32nd Congress of IAHR, the International Association of Hydraulic Engineering & Research

Harmonizing the Demands of Art and Nature in Hydraulics

Venice, Italy
1-6 July 2007

Invitation from LOC Chairman

Venice and its Lagoon are the remarkable result of the thousand-year old combined action of Art and Nature. Venice, in fact, is not only the splendid jewel case containing countless works of art by painters, sculptors and architects, but is a "work of art" by itself, the product of the skill and care of hydraulic engineers. Over centuries and centuries, since its birth, the city had to live in careful coexistence with the delicate tidal environment where it was founded. While the *Magistrato alle Acque*, the ancient water authority of the *Serenissima Repubblica* never ceased to fight against the eternal enemies of Venice: the sea, the rivers and mankind itself, as an ancient Venetian saying goes. Today the modern *Magistrato alle Acque* is also engaged in a huge project to combat the increasingly frequent inundations of the city and the degradation of the lagunal landscape. As in the past, and even more today, a variety of technical and non-technical requirements should be met to solve these problems.

The XXXII Congress of IAHR "Harmonizing the Demands of Art and Nature in Hydraulics" will have appealing consonances with the vicissitudes of Venice and its lagoon, as well as with many other aspects of our trade, as you may see in the Call for papers of this brochure. A special Workshop devoted to "High Water Control and Environmental Issues in the Lagoon of Venice and Analogous Situations" will be held during the congress. We will also be holding courses before the congress and Special Seminars during the congress. The ASCE – COPRI Costal Structures Conference will be held in parallel with IAHR and maritime colleagues registering for both events will be able to take part in a unique range of activities.

You are cordially invited to send a paper and to participate in this congress which will be the big water event of the year. To find out what is happening, how to register, how to get there, etc. please use our website www.iahr2007.corila.it.

We look forward to meeting you next July and wish you to enjoy all the beauty that Art and Nature can offer in Venice.

Giampaolo Di Silvio
Chairman of Local Organizing Committee IAHR 2007

What is IAHR

The International Association of Hydraulic Engineering and Research (IAHR), founded in 1935, is a worldwide independent organization of engineers and water specialists working in fields related to hydraulics and its practical application. Activities range from river and maritime hydraulics to water resources development and eco-hydraulics, through to ice engineering, hydroinformatics, and continuing education and training. IAHR stimulates and promotes both research and its application, and by doing so, it strives to contribute to sustainable development of the optimization of world water resources management and industrial flow processes. IAHR accomplishes its goals through a wide variety of member activities including working groups, research agenda, congresses, specialty conferences, workshops and short courses; by contributing to journals, monographs and proceedings; by being involved in international programs such as UNESCO, WMO, IDNDR, GWP, ICSU and The World Water Council; and by co-operating with other water-related national and international organizations.

The IAHR Council

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Giampaolo Di Silvio (*Chairman*), Aronne Armanini, Attilio Adami, Maria Teresa Brotto, Alfredo Caielli, Pierpaolo Campostrini, Roberto Casarin, Antonio Castorani, Gian Antonio Danieli, Claudio Datei, Costantino Fassò, Sandro Franchini, Alberto Lamberti, Stefano Lanzoni, Ugo Maione, Enrico Marchi, Giovanni Mazzacurati, Aurelio Misiti, Roberto Passino, Maria Giovanna Piva, Philippe Pypaert, Andrea Rinaldo, Antonio Rusconi, Giovanni Seminara, Lucio Ubertini, Marcello Benedini, Antonio Cenedese.

Congress Venue

Venice can be reached directly by air, car and train. The Congress will take place on the beautiful Lido island in front of Venice - famous for its quiet beach and *belle epoque* architecture. The Lido is only ten minutes away from St. Mark's Square and half an hour away from the airport, with private or public trasportation by water.
The Lido represents the perfect place for those who want to meet colleagues and at the same time mix cultural tourism and a vacation by the sea.
The Congress venue is the Venice Congress Centre which is used for the famous Venice Film Festival, held every September. It is located in front of the sea, and is fully equipped with modern facilities.

