that it will gain much on this front. But, of course, we must here depend on our members for writing stimulating articles of general interest.

Olgierd Zienkiewicz

It seems to me that each specialist field has much to gain from the others and certainly in the development of the application of the finite element method, this has historically been the case.

However, specialisation is of course something which will always continue to have its attractions and here the recent action of IACM in supporting 'Special Interest' Conferences based on already existing Conference series seems productive. Already, the well known series of Conferences of 'The Finite Elements and Fluids' and 'Complas' on computational plasticity, are so linked and many others will follow in the future.

Implicit in the early objectives of IACM is its international character, as only through world-wide scientific activity can real progress be made. Though geographical distribution of Congresses speaks for itself, to maintain contact of a local nature, however, IACM has since its inception supported national or regional associations which are represented in all its activities and which establish the membership core. Europe alone has today some 12 such national organisations, each sponsoring appropriate local conferences and activities. It is our hope that the new magazine will provide help for such organisations by establishing special correspondents and sections of items of more local news, thus obviating the need for duplication of effort on the local scale.

I personally wish much success to the Editors of *'expressions'* in their new venture and I am sure the wide membership of IACM will support it.

Footnote:
The name of "Computational Mechanics" chosen by our association needs perhaps some explanation and appears to be somewhat limiting. When we first used it, it appeared that most activities of an Engineer were associated with 'Mechanics' and indeed they are so if we accept the preamble to our Constitution which I quote:-"For the purposes of the Association we define the subject of Computation Mechanics as the development and application of Numerical Methods and Digital Computers to the solution of problems posed by Engineering and Applied Science with the objectives of understanding and harnessing the resources of nature." The provision of a common forum for discussion, education and research information transfer between the diverse disciplines represented in the main *raison d'etre* of the Association.
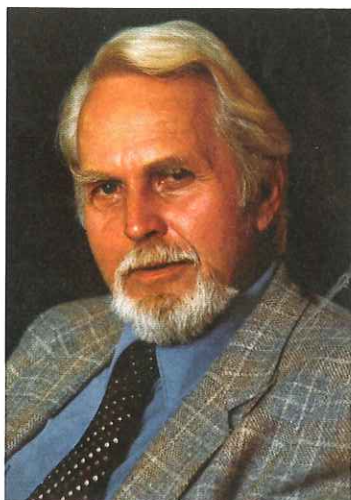
Some Thoughts on the Reliability of Engineering Analysis

by

K. J. Bathe
*Department of
Mechanical Engineering,
Massachusetts Institute
of Technology*

Finite element methods are now very widely used in engineering analysis, and we can expect a continuous growth in finite element applications. This growth occurs in many engineering industries and pertains to applications in structures, fluid flows, field problems and so on.

With the current extensive use of finite element methods, an important question to address is "How reliable are finite element methods and computer programs in engineering practice?" While, clearly, in a University environment all sorts of finite element methods can and should be experimented with, the situation in industrial research and engineering design is quite different. Here the finite element methods used must be reliable. Indeed, the reliability of the methods is much more important than the speed of execution. I have emphasized this

point for a long time and want to take this opportunity to once again put forth some of my thoughts.

At the outset, let me emphasize that I would like to focus here only on the reliability of the finite element solution procedures to solve a given mathematical model. Of course, there are also the issues of whether the mathematical model used is reliable, and indeed the issues arising in selecting a reliable mathematical model are in many regards more fundamental and more difficult to address. However, just to give some basic ideas on this topic would require a much longer exposition (see ref. [1]).

The primary point that I would like to make in this short article, once again, is that in engineering practice only reliable finite element methods should be used to solve a mathematical model. One specific aspect of reliability is that –somewhat loosely speaking– in the solution of a well-posed mathematical model, the finite element procedures (i.e. the element discretizations, integration techniques,...) should always for any reasonable finite element mesh give a reasonable finite element solution (the accuracy of which can be measured), and that the finite element solution can therefore always be trusted for an engineering interpretation. This statement is more precisely enumerated upon in ref. [1].

Therefore, for example, finite element discretizations that contain spurious, i.e. phantom, frequencies (typically due to use of "reduced integration") or that need to be adjusted with artificial factors should not be used in engineering practice. For a simple illustrative example which elucidates what can go wrong using such unreliable techniques, see ref. [1], Table 5.10.

Let me mention some important engineering analysis cases that emphasize my points, also see ref. [2].

The first case is the tragic failure of the Sleipner offshore platform in 1991 in the North Sea. The concrete hull of the platform failed during testing in calm seas, and the platform sank. Fortunately, no human life was lost but a huge

Heidrun Off-shore Platform
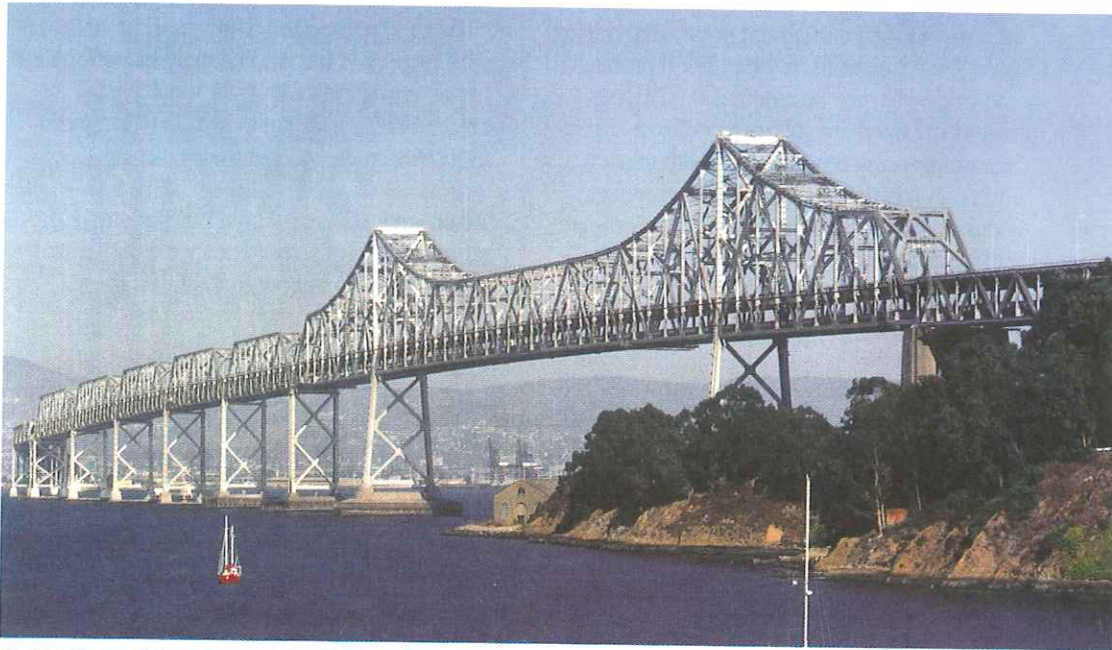
Partial View of the San Francisco-Oakland Bay Bridge

financial loss was measured. The failure of the platform was partly due to an inadequate finite element analysis based on inadequate finite element procedures.

