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Water & Geoscience

***Proceedings of the 5th IASME/WSEAS International Conference on
Water Resources, Hydraulics & Hydrology (WHH '10)***

***Proceedings of the 4th IASME/WSEAS International Conference on
Geology and Seismology (GES '10)***

University of Cambridge, UK, February 23-25, 2010

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Preface

This year the 5th IASME / WSEAS International Conference on WATER RESOURCES, HYDRAULICS & HYDROLOGY (WHH '10) and the 4th IASME / WSEAS International Conference on GEOLOGY and SEISMOLOGY (GES '10) were held at the University of Cambridge, UK, February 23-25, 2010. The conferences remain faithful to their original idea of providing a platform to discuss water resources management, wetland creation and restoration, watershed planning, management and restoration, agriculture conservation practices and programs, endangered species habitat assessment, water pollution control and water systems, computational hydraulics, flood control and disaster assessment, extreme weathers, mineralogy and petrology, palaeontology, rock mechanics applied to geology, tectonics and geological mapping, earthquake engineering, seismotectonics etc. with participants from all over the world, both from academia and from industry.

Their success is reflected in the papers received, with participants coming from several countries, allowing a real multinational multicultural exchange of experiences and ideas.

The accepted papers of these conferences are published in this Book that will be indexed by ISI. Please, check it: www.worldses.org/indexes as well as in the CD-ROM Proceedings. They will be also available in the E-Library of the WSEAS. The best papers will be also promoted in many Journals for further evaluation.

Conferences such as these can only succeed as a team effort, so the Editors want to thank the International Scientific Committee and the Reviewers for their excellent work in reviewing the papers as well as their invaluable input and advice.

The Editors

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Plenary Lecture 1

Wave Propagation Modeling



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Abstract: The speech is divided in four parts. In the first part, propagation and transformations of coastal waves will be told. In the second part, wave model approaches will be presented. In the third part, the development of mild slope equations will be given. Finally, UNDA07, a numerical wave model based on the extended mild slope equations, will be explained in details.

Brief Biography of the Speaker:

Dr. Asu Inan received her B.Sc. in Civil Engineering from Gazi University, Turkey. She then completed her M.Sc. and Ph.D. in Coastal Engineering at Gazi University. She worked for eight years as research assistant in Hydraulic Division of Civil Engineering Department during her graduate education. She had Ph.D. in 2007 and then she worked in the Environmental & Technical Research of Accidents Department of Institute of Science & Technology in Gazi University two years long as Assistant Professor and Vice Chair. Since August 2009, she has been working in Construction Department in the Faculty of Technical Education in the same university. Her works are focused on wave mechanics, mild slope equations and numerical modeling. She has authored and co-authored thirty scientific publications in several journals and conference proceedings.

Plenary Lecture 2

Low Frequency Radiation Processes Around the Earth - Phenomena and Numerical Modeling



Professor Ernst D. Schmitter

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Abstract: Very low, extremely low and ultra low frequency electromagnetic radiation (VLF/ELF/ULF, i.e. 30 kHz down to some milli-Hz) generated within the earth's magnetosphere, ionosphere, atmosphere and lithosphere yields a wealth of information about extraterrestrial and terrestrial phenomena including gamma ray bursts, solar activity and thunderstorms. Furthermore because of its penetrating properties man made very low frequency radiation plays an important role in underwater and underground research and applications including submarine communication and remote sensing mineral contents of the terrestrial subsurface. Elaborate ionosphere heater experiments try to modulate the charged layers of our upper atmosphere with these frequencies. A detailed understanding of the propagation properties of this radiation in and around the earth can be gained using powerful numerical methods, for example FDTD and FEA (Finite Difference Time Domain and Finite Element Analysis) based solutions of the Maxwell equations. The talk gives a survey of the phenomena involved and discusses results of computer model calculations.

Brief Biography of the Speaker:

Dr. Schmitter is professor for mathematics and software technology at the University of Applied Sciences Osnabrueck, Germany since 1990. He is a member of the faculty of Engineering and Computer Sciences and teaches courses on applied mathematics, simulation (for example Finite-Element-Methods) and data analysis. He wrote several books in the computational intelligence area and published papers on data and signal analysis and modelling topics applied to material sciences and geophysics.

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Overview of a New Method for Designing High Efficiency Small Hydro Power Plants

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Abstract: - Significant number of research projects in the area of renewable energy sources (especially for small hydro power plants) has been made within the Department for Energy and Process Engineering and Regional Euro Energy Efficiency Center at Faculty of Mechanical Engineering (University of Kragujevac, Serbia) since early eighties. The results are various; numerous domestic and international recognition and technical performance tell about the success of the research. Research projects have been following the technical and technological development of research equipment and economy growth. This has led to the development of software for designing turbines of SHP plants. In order to notify the public about possibilities of our software, in this paper is briefly described a mathematical model and procedures for calculating and designing of SHPP for known conditions. As an argument for assessing the validity and potential of our research results is shown constructed SHP plant “Bosnia 1”, 2 x 100 kW power.

Key-Words: SHPP, optimal shape, meridional plane, cross section, turbine, impeller, CAD, CATIA

1 Introduction

For years, with more or less success, the problem of energy use of both listed and uninvestigated hydro potentials have been trying to be put in first plan at the local scene in order to obtain the status of development priorities. Insisting on SHP plants and putting extra attention on their significance is justified, because the energy that can be obtained from it is not negligible.

For some time, many international and domestic companies and entrepreneurs without the media exposure, almost stealthily are investigating the most cost-effective locations for the construction of SHP plants, buying land, preparing the terrain and building SHP plants. Since 2002th until today about twenty SHP plants of unknown power and performance were built. The SHPP made in the process are mainly individually built or purchased abroad and generally are not designed and developed in the energy optimal manner to use all available hydro energy of the source. The reasons for this situation are: the insufficient presence of

inspection authorities on site, lack of expertise of designers, primitive construction of SHP plants and inadequate logic - these are low power sources, so why insist on a high performance efficiency and increasing investment. This way of thinking would be tolerable if a number of SHP plants we consider are small. Not insisting on the high performance of SHP plants (in terms of the massive use of available SHPP potential) means losing precious energy in long term. That is why we insist on the introduction of special regulations to investors interested in the construction of SHP plants (along with already prescribed conditions) so that they would achieve optimal use of available hydro potential on each specific location, as well as the minimum allowed efficiency of SHP plants.

In order to arrange the construction of SHP plants, raise their energy performance and to reduce total investment costs related to the design of SHP plants, the authors of this paper have developed sophisticated and relatively inexpensive process of designing SHP plants for each specific location which guarantees high-energy and other technical