Technical Program

CALL FOR PAPERS

The Main Theme of the Congress, "Harmonizing the Demands of Art and Nature in Hydraulics", is becoming increasingly relevant for many large engineering projects around the world, where different requirements are often in conflict. The four Scientific Themes of the Congress, listed below, reflect the obvious necessity to incorporate aspects other than engineering (e.g. economical, social, political etc.) in the development of projects. The 26 Sub-Themes, moreover, clearly indicate that problems in water science and technology are numerous and that the same problem may often be viewed in a different way, depending upon the perspective (Theme) that is considered. The Biennial Congress of IAHR will be held in conjunction with the COPRI Conference on Coastal Structures 2007 which will cover topics of maritime and coastal research and engineering more related with the structural aspects.

A. Engineering and Management of Fresh-water Systems

Approach or point-of-view: *interactions of fluid mechanics with other disciplines: ecology, management, geomorphology.*
LOC Coordinator: Prof. Giovanni Seminara, University of Genoa, Italy.

A1.a Hydrodynamics of lakes and reservoirs *(stratification, internal waves, wind forcing flushing, sluicing, mixing processes...).*

A1.b Hydraulic and ecological interactions *(wetlands, flood plains, fluvial biology, habitat, restoration and rehabilitation, vegetation and flow resistance, eutrophication, nutrient cycles...).*

A1.c Water resources and river basin management *(fluvial basins and land planning, drainage and distribution systems, reservoir regulation, wastewater, arid zones, desertification, conjunctive use of water, integral use and reuse of water, transboundary basins...)*

A1.d Floods *(formation and propagation, control and mitigation, dam break...)*

A2.a Hydro- and morphodynamics of rivers *(bedforms, meandering, braiding, pools and riffles, bank erosion, equilibrium sections, vegetation effects on morphology...)*

A2.b Sediment transport and erosion processes *(linear transport, surface erosion, mass movements, reservoir sedimentation, turbidity currents...)*

A2.c Mountain streams and debris flows *(overaggradation, inundation control, disaster mitigation, floating debris...)*

B. Data Acquisition and Processing for Scientific Knowledge and Public Awareness

Approach or point-of-view: *interactions of hydrology with other disciplines: atmospheric science, soil science, measurements, information theory, economy, law, sociology.*
LOC Coordinator: Prof. Andrea Rinaldo, University of Padua, Italy.

B1.a Land-Water-Atmosphere Interactions *(climate change, meteorological-hydrological modelling, precipitation, storms...)*

B1.b Surface hydrology *(modelling, parameter estimation, slope processes, runoff, infiltration, urban hydrology...)*

B1.c Sub-surface hydrology *(groundwater flow, modelling, parameter estimation, scales, fractured and heterogeneous aquifers, aquifer pollution and restoration, groundwater-seawater interaction, groundwater management, subsidence and recharge...)*

B1.d Field measurements *(instruments, techniques and networks, optical and acoustic measurements (ADCP, ADV, UVM), stream processes, watershed processes...)*

B2.a Remote sensing techniques and applications *(processing, evaluation, implementation of data, coupling with ground-based measurements...)*

B2.b Hydroinformatics *(advanced numerical modelling, neural networks, fuzzy logic, evolutionary computing, data missing, data assimilation, data management...)*

B2.c Risk analysis *(uncertainty, extreme events, forecasting, warning systems, structural and non-structural countermeasures...)*

B2.d Economic, legal, social and political aspects of water management *(ecological, technological and sociological constraints, decision making, decision support, sustainability, political implications, water crisis, interboundary rivers...)*

C. Fluid Mechanics and Hydraulics

Approach or point-of-view: *basic fluid mechanics and hydraulics, hydraulic constructions, machinery and experimental devices.*
LOC Coordinator: Prof. Antonio Cenedese, University of Rome "La Sapienza", Italy.