With the above shock provided to the industry, good care was more recently taken using reliable finite element methods in the analysis of critical components of the Heidrun platform, a tension leg offshore platform, the first of its kind and the largest tension leg platform ever built, see figure. Here reliable finite element methods have been employed, mesh studies performed and error measures used to ensure good analysis results, see ref. [3].

These offshore structural analysis cases drastically underline the importance of using reliable finite element methods. A distinguishing feature in these analyses is that the finite element procedures and accompanying computer programs are used on very large and expensive structures, and no (physical) experimental results for the whole structure can be sought until the structure has been built on the site. During the design phase, test results of only certain components are available. In these cases particular care is essential.

Another large civil engineering project where the aspects of reliability are most important is the current seismic analysis of seven large bridges in California, including the famous San Francisco-Oakland Bay Bridge, see figures. After the devastating 1989 and 1994 earthquakes, the Governor of California established a panel of experts to review what could be done to

strengthen the major bridges. This panel recommended that state-of-the-art finite element methods be used for the seismic analysis of the bridges to establish what retrofitting should be carried out. At present, the California Department of Transportation and many contractors are using the ADINA system in a very large effort to analyze the bridges with global and local models. Clearly no experimental results are available for the response of the bridges, and it is of utmost concern that only reliable finite element methods be used.

These types of analyses are quite in contrast to some practices currently established in the automobile industry, and specifically in the crash and crush analyses of automobiles or parts thereof. Here, typically, experimental results are available and nonlinear finite element models are "tuned" in dynamic explicit time integration solutions to give good comparison with these experimental results. This good correspondence between computed and experimental results is reached after a few finite element model runs, adjusting the model including the solution parameters. The final finite element model (including the solution parameters) is then deemed to be applicable to the physical problem analyzed and variations thereof.

This approach in some sense washes over the use of inadequate finite element methods because the iterative adjustment of the models used compensates for the inadequacy of the techniques. Of course, if the physical problem changes significantly, the complete tuning

"the reliability of the finite element solution procedures to solve a given mathematical model"

process must be carried out anew, and indeed even small variations in the physical problem can cause concern on whether the analysis results obtained are still trustworthy. A common excuse for using this approach with explicit time integration is that more reliable techniques –that might use implicit time integration– are not available or are too expensive to use. However, this is frequently not the case with the current analysis procedures and latest computer hardware at hand.

Namely, the use of iterative solvers, sparse solvers, substructuring/domain decomposition techniques, reliable mixed elements, consistent tangent matrices, new powerful contact algorithms, solution error measures, and the use of fully parallelized finite element programs are making it possible to obtain today much more reliable finite element solutions than is frequently realized. This is due to the research advances that have taken place in the field with increasing emphasis on reliability issues, see for example refs. [1] to [5], and the fact that these advances have been implemented to a considerable degree in some commercial finite element programs.

With respect to the kind of analyses performed on the Sleipner offshore platform mentioned above, we of course hope that such finite element applications will never occur again, and with respect to the kind of analyses exemplified by the crush and crash analyses in the automobile industry, it is high time for such industries to re-evaluate their practices.

While we focussed here on the state in structural analysis, similar considerations are applicable to fluid flow analysis, but these thoughts would warrant another article...

" ...it is high time for such industries to re-evaluate their practices"

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Partial Model of the San Francisco-Oakland Bay Bridge
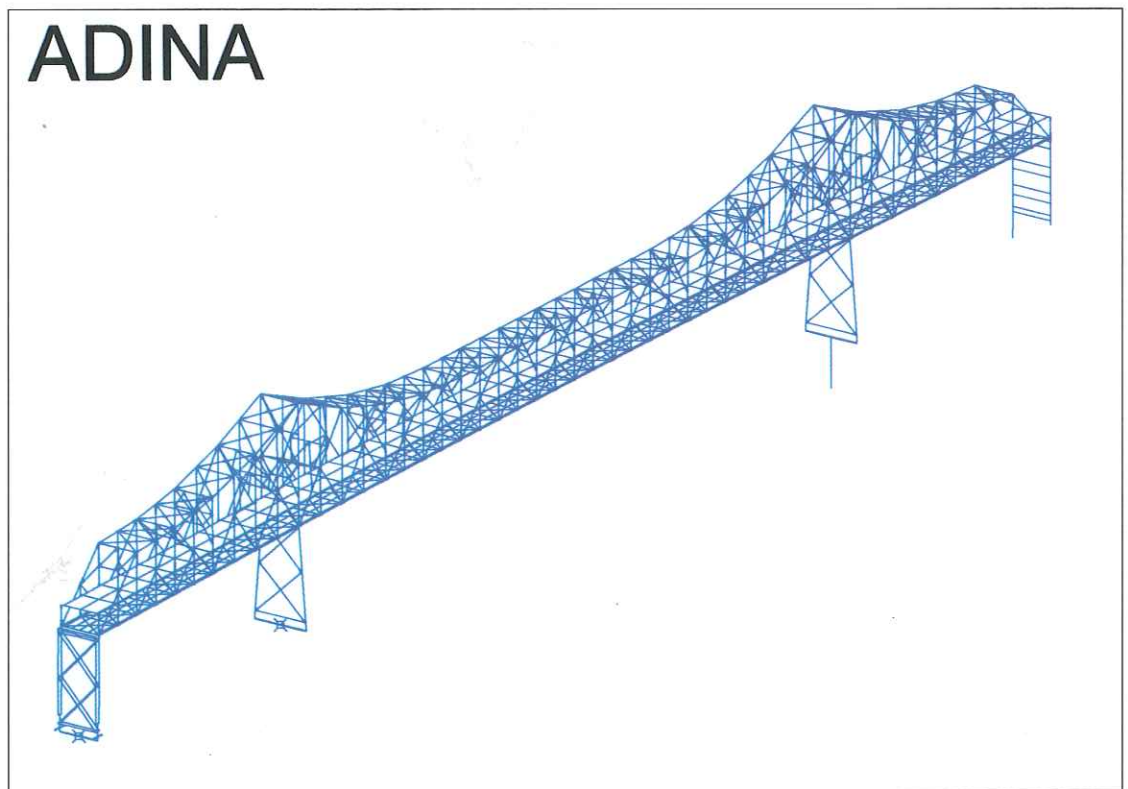
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IACM

In addition to the main World Congresses, IACM sponsors thematic conferences organised by national, regional or private organisations, Current IACM Special Interest Conferences include the *International Conference on Computational Plasticity (COMPLAS)* and the *International Conference on Finite Elements in Fluids (FEMIF)*. Interested conference organisers should contact the IACM Secretariat for further information on sponsoring procedures.

IACM has permanent links with the International Union of Theoretical and Applied Mechanics (IUTAM). IACM and IUTAM have held regular joint seminars and meetings, the next is in Kyoto this year.

USA

Von Neumann medals have been awarded by the USACM to Richard H. Gallagher and Ivo Babuska during the Third National Conference, Dallas, TX, June 1995.

USACM is serving as an umbrella and a focal point for all computational mechanics in the U.S. To fulfil its mission, USACM has appointed liaison officers with all professional societies involved in computational mechanics including ASME, ASCE, AIAA, SIAM, ACM and IEEE.

