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Computing: 2001**

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Edited by
B.H.V. Topping



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Contents

1	Internet Information and Communication Systems for Civil Engineering: A Review Z. Turk	1
2	Computer Integrated Construction: Recent Developments and Future Directions G. Aouad, M. Sun and I. Faraj	27
3	Information Management for the Construction Industry: A Review A.P. Chassiakos	55
4	Knowledge-Based Approaches to Project Risk Management T. Andersen	83
5	Computer Aided Conceptual Design: A Review J.C. Miles	107
6	Object Oriented Programming for Structural Mechanics: A Review R.I. Mackie	137
7	Evolutionary Computation in Civil Engineering: Research Frontiers T. Arciszewski and K.A. De Jong	161
8	Neural Networks in Civil Engineering: A Review I. Flood	185
9	Parallel and Distributed Computations for Structural Mechanics: A Review Z. Bittnar, J. Kruis, J. Němeček, B. Patzák and D. Rypl	211
10	Self-Designing Structures J.W. Bull and Z. Pitouras	235
11	Analysis and Design of Flexible Structures J.Y. Kim	261
12	Stochastic Dynamics for Structural Engineering Problems: A Review G. Muscolino	287

13	Algebraic and Combinatorial Graph Theory for Optimal Structural Analysis A. Kaveh	319
14	Pressure Vessels under External Pressure C.T.F. Ross	357
15	The Influence of Dampers on Earthquake Response of Tall Buildings J. Gluck and Y. Ribakov	387
16	Behaviour of Compartment Masonry Walls In Fire Situations A. Nadjai, D. Lavery and M. O’Gara	407
17	Computers and Geotechnical Engineering: A Review D.G. Toll	433
18	Modelling and Analysis of Geoenvironmental Problems using the Finite Element Method H.R. Thomas, P.J. Cleall and D.H. Owen	459
19	Modelling and Analysis of Ground Vibration Problems: A Review D. Le Houédec	475
	Author Index	487
	Keyword Index	488

Preface

This volume comprises the invited lectures presented at the Eighth International Conference on Civil and Structural Engineering Computing and The Sixth International Conference on the Application of Artificial Intelligence to Civil and Structural Engineering held concurrently, in Eisenstadt, Austria from 19 to 21 September 2001. These conferences are part of the Civil-Comp series that commenced in 1983. The first conference was held in London where just 39 papers were presented. The emphasis at that time was on the use of micro and mini computers in civil and structural engineering. Today's PC power dwarfs that available on the largest of main frame computers in 1983. Many of the concepts discussed in the present volume were unheard of then. The notion of the internet, supercomputing, distributed computing, neural networks and evolutionary computing were yet to enter our consciousness. Indeed, the information age had yet to really begin!

Since 1983 Civil-Comp Conferences have been held almost every year and a total of over 2,500 papers has been presented. More information on these proceedings can be found on the Civil-Comp website (www.civil-comp.com).

I find the speed at which the years have passed and the rate at which the blue sky research ideas have become a reality breathtaking. Even though the Civil-Comp 1985 conference proceedings included only one paper on supercomputing this was at least an indication of how important high performance computing would become. In 1985 the first papers on knowledge-based systems appeared and in 1991 the topic of neural networks appeared for the first time. Along with evolutionary computing, these topics are now a significant portion of the papers presented at recent Civil-Comp Conferences.

At the 1989 conference held at the City University, London, I remember one author asking me if the Civil-Comp conferences would continue until there was a 2001 conference. At the time, a 2001 conference seemed such a long way off. In 1994, Professor Ernie Hinton suggested that Civil-Comp Conferences should be held at venues all over Europe so that "he could travel to interesting cities with Civil-Comp". Sadly, Ernie is no longer with us to make these and more important suggestions on research matters. But this suggestion like so many others he made has been acted upon. With Ernie Hinton's suggestion in mind, it was decided to hold the 2001 conference in the City of Haydn - Eisenstadt near Vienna, Austria. I am sure that this charming

city, with the Esterházy Palace, surrounded by vineyards and picturesque countryside would have satisfied him. I hope that he would have also found the research lectures and contributed papers stimulating.

The topics covered in this book are wide ranging and demonstrate the extensive use of computers in civil and structural engineering. The topics covered by the invited lectures may be classified as:

- Information Technology (Chapters 1, 2 and 3)
- Knowledge-Based Systems (Chapters 4 and 5)
- Object Oriented Techniques (Chapter 6)
- Evolutionary Computing and Neural Networks (Chapters 7 and 8)
- Parallel and Distributed Computing (Chapter 9)
- Optimization (Chapter 10)
- Analysis and Design of Structures (Chapters 11, 12, 13, 14, 15 and 16)
- Geotechnical Engineering (Chapters 17, 18 and 19))

Of course many of the lectures cover more than one topic, since *the integration* of object-oriented techniques, distributed computing, neural networks, knowledge-based systems, evolutionary computing and visualisation techniques is a most important aspect of software development and research.

I should like to thank all the authors of the lectures included in this volume. The time available to prepare this book was very short and the response of the authors is greatly appreciated. As well as the invited lectures many contributed papers were presented at the 2001 Civil-Comp Conferences. These contributed papers were published in two volumes. Each volume includes an extended abstract of each paper and all of the complete papers are to be found on an accompanying CD-ROM. These publications are:

- Proceedings of the Eighth International Conference on Civil and Structural Engineering Computing, B.H.V. Topping (Editor), (Book of Abstracts and CD-ROM), Civil-Comp Press, Stirling, Scotland, 2001
- Proceedings of the Sixth International Conference on the Application of Artificial Intelligence to Civil and Structural Engineering, B.H.V. Topping and B. Kumar (Editors), (Book of Abstracts and CD-ROM), Civil-Comp Press, Stirling, Scotland, 2001

These Conferences could not have been organised without the contribution of many who helped in their planning, organisation and execution. I should like to thank Dr Bimal Kumar for his collaboration in editing a volume of the contributed papers. I am grateful to Dr Martin Sales who suggested Eisenstadt as the venue for these conferences.

My thanks are also due to all at Saxe-Coburg Publications: Civil-Comp Ltd for their help and perseverance in the realisation of these conferences, particularly Evelyn Armit and Rosemary Brodie. The development of the new format and design of the Civil-Comp Conference Proceedings for 2001, including the CD-ROMs required a major effort by Civil-Comp Ltd. This is the first major re-design and re-formatting of the Civil-Comp Conference Proceedings in over ten years and this has been undertaken and coordinated by Jelle Muylle. His skill, support and dedication during this radical change is greatly appreciated. The assistance of members of the Structural Engineering Computational Technology Research Group at Heriot-Watt University, Edinburgh is gratefully acknowledged especially from Roman Putanowicz, Péter Iványi and János Néző.

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