C1.a Fundamentals of turbulence, mixing and dispersion processes *(density currents, plumes, jets, wakes, multiphase flows, effects of vegetation...)*

C1.b Localized hydraulic phenomena *(local scour, hydraulic jumps, curved channels...)*

C1.c Mathematical (numerical) modelling of complex flow fields *(compound channels, steep flows...)*

C2.a Water distribution and drainage networks *(irrigation, storm water, sewers, urban drainage...)*

C2.b Hydraulic structures *(dams, spillways capacities and rehabilitation, outfalls, fishways, spur dikes, groynes, weirs, intakes, dissipaters, gates, navigation locks...)*

C2.d Hydraulic machinery *(pumps, turbines, propellers...)*

C2.d Physical models and laboratory measurements

D. Maritime and Coastal Research and Engineering

Covering all aspects other than the structural topics of CS 2007: *sea and coastal processes, interactions with inland water and other disciplines.*
LOC Coordinator:
Prof. Alberto Lamberti, University of Bologna, Italy.
COPRI's Coastal Structures co-chairman.

D1.a Hydrodynamics and morphodynamics of coastal systems (littorals, beaches, long- and cross-shore transport, beach nourishment...)

D1.b Hydrodynamics and morphodynamics of estuarine systems *(river mouth deltas, estuaries, lagoons, sea level rise...)*

D2.a Deep water hydrodynamics *(wave generation, real time forecasting, wave climate and statistics...)*

D2.b Extreme and ordinary events in coastal management *(hurricanes, tsunami, storms, generation, evolution / propagation, effects on the coast, risk analysis, coastal disasters, coastal flooding, integrated coastal-zone management, environmental and water-quality aspects...)*

IAHR - COPRI WORKSHOP

High-Water Control and Environmental Issues in the Lagoon of Venice

SEMINARS

Issues on education
(Undergraduate courses in civil and environmental engineering; Permanent learning; Student mobility and international co-operation), Aronne Armanini, LOC and Chair of Technical Section on Education.

Exibition seminars
(in co-operation with industry), Antonio Cenedese, Attilio Adami, LOC. Short courses will be organsied before the Congress.
For more information visit the website.

Deadline for paper submission: December 15th 2006

For information on submitting a paper please visit the website

COPRI-ASCE Coastal Structures 2007 International Conference

Venice 2-4 July 2007

www.cst07.corila.it

CONFERENCE TOPICS

A. Breakwaters
1. *Rubble mound breakwaters*
2. *Concrete armour units for severe wave conditions*
3. *Caisson breakwaters and wave impact*
4. *Geotechnical and foundation design*
5. *Floating barriers and breakwaters*

B. Coastal Zone Defence
1. *Shore defence structures and systems*
2. *Storm surge defence systems*
3. *Tsunami defence systems*
4. *Innovative CSs*
5. *Societal reaction to events and resilience*

C. Functional Design
1. *Wave-structure interaction*
2. *Run-up, overtopping, transmission and reflection at CSs*
3. *Morphological effects*
4. *Physical Modelling of CSs*
5. *Numerical Modelling of CSs*
6. *Biological habitat provided by breakwaters*

D. Structural Design
1. *Structure foundation interaction*
2. *Extreme events and design conditions*
3. *Design methods for CS reliable performance*
4. *Design and construction standards*
5. *Materials and construction techniques*

E. Monitoring and Maintenance
1. *Surveying of CSs*
2. *Maintenance of CSs*
3. *Case Studies*

Coastal specialists interested in all aspects of coastal research and engineering are strongly advised to register for both events which will run "back-to-back" in the same Congress Centre.

Technical Visit

THE GREAT VENICE PROJECT

As a highlight of the Congress week, delegates and their partners will have a unique opportunity to vist works underway on one of the world's most important environmental protection projects. By means of a boat tour of the Laguna delegates will see the complex and fragile ecosystem surrounding Venice and the action being taken to defend it, which take the form of a vast programme of work, organised according to a number of distinct but interrelated lines of action: defence from high waters, defence from sea storms and environmental protection. This system of safeguarding measures, has been carried out by the Ministry of Infra-structure and Transport - Venice Water Authority through the Consorzio Venezia Nuova. The visit will also include the work sites for the construction of the Mose System, the mobile barriers at the lagoon inlets for the defence against high waters.