The USACM WWW home page was introduced in November 1994. It has since been expanded and has hyperlinks which describe the computational mechanics activities of government agencies and labs, university centres, group and individuals active in computational mechanics. It has research engineers and places to allow for computerised literature searches to be conducted in the diverse areas of computational mechanics. It is planned to add to the home page a list of commercial software vendors and consultants in computational mechanics.

A number of technical committees have been established by USACM including committees on meshless methods (coordinated by Ted Belytschko), computational material mechanics (coordinated by Satya Atluri and Michael Ortiz), multidisciplinary problems (coordinated by Charbel Farht), and computational modelling of composite and smart structures (coordinated by Ahmed Noor). Additional technical committees are currently being organised.

Sweden

Professor Alf Samuelsson, our current president of the IACM, retired from his chair as professor in Structural Mechanics at Chalmers University of Technology, Göteborg.

Argentina

The organising committee of the IACM Fourth World Congress on Computational Mechanics on 29 June - 2 July 1998 in Buenos Aires have introduced a WWW page for easy access of information. Complete conference details, including instructions for organising sessions and submitting of abstracts can be found on http://venus.unl.edu.ar/bsas98web.html

Israel

The new Israel Association for Computational Methods in Mechanics -IACMM had it's first general meeting and symposium in November 1995. It was a great success and now boasts over 50 members with the new president and one of the founder members being Prof. Pinhas Bar-Yosef of the Israel Institute of Technology.

Europe

The European Council on Computational Mechanics (ECCM) was created at a meeting held in Göteborg on Nov 17th, 1995. The new ECCM groups the European associations which are affiliated to IACM with the following objectives:
1. To promote and coordinate computational mechanics activities in Europe;
2. To support worldwide IACM by ensuring European representation. The members of the Interim Managing Committee of ECCM are O.C. Zienkiewicz, E. Oñate, M. Kleiber and E. Stein.

The European Community on Computational Methods in Applied Sciences (ECCOMAS) is organising, in Paris, the 2nd European Conference on Numerical Methods in Engineering and the 4th European Conference on Computational Fluid Dynamics (Paris, 9 - 13 September 1996). Further details can be found on page 15.

A number of IACM affliliated associations in Europe will be holding their national conference in 1996 (i.e. Spain, Greece). see page 12/13.

Overheard after dinner ...

"Guess where your conference fees have gone - you´ve just eaten them."

J.T. Oden
International Conference on
Finite Element Fluids
Tokyo, Japan
October 1995

"Facts are stubborn things."
Alain René Lesage

NoACM hosts a Cold Conference with a Warm Farewell

N.-E. Wiberg
President of NoACM
Göteborg - January 1996

The Nordic Association of Computational Mechanics (NoACM) held it's yearly seminar NSCM VIII on November 17-18 1995 at Chalmers University of Technology, Göteborg, Sweden which was attended by 120 people.

Everyone will remember the seminar as 'the snow seminar'. A snowstorm of the century completely closed down the entire Göteborg area and gave the organisers some headaches and the participants at the Panorama Hotel had some 'free' time for personal discussions or just having some pleasant time together. One delegate came quite unprepared for the cold and was last seen walking out of the hotel with a conference bag, complete with cut out eyes, covering his head.

The objective of this conference is to stimulate and promote research and applications within the area of computational mechanics, to foster the interchange of ideas among the various fields contributing to computational mechanics, and to provide a forum for personal contacts between researchers and practitioners in this field. At the fourth NoACM meeting in 1991 the Baltic countries, Estonia, Latvia and Lithuania, joined NoACM who now represents the interests of the Nordic countries in the IACM. The main activities of NoACM is the annual two day seminar, of which this was the eighth. Previous seminars were held in: 1988, Göteborg - *Sweden*; 1989, Oslo - *Norway*; 1990, Helsinki - *Finland*; 1991, Lund - *Sweden*; 1992, Aalborg - *Denmark*; 1993, Linköping - *Sweden*; 1994 Trondheim - *Norway*.

These seminars are mainly for young researchers, to give training in presenting research and to give opportunities to create a professional network earlier in life, invaluable for the following professional life. It also gives an opportunity for teachers and professionals to meet and discuss common matters.

This year was special. We added one day, a European Workshop in Computational Mechanics, EWCM - 95, held on November 16, with the NoACM as the host. This workshop was auspiced by IACM and supported by the European Community on Computational Methods in Applied Sciences (ECCOMAS). The workshop was conducted by a dozen leading specialists from Europe (by special invitation); Stein, Wunderlich, Wriggers - *Germany*, Jennings, Owen, Zienkiewicz - *U.K.*, Kleiber - *Poland*, Oñate - *Spain*, Mikkola - *Finland*, Bergan - *Norway*, Krenk - *Denmark* and Wiberg - *Sweden*.

The workshop was given in the honour of Professor Alf Samuelsson, the IACM President, who retired from his chair last summer as professor in Structural Mechanics at Chalmers University of Technology. Alf took the initiative to create NoACM at its first seminar in 1988. The invited papers to EWCM - 95 are collected in a special volume - Advances in Finite Element Technology. Copies can be ordered from the IACM Secretariat.

The proceedings of NSCM VIII contains the short papers of 60 presentations, given at three parallel sessions over the two days. Copies can be obtained from Nils-Erik Wiberg on Fax: +46 31 772 1976.

During the seminar a General Meeting was held and a new Executive Committee of NoACM was elected for the next 4 year period: Lars Damkilde, Niels Olhoff - *Denmark*; Martii Mikkola (Vice President), Anti Pramila - *Finland*; Pål Bergan (Vice President), Kjell Magne Mathisen - *Norway*; Anders Eriksson, Göran Sandberg (Secretary), Nils-Erik Wiberg (President) - *Sweden*; Jaan Lellep - *Estonia*.

During his inauguration speech, Prof. Anders Sjöberg, the rector of Chalmers University, pointed out that the department of Structural Mechanics has, under the leadership of Alf Samuelsson, had a great impact on the development and spread of Computational Techniques in Mechanics in Sweden. Many of his PhD students have become professors all over Sweden in different subjects.

The next NoACM Seminar will take place in Copenhagen, Denmark in October 1996.

The invited speakers

A brief word with
Alf Samuelsson

Alf receiving his dedicated book at the NoACM Conference in November 1995

Within computational mechanics, do you think that the continents influence each other?

As we publish to a great extent in the same journals, I think so.

Following on from that, as president of the IACM, how do you perceive the future of the IACM?

IACM is a young organisation and I hope it will stay that way, There is always a danger with organisations like this that it stiffens in its form. It is important to get the younger people into the leading posts and listen to them.

How would you summarise your career so far at the university?

I have has an ordinary academic career. I have been professor here for 30 years. My ambition has been to give education and research a sound scientific basis and to offer a good environment for the students and colleagues. I have tried to establish and maintain good international contacts in my subject. I have also tried to be helpful with the general administration at our university and in the international organisations.

> " my ambition has been to give education and research a sound scientific basis"

During your academic career so far, how have you seen Computational Mechanics evolve in Europe and World Wide?

As a research student at Chalmers University of Technology in Göteborg, Sweden, I had Professor S.O. Asplund as my supervisor. This was in the middle of the fifties. He saw big possibilities with the new fast computers and worked on matrix formulations in Structural Mechanics. The first one is the change at the University Departments of Engineering, computers have been the most important tool in the research. The other is the change in the Departments of Applied Mathematics where Computation Mechanics has become one of the big interests and the third one is the software production in the field which has brought Computational Mechanics to general use in industry.

Do you think there are strong technical links between Europe, Far East and the Americas?

We have many strong links and I am specially pleased with the good links between Spain, Portugal and South America.

Now that you have retired as Professor how do you visualise your future?

I have five research students. I want to guide them to their doctor exam. I also hope to be helpful with other research projects in the department. I have always been interested in writing textbooks. I am at present involved in the translation of some of our earlier books from Swedish to English. I am also interested in the history of science and technical education. I recently read a very interesting book about the building of Brooklyn Bridge in New York.

What are your expectations of the Fourth World Congress on Computational Mechanics to be held in Argentina in 1998?

I am sure that the colleagues in Argentina and Barcelona will do a great job. I really hope the young scientists can persuade their supervisors to let them go to to Buenos Aires. It is important to meet others with the same or similar interests and to get a general view on what is going on in Computational Mechanics.

We are **Getting Organised**

News from
IACM Secretariat
E. Oñate
IACM Secretary / Treasurer

Things are slowly taking shape at the new IACM Secretariat in Barcelona. A brochure presenting IACM membership and activities has been recently released; the new IACM Special Conference Series is catching up (agreements with the International Conferences on Computational Plasticity and Finite Elements in Fluids have been reached), and the new bulletin, IACM Expressions, is finally out. We do hope that in its pages you will find a friendly glimpse of the broad spectrum of IACM activities worldwide.

Most of the merit of the new outcome at the IACM Secretariat is due to the enthusiasm and dedication of the IACM staff, namely Ms. Padma Gettu in charge of the everyday correspondence and finances, and Ms. Diane Duffett, responsible for IACM Expressions. Their picture is shown here below so you can easily recognise them next time you visit the IACM Secretariat.

We certainly look forward to receiving your critics, comments and suggestions in order to improve the content of the new IACM Expressions. Please send us proposals for courses, workshops, symposia (the new format and regulations of IACM Symposia will be soon released) and any activity you consider which will benefit from being linked to the IACM. Indeed, the IACM image and prestige will be built up from the sum of all these activities and, from the IACM Secretariat, we will do our best to contribute to their success.

IACM Staff Padma and Diane

Advances in Finite Element Technology
N.-E. Wiberg (Ed.). 305 pages, 1995, US$ 45.00, CIMNE Barcelona.

The second of a new series of handbooks on 'Theory and Engineering Application of Computational Methods'. It contains the original contributions from eminent scientists in different theoretical and applied aspects of the Finite Element Method to a wide range of problems in engineering mechanics. This book was dedicated to Prof. Alf Samuelsson at his retirement from his chair in Structural Mechanics at Chalmers University, Göteborg, Sweden.

Composite Steel and Concrete Structural Members Fundamental Behaviour
D.J. Oehlers and M.A. Bradford (Eds.) 549 pages; 1995; US$ 145.00; Pergamon.

This book deals with the analysis and behaviour of composite structural members that are made by joining a steel component to a concrete component. The emphasis is to impart a fundamental understanding of how composite structures work, so that engineers can develop a feel for the behaviour of the structure, often missing when the design is based solely on using codes of practice or by the direct application of prescribed equations.

Problem Solving - Methods, Programming and Future Concepts
O.V. German and D.V. Ofitserov (Eds.) 434 pages, 1995, US$ 184.00, Elsevier North-Holland.

This volume looks at classifying problems, interpreting them, and the methods in solving them. The final chapter covers future concepts such as universal problems approaching restoration, weak methods becoming strong, the role of formal logic in future development, human factors and other paradigms.

Constitutive Laws: Theory, Experiments and Numerical Implementation
A.M. Rajendran and R.C. Batra (Eds.) 302 pages, 1995, US$ 45.00, CIMNE Barcelona.

The first of a new series of handbooks on 'Theory and Engineering Applications of Computational Methods'. This volume contains the papers presented at the Symposium on Constitutive laws held in conjunction with the International Conference on Engineering Science (ICES'95) in Mauna Lani, Hawaii on July 30 - August 3, 1995.

Parallel Computational Fluids Dynamics

N. Satofuda, J. Periaux and A. Ecer (Eds.)
470 pages, 1995, US$ 212.50,
Elsevier North-Holland.

For the solution of large scale complex problems in Computational Fluid Dynamics which require high performance computer architectures, new systems have been announced which offer the promise of Tera FLOPS. This book contains papers presented at the Parallel Computer Fluid Dynamics '94 Conference and topics include reacting or turbulent flows; distributed memories, FEM and irregular meshes.

Handbook of Numerical Analysis

P.G. Ciarlet and J.L. Lions. Multi volume (five); 1995, Elsevier North-Holland.

This series of volumes aims to cover all the major aspects of numerical analysis, serving as the basic reference work on the subject. Each volume will concentrate on 1, 2 or 3 particular topics. Each article is an in-depth survey, reflecting recent trends and is essentially self-contained. It covers the basic methods of Numerical Analysis under the following general headings: solution of equations in Rn; finite difference methods; finite element methods; techniques of scientific computing and optimisation theory and system science.

The Finite Element Method in Heat Transfer Analysis

R.W. Lewis, K. Morgan, H.R. Thomas, K.N. Seetharamu (Eds.) 350 pages, 1996, US$ 45.00, John Wiley & Sons, U.K..

This comprehensive text is essential reading for all advanced students in mechanical, aeronautical, chemical and nuclear engineering. Starting with fundamental ideas through to more complicated and industrial problems.

Structural & Multidisciplinary Optimization

N. Olhoff and G Rozvany (Eds.)
960 pages, 1995, US$ 195.00, Pergamon U.K.

Proceedings of the First World Congress of Structural and Multidisciplinary Optimization, 28 May - 2 June 1995, Goslar, Germany. It aimed to bring together, at a single international meeting, researchers and practitioners in the field of structural optimisation. The proceedings contain contributed papers presented at WCSMO-1, demonstrating the strong activity and recent advances of the field of optimum design.

The Written Word versus Digital Technology

This article refers in particular to technical reference books.

The perception that books will be substituted by digital technology has not yet been realised. In the United States, where the audiovisual sector is more developed, the public continues to spend more on books than on any other product of amusement or culture. The electronic book, although a growth market, still only constitutes a small part of reference books.

Simon & Schuster, an old North American publishing house (owned by Viacom, the television cable giant) shows the limited appeal of electronic books on CD-ROM. This publishing house adopted digital technology with determination and has already invested more than a hundred thousand dollars in multimedia projects. Electronic products now total 22% of their bulk business, while five years ago it was practically nothing.

These facts do not however signify a victory of the 'bit' over printed paper. Firstly, not all publishing heads are convinced of the possibilities of the new technology. The two immediate competitors of Simon & Schuster, Bantam Doubleday Dell (property of Berteslmann) and Random House, have barely entered into the business. Secondly, Simon & Schuster are a special case because they obtain 41% of their income from technical reference books where digital technology certainly has some advantages.