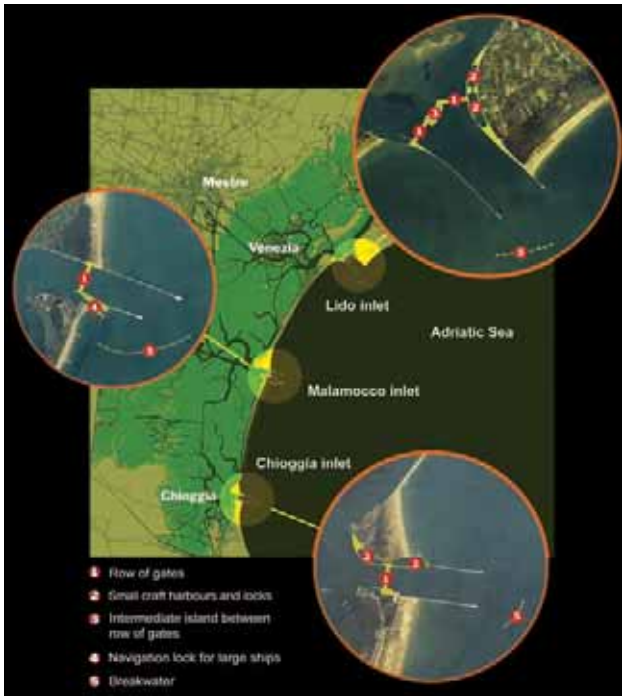
In cooperation with
Ministry of Infrastructure and Transport, Venice Water Authority, concessionary
Consorzio Venezia Nuova

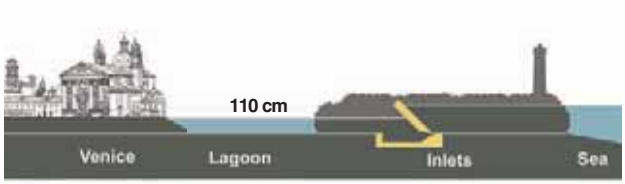
MOBILE BARRIERS AT THE INLETS TO REGULATE TIDES IN THE LAGOON

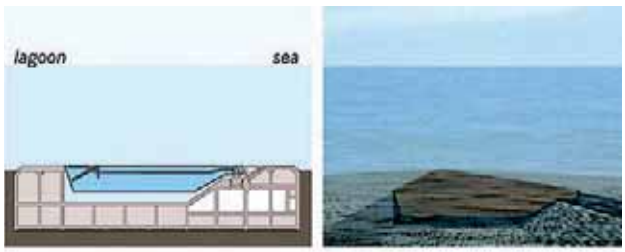
For the complete protection the lagoon, its inhabitants, its extraordinary towns and cities from high waters of all levels, including extreme events and considering a possible future rise in sea level, a combined system of various types of measures has been developed. These include the temporary closure of all three lagoon inlets by means of "mobile gates" to protect against exceptional high tides and complementary measures to the mobile gates, as the external breakwaters, together with raising of quaysides and paving in the lowest lying urban areas, to protect against the tides that cause the most frequent flooding.