In fact, a survey carried out by Sofres in France shows that although the public value the quality of digital technology it is only for reference books and, even then, with some reservation. In the case of encyclopaedias, 66% of the interviewees said that books were better suited to an in depth study of a topic rather than a quick reference, 74% said that it is more tiring to read long text on a screen, 42% said it was complicated to use the CD-ROM and only 38% were interested in using an encyclopedia on disk.

Simon & Schuster's digital technology is, however, still in the process of being developed, even though the major part of their business is still printed books. The 'electronicos' all agree that, just as The New York Times is acknowledged as the premier of publishing houses, the benefits of electronic books are not far reaching. And it does not look like changing for years to come.

On the other hand, it is known that digital technology does reduce costs. This cost reduction could be decisive in the modern market - the superstores that cater for mass sales rather than the traditional book shop. The chain stores, which sell large volumes of books, impose their own laws: they force the publishing houses to lower their prices and enforce large discounts. The cost of recalling unsold copies has doubled in the last ten years and is now the main argument for publishers who face declining profits. If electronic books can be produced quickly when demand is identified, the publishing houses could save a good deal of money which they now waste on the moving and storing of books.

The Institute for Hydraulic Machines and Fluid Mechanics of the Swiss Federal Institute of Technology in Lausanne

is profoundly saddened by the untimely passing of

Professor Inge Lennart Ryhming

on February 6, 1996.

His friends, colleagues, collaborators and former students will cherish the memory of Inge's exceptional leader personality, which combined an enthusiastic and warm human side with a keen scientific mind.

In his memory, donations can be made to the "Fonds de recherche Inge L. Ryhming" which has been created to support young scientists (Account no. C.302.201.0 at the Banque Cantonale Vaudoise in Lausanne).

notices

IACM
Fourth World Congress on Computational Mechanics

Following the success of the three previous World Congresses on Computational Mechanics held in Austin, Texas (USA 1986), Stuttgart (Germany 1990), and Chiba (Japan 1994), the International Association for Computational Mechanics is pleased to announce the Forth World Congress on Computational Mechanics (WCCM IV) to take place in **Buenos Aires, Argentina** on **29 June - 2 July 1998**. Keynote, contributed and organised sessions are envisaged in topics related to theoretical developments and applications in any field of Computationl Mechanics.

The conference is to be held at the Sheraton Hotel, Buenos Aires and a full social programme including city tours and a reception banquet is available. At your request, a variety of individual post conference tours can be arranged within Argentina and in neighbouring countries.

This is being organised by the 'Asociación Argentina de Mecánica Computacional' (AMCA) and the 'Sociedad Española de Métodos Numéricos en Ingeniería' (SEMNI) in collaboration with the 'Fundación para el Desarrollo Tecnológico' (FUDETEC), Buenos Aires - Argentina, and The International Centre for Numerical Methods in Engineering, Barcelona - Spain.

A substantial reduction is afforded for registration and payment before 30 June 1997. This date is also the deadline for presenting one page abstracts. The deadline for submission of extended abstracts is 21 January 1998. It is recommended that hotels are reserved as soon as possible.

For further information please contact the IACM secretariat
Edificio C1, Gran Capitan s/n,
08034 Barcelona, Spain.
Tel: (34) 3-401 60 36
Fax: (34) 3-401 6517
Email: iacm@etseccpb.upc.es.

Fourth World Congress on Computational Mechanics

Buenos Aires, Argentina
29 June - 2 July, 1998

IACM
Forth World Congress
on Computational Mechanics
in Buenos Aires

Fourth U.S. National Congress on Computational Mechanics

To be held on **6 - 8 August 1997** at the Hyatt Regency in Embarcadero Centre, **San Francisco - California**. This is the official congress of the U.S. Association for Computational Mechanics, an affiliate of the International Association for Computational Mechanics.

It will provide a forum to communicate ideas and new developments on a wide range of topics associated with computational mechanics and its application to critical problems in science and engineering. Complete conference details, including instructions for abstracts (due by 1 November 1996) can be found on the conference web:
http://www.scorec.rpi.edu/usnccm/usnccm.html.

For further information:
Mark Shephard
Scientific Computation Research Centre, 7011 CII Building, Rensselaer Polytechnic Institute, Troy, NY 12180-3590.
Tel: (1) 518-276 6795
Fax: (1) 518-276 4886
Email: usnccm@scorec.rpi.edu.

GRACM
The Greek Association of Computational Mechanics

The 2'nd Greek National Congress on Computational Mechanics is to be held at the Technical University of **Crete**, in Chania, **Greece** from **26 - 28 June 1996**. Its aim is to provide a forum for discussion of both academic and industrial research in the various areas of computational mechanics which combine computer applications, numerical methods and mechanics.

In addition to Greek participants, the following distinguished Professors have agreed to participate as invited speakers;
J. Dominguez (Spain); E. Hinton (U.K.);
M. Kleiber (Poland); J.E. Luco (USA);
A.K. Mal (USA); L. Morino (Italy); H. Nagib (USA); S. Nair (USA); E. Oñate (Spain);
J. Periau (France) & R. Piva (Italy).

For more information:
Prof. D.A. Sotiropoulos,
Dept. of Eng. Sciences Technical University of Crete, GR-73100, Chania, Greece.
Tel: +30 821 69 563
Fax: +30 821 69 522
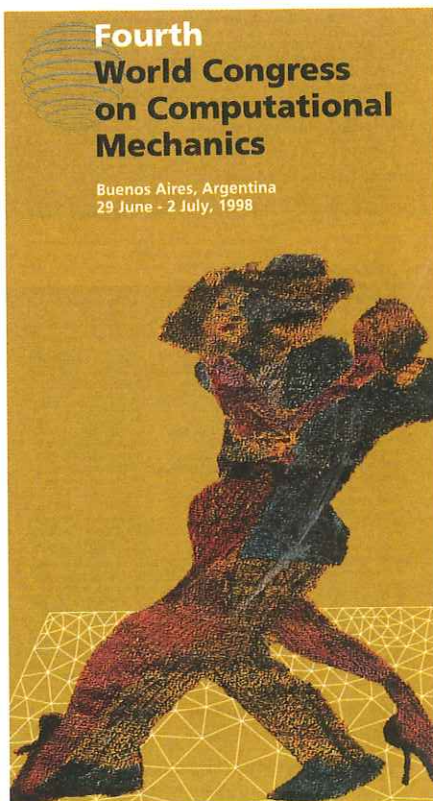
3rd Congress on Numerical Methods in Engineering in Spain

On **3 - 6 June 1996, Zaragoza, Spain**, will be the epicentre for Spanish and Latin American engineers and scientists interested in computational mechanics, exchanging information, ideas and experiences between research institutes, academics and professional organisations. The venue is the Centro Politécnico Superior de Ingenieros, Universidad de Zaragoza and is the third conference organised by the Spanish Association for Numerical Methods in Engineering (SEMNI), in cooperation with the Centro Politécnico Superior de Ingenieros de la Universidad de Zaragoza, the Universidad Poli-técnica de Madrid and the Centro de Estudios y Experimentación de Obras Públicas (CEDEX).

Running parallelled will be a variety of social and cultural activities including an excursion visiting some of the most beautiful villages in the area. For further information:
SEMNI secretariat, Edificio C1, Camput Norte UPC, Gran Capitán s/n, 08034 Barcelona, Spain. Tel: (34) 3-401 6036; Fax: (34) 3-401 6517; Email: semni@etseccpb.upc.es.

XIX ICTAM -International Congress of Theoretical and Applied Mechanics

Back in 1924, in Delft - Holland, the ICTAM held it's first conference. They are now proudly holding their 14 th, from **25 - 31 August 1996** at Kyoto Int. Conference Hall, **Kyoto, Japan**. The Congress is organised under the auspices of the International Union of Theoretical and Applied Mechanics (IUTAM) by invitation of the Japan National Committee of Theoretical and Applied Mechanics.

The Congress, whose president is Professor T. Tatsumi, provides an important means of meeting the objectives of IUTAM through the gathering of the Mechanics community. The programme will include three presentations organised jointly between IUTAM and IACM. The first is within solid mechanics: Adaptive Hierarchical Modelling in Computational Mechanics, chaired by E Stein (Germany) and J.T. Oden (USA). The others are within fluid mechanics: Computational Approaches to Turbulence and Hydrodynamic Stability, chaired by J. Periaux (France) and A.J. Baker (USA) and Plates and Shells, chaired by H. Mang (Australia).

MECOM 96 V Argentinian Congress on Computational Mechanics

MECOM 96, will be hosted by the Universidad Nacional de Tucumán from **10 - 13 September 1996. Tucumán**, situated in the South-West of **Argentina**, is one of the oldest cities in the country. It was founded by the Spanish in 1565 and is today a fascinating city with a large historical tradition and colonial architecture.

The first conference was held in Paraná in 1985 and is now held every three years. MECOM promotes a forum for discussion of the current state of Computational Mechanics, not only in Argentina but also involving Brazil, Chile and Uruguay. Collectively these countries have more than 200 associates, between whom there is invaluable participation.

Together they form the core of the 'Association Argentina de Mecánica Computacional', (AMCA), one of the first IACM Affiliated Associations.

For further information:
AMCA secretary, Güemes 3450-300, Santa Fe, Argentina. Fax: (54) 42-509 44.

Complas - Fifth International Conference on Computational Plasticity

The fifth conference in this series aims to bring together leading researchers and practitioners in the field of computational plasticity. Hosted by the Universidad Politécnica de Catalunya in **Barcelona, Spain** from **17 - 20 March 1997**, it will provide a forum for discussion of the current state of solution procedures for plasticity problems and their integration in computer aided analysis and design. It will address both the theoretical bases for the solution of plasticity problems and the numerical algorithms necessary for efficient and robust computer implementation. The conference themes will fall within the following subject groups: (a) Consititutive models and fundamentals, development and verification of constitutive models involving plasticity, visco-plasticity, dynamic plasticity, damage mechanics etc.; (b) Computer implementation of constitutive models, parallel processing, software reliability and benchmarking, nonlinear equation solving techniques etc.; and (c) Application to practical engineering problems. Abstracts on related topics are invited by 15 September 1996.

For further information:
CIMNE
Edificio C1, Campus Norte UPC,
Gran Capitan s/n
08034 Barcelona, Spain.
Tel: (34) 3-401 6036
Fax: (34) 3-401 6517
Email: semni@etseccpb.upc.es.

COMPLAS

▲▼ NAFEMS WORLD CONGRESS '97
Design, Simulation & Optimisation
Universität Stuttgart, Stuttgart, Germany, 9-11 April 1997

OBJECTIVES

The ever increasing competitiveness of world-wide industry places escalating requirements for the rapid and near optimal design of both products and their manufacturing processes. The remarkable (and continuing) developments in computer hardware makes it increasingly possible to use computational techniques in both product development costs and time to market and is a major driving force in the introduction of computational tools to the environment. This conference seeks to examine the Reliability & Applicability of Computational Methods through three principle themes:-

Design

CAD/CAE Links for Analysis Design	Conceptual Design Analysis Tools for Engineers
QA Requirements	Engineer Registration
Parametrics	Data Transfer Issues
Education & Training.	

Simulation

Product Performance	Manufacturing Processes
Virtual Prototyping	Development of Real World Material Models
Validation & Certification of Software Tools	Coupled Fitness for Purpose/Performance

Optimisation

Approaches to Optimal Product Design	Process for Optimal Performance Solutions
Adaptivity Processes in Simulation	Efficiency of Solutions
Optimisation Techniques	

Abstract

One or two page abstracts on topics related to the theme of the conference, are invited by **30th June 1996**.

FOR FURTHER INFORMATION PLEASE CONTACT:-
Anne Creechan, NAFEMS LTD +44 (0) 13552 72639   Fax + 44 (0) 13552 72749

DTA/NAFEMS
2nd International Conference

▲▼ **NAFEMS**
The International Association for the
Engineering Analysis Community

STRUCTURAL DYNAMICS MODELLING
Test, Analysis, Correlation & Updating

Low Wood Hotel & Conference Centre, Cumbria, UK
3-5 July 1996

Following the successful 1993 conference on Structural Dynamic Modelling: Test, Analysis and Correlation, a second conference with the same theme will be organised by DTA in collaboration with NAFEMS and SECED, during the period 3-5 July 1996, at The Low Wood Hotel, Lake Windermere, Cumbria, England.

This conference focuses on the integration of analytical and experimental aspects of structural dynamic analysis and, in particular, on the correlation between these two approaches and on model validation, verification and updating. The conference is run on a single-session format, and will include approximately 50 papers relation both to methods of modelling and also some on application to particular case studies. There will be open workshops reporting on progress of two relevant surveys which are in progress at present, and there will be an exhibition of relevant products.

FOR FURTHER INFORMATION PLEASE CONTACT:-Anne Creechan, NAFEMS Ltd
Phone +44 (0) 13552 72639   FAX +44 (0)13552 72749

conference diary planner

3 - 6 June 1996
3rd National Congress on Numerical Methods in Engineering in Spain.
Venue: Centro Politécnico Superior de Ingenieros, Universidad de Zaragoza, Spain.
Contact: SEMNI. Tel: (34) 3 401 60 35. Fax: (34) 3 401 65 17. Email: semni@etseccpb.upc.es

13 - 15 June 1996
CPiP '96 - Collective Phenomena in Physics - Pattern Formation in Fluids and Materials.
Venue: Western Science Centre, University of Western Ontario, London, Ontario, Canada.
Contact: Prof. T. Lookman. Tel: (519) 679 2111 ext. 8788, Fax: (519) 661 3523 Email: lookman@uwo.ca

25 - 28 June 1996
IX Conference on the Mathematics of Finite Elements and Applications.
Venue: Brunel University, Uxbridge, United Kingdom.
Contact: Brunel Institute of Computational Mathematics. Tel:(44) 1895 274 000 ext. 2470

23 June - 6 July 1996
NATO ASI (Advanced Study Institute) - On Algorithms for solving large linear equations: state of the art and industrial applications.
Venue: Las Palmas de Gran Canaria.
Contact: CEANI. Tel (34) 28 45 19 16

1 - 3 July 1996
CADCOM 96 - Computer Aided Design in Composite Material Technology.
Venue: Udine - Italy.
Contact: Amanda Goodchild. Tel: (44) 1703 293 223

15 - 19 July 1996
Miskolc '96 - Numerical Methods and Computational Mechanics in Science and Engineering. *Venue:* The University of Miskolc, Miskolc, Hungary.
Contact: A. Galántai. Tel: (36) 46 365 111, Fax: (36) 46 365 174, Email: matnum@gold.uni-miskolc.hu

25 - 31 August 1996
KTAM Kyoto '96 - XIX International Congress of Theoretical and Applied Mechanics.
Venue: Kyoto, Japan
Contact: Prof. E. Watanabe, Fax: (81) 75 752 5296

9 - 13 September 1996
ECCOMAS 96 - Second ECCOMAS Conference on Numerical Methods in Engineering / Third ECCOMAS Computational Fluid Synamics Conference
Venue: Maison de la Chimie, Paris, France
Contact: ECCOMAS Secretariat. Tel: (33) 1 44 27 44 11, Fax: (33) 1 44 27 72 00.

10 - 13 September 1996
MECOM 96 - V Congreso Argentino de Mecánica Computacional.
Venue: Universidad Nacional de Tucumán, Tucumán, Argentina.
Contact: AMCA, Güemes 3450-300, Sante Fe, Argentina. Fax: (54) 42 509 44

16 - 18 September 1996
APCOM '96 - I I I Asian-Pacific Conference on Computational Mechanics.
Venue: Seoul, Korea.
Contact: APCOM'96, Department of Civil Engineering, Korea Advanced Institute of Science and Technology, Taejon 305-701, Korea.

25 - 26 October 1996
NSCMIX - 9th Nordic Seminar on Computational Mechanics.
Venue: Copenhagen, Denmark.
Contact: Prof. L. Damkilde. Fax: (45) 45 88 32 82

3 - 6 December 1996
IV International Conference on Control, Automation, Robotics and Vision.
Venue: Western Stamford, Singapore.
Contact: Dr. Chan Sai Piu. Tel: (65) 799 5471

17 - 20 March 1997
COMPLAS - Fifth International Conference on Computational Plasticity.
Preceded by 5th Short Course on Computational Plasticity, 13 - 14 March 1996.
Venue: Barcelona, Spain
Contact: Prof. D.R.J. Owen. Department of Civil Engineering, University College of Swansea.
Tel: (44) 1792 20 56 78. Fax: (44) 1792 29 56 78

26 - 30 March 1997
CHT '97 - International Symposium on Advances in Computational Heat Transfer.
Venue: Cesme, Turkey
Contact: Prof. G. de Vahl Davis. Tel: (61) 2 385 4099. Fax: (61) 2 385 4099,
Email: g.devahldavis@unsw.edu.au

9 - 11 April 1997
NAFEMS World Congress '97 - "Design, Stimulation & Optimisation"
Venue: University of Stuttgart, Germany.
Contact: Anne Creechan. Tel: (44) 1355 272 639. Fax: (44) 1355 272 749, Email: tkenny@nafems.org

1 - 6 June 1997
CANCAM '97 - 16th Canadian Congress of Applied Mechanics.
Venue: Laval University, Ste-Foy, Quebec, Canada.
Contact: Prof. L. Cloutier. Tel: (418) 656 3271. Fax: (418) 656 7415.

6 - 8 August 1998
The Fourth U.S. National Congress on Computational Mechanics.
Venue: Hyatt Regency in Embarcadero Centre, San Francisco, California, USA
Contact: Mark S. Shephard. Tel:(518) 276 6795, Fax: (518) 276 4886, Email: usnccm@scorec.rpi.edu

January 1998
FLOW '98 - '10th International Conference on Finite Elements in Fluids.
Venue: University of Arizona, Tucson, Arizona, U.S.A.
Contact: Prof. R. Gallagher. Tel: (315) 268 6444, Email: dick5762@aol.com

29 June - 2 July 1998
IACM - Fourth World Congress on Computational Mechanics.
Venue: Buenos Aires, Argentina.
Contact: IACM Secretariat, Spain. Tel: (34) 3 401 6036. Fax: (34) 3 401 6517, Email: semni@etseccpb.upc.es

time is precious
are you using it wisely?

Tony Keck
International Training
Corporation
London

"People who really manage their time well, consider all aspects of their lives""

As far as we understand it - the only truly finite resource is time. We cannot expand it to suit our own needs; all we can do is use it in such a way that our goals and ambitions are realised.

There is a clear research which demonstrates that, for many people, working today is getting harder and involving more hours. In this hectic pace, it is so easy to fall into the trap of 'working harder not smarter', being the busy fool, adopting the 'headless chicken' syndrome. It becomes a treadmill!

How can I help? - Following a few years experience of working with people just like you, let me share a few thoughts on what those experiences have taught me.

The first crucial issue is one of BALANCE. Many people believe mistakenly, that improving their use of time only involves thinking about their time at work. People who *really manage their time well*, consider all *aspects* of their lives and manage to keep those varying aspects in some kind of balance.

Most of us have three main aspects of our lives which must be carefully balanced: our working time, the time we devote to our personal relationships and families and the time we devote to our own personal interests - in other words time to ourselves.

My experience in working with many people is that they do not create, for themselves, a healthy balance. There is no definite pattern, any one of the three areas I mentioned can be given insufficient attention. Don't make the mistake of thinking that creating a good balance means the same as devoting equal amounts of time - it doesn't. We have to find what makes the best balance for us. For some people spending just 15 minutes each day on a purely personal activity is enough to give them a feeling of personal space. For others the figure may be a few hours.

The secret of using our time well is to know our personal balance and to pro-actively plan towards building and maintaining that balance.

Before leaving the subject of balancing your time, remember that it will change throughout certain phases of your life so keep looking at it. December 31 is quite a good day to reflect whether you got it right each year! I turn my attention to time spent at work.

For all of us, this is a large part of our time. We must use it effectively and efficiently, dealing with the important issues and leaving aside the trivia, making sure we know what we are really being measured on - and achieving the best results possible in those areas.

In that way we will achieve excellent performance and still have time for those more personal matters.

Training in Time Management Skills and techniques can be very valuable to the right person. Attending a Time Management Workshop helps people already strongly motivated in their job but who need skills to help them use their time more effectively. Time Management training does not usually help people whose lack of performance is more genuinely linked to lack of motivation - they need help of a different kind!

Some advice to improve your Time Management Skills are given by the main elements which people tell me have had the strongest impact on their better use of time:
— Being forced to objectively consider all their work and personal goals.
— To actively produce a definite plan for the achievement of those goals.
— To find a way of more effectively integrating their long and short term activities.
— To identify and analyse how their time is used currently and from this phase to plan the required improvements.
— To recognise how many little things detract from managing our time well which, when added together, steal enormous amounts of our time.
— To recognise how ineffectively time spent in meetings is often used.

The ultimate question is - if I am already too busy, can I really afford the time to consider, plan and implement change? Many people have found that by altering a few aspects of their working and personal lives, they are better organised, less stressed, more effective in terms of real results and happier!

And you?

"There are 24 hours in every day but, if that is not enough, you can always use the night."
Dr. G. Krause

"It's come to my attention that you have a life outside the office."

iacm

Constitution

1. Name and Objective

1.1 *Name.* This organisation (hereafter referred to as the "Association") shall be known as "International Association for Computational Mechanics".

1.2 *Objective.* The objective of the Association shall be to stimulate and promote education, research and practice in computational mechanics, to foster the interchange of ideas among the various fields contributing to computational mechanics, and to provide forums and meetings for the dissemination of knowledge about computational mechanics.

2. Membership

2.1 *Categories of membership.* Membership in the Association shall consist of the following categories:
a) Individual Members   b) Laboratory Members   c) Corporate Members

2.2 *Individual Members.* Individual members shall be open to any person engaged in, connected with or interested in computational mechanics and who is a university graduate in engineering, science, mathematics, or possesses equivalent qualifications.

2.3 *Laboratory Membership.* This category is open to non-profit research institutes, technical societies and university laboratories whose activities include work in computational mechanics.

2.4 *Corporate Membership.* This category is open to industrial organisations whose interest include the field of computational mechanics.

2.5 *National and Regional Organisations* can be affiliated to IACM with approval of the Executive Committee and individual, laboratory and corporate members can join via such organisations.

3. General Council, Executive Council

3.1 *The general policy of the IACM* shall be determined by the General Council and its affairs managed by the Executive Council, the members of which are also members of the General Council.

3.2 *The membership* of the General Council will be limited to 70 members. 1/3 of the General Council will be subject to election at four year intervals.

3.3 *The General Meeting* of the Association will take place at four year intervals at the World Congress of IACM.

3.4 *The Executive Council* shall consist of 10 General Council Members and its appointment will take place at 8 year intervals. The Executive Council includes the President, two Vice Presidents and the Secretary elected by the General Council. These officers are subjected to elections by the Executive Council at four year intervals.

3.5 *Three geographical regions* representing respectively Europe-Africa, The Americas and Asia-Australia exist within the association and it is envisaged that these regions be approximately equally represented in the General Council. The President and the two Vice Presidents shall together represent the three regions.

3.6 *Nomination of new members* of the General Council should be made to the Secretary at least 6 month before the General Meeting. Each nomination should be accompanied by 5 signatures of members and a brief biographical sketch. A postal ballot will be made before the General Meeting.

4. World Congress

4.1 World Congress of IACM will be held at four year intervals.

4.2 World Congress will normally be held in rotation in three geographical areas. Proposals for World Congress locations should be made to the Secretariat at least three months before the previous congress.

5. Finances

5.1 *Fiscal Year.* The fiscal year of the Association shall begin on January 1 and end on December 31.

5.2 *Dues.* Each member shall pay annual dues, to be determined by the Executive Council for each membership category to the Association Secretary or to the Secretary/Treasurer of the national chapter and/or association. Dues are payable upon billing. If any member shall be in default in payment of dues for three monthly or longer the Secretary shall notify him or her, in writing, that membership will terminate if payment is not make within one month of the mailing of such notice.

5.3 *Financial Reports.* It shall be the responsibility of the Secretary to keep the financial records of the Association and to present a report on the financial status of the Association to the General Council at the time of the General Meeting.

6. Committees

6.1 *Procedure.* The Executive Council is empowered to establish such committees at it deems appropriate. It will also act on petitions, signed by no less than 5% of the membership, for the establishment of committees.

6.2 *Membership.* Conditions on membership committees shall be set by the General Council. Members on committees shall be subject to approval, by a majority vote, of the council.

7. Bylaws

7.1 The General Council may frame and amend bylaws provided the contents of these bylaws do not conflict with the Constitution and provided that at least two-thirds of the entire General Council have approved them.

7.2 The Executive Council can propose changes to the Constitution. Such changes will be notified to all members of the General Council and accepted unless opposed by 1/2 of its members.
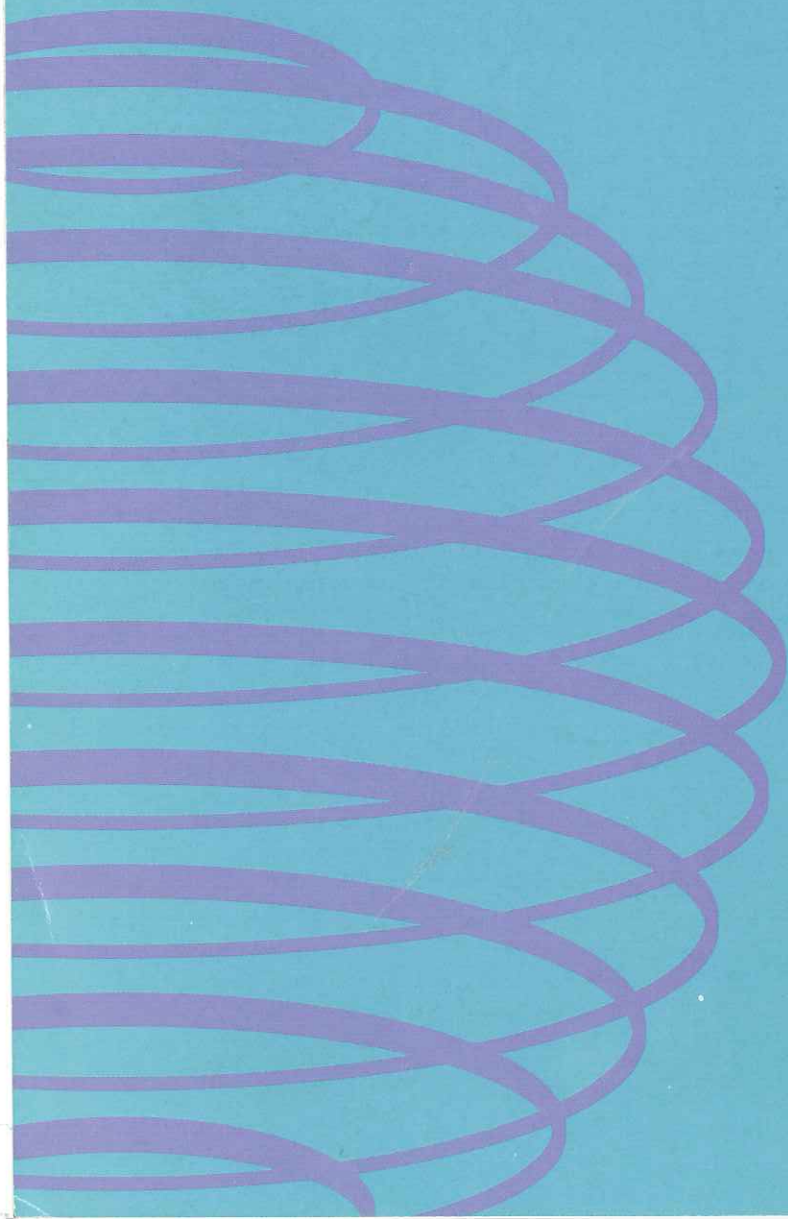
International Association for
Computational Mechanics

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