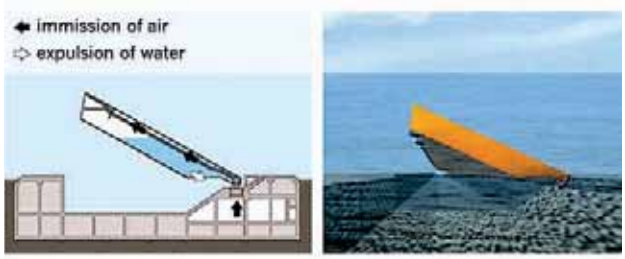
WHY

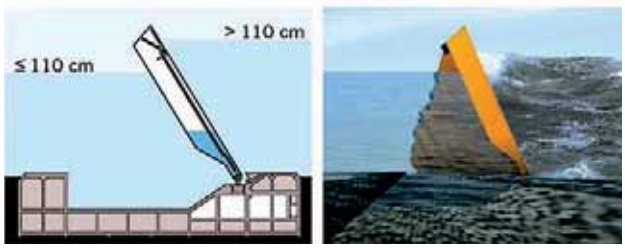
During the last century sea level has risen, land level has dropped: Venice has "lost" 23 cm with respect to the sea and high waters have become more frequent and intense.
The problems caused by flooding for inhabitants and for architecture and buildings are becoming more serious and reach an ever greater area as water levels increase. There is also the high risk of a catastrophic event such as the flood of November 4, 1966 when Venice, Chioggia and other urban centres in the lagoon were completely submerged by a metre of water.











WHERE

The mobile barriers to regulate tides are the heart of the system and they are being constructed at the lagoon inlets, the spaces between the barrier islands through which the tides enter and exit the lagoon.

HOW THEY WORK

The mobile barriers consist of rows of gates installed in the inlet channels. When not in operation, the gates are full of water and rest in caissons on the bed. When a tide higher than 110 cm is forecast, compressed air is introduced into the gates, expelling the water. As the water is expelled from the gates, they rotate around the axis of the hinge until they emerge and block the tidal flow entering the lagoon. The mobile barriers remain in position for the duration of the high water only (on average, from 4 to 5 hours, including the time taken to open and close the gates). When the tide drops and the lagoon and sea are again at the same level, the gates are again filled with water and return to rest in the bed. With the current sea level, the lagoon inlets will be closed on average of 3 / 4 hours times per year. In the case of the Malamocco inlet, the system also includes construction of a lock to allow the transit of large ships in order to guarantee port operations even when the gates are operational.

CONSTRUCTION

Start of work: 2003
Today: 22 work sites at the three inlets
Completion of work: 2011

Construction of the high water defence system involves three phases of work lasting a total of eight years. Work officially began on May 14th, 2003. The first phase of work, almost completed, involves construction of the complementary structures and a series of other activities prior to installation of the mobile barriers (trial areas for experiments on bed consolidation, underwater surveys to identify possible archaeological remains, securing of military devices left from the war, etc.). The second phase of work, already well advanced, involves construction of the barrier abutments and other associated structures - the small craft harbours and locks for fishing, pleasure and emergency craft at Lido and Chioggia inlets and the lock for large ships at the Malamocco inlet. The third and last phase of work involves construction of the barriers themselves (caissons and gates) and their installation.

1. Lido inlet. The refuge haven and the new island under construction

2. Lido inlet. Reinforcement of the south jetty and, on the foreground, the new island

3. Malamocco inlet. The outer breakwater and the construction of the lock for large ships

4. Chioggia inlet. The refuge haven and locks

5. Chioggia inlet. Construction of the locks

Exhibition

The Technical Exhibition will be an important part of the congress. Delegates will be able to meet a range of exhibitors working in the hydraulic engineering field. A list of exhibitors will be included in the website in early 2007. The Exhibition Area will be near to the meeting rooms, very visible and easily accessible to the partecipants and will be open for the entire duration of the Congress. Should you be interested in participating as Exhibitor, do not hesitate to contact the Congress Secretariat.

Student Programme

Special attention will be paid to the needs of students and young researchers. Two short courses will be organised in the days before the opening:
1) *Contaminated sediment management*
2) *Submarine outfall planning.*
The Master Classes are small workshops open to 5 - 10 young scholars supervised by two senior experts on some specific topic: research will be presented and general discussion will follow. The topics will be suggested by the Student Chapters and may include: *Flow turbulence models, Mechanics of sediment transport and river morphology, Hydrodynamics and morphology of vegetated rivers, Hydroinformatics and Echohydraulics*. Participation in the Master classes is included in the congress registration fee for students.
The prestigious John F. Kennedy Student Paper Competition will be held to identify leading young researchers. The winner will be awarded a cash prize and commemorative plaque. Student Chapters will meet together to discuss the joint activity and to wave new relations and common activities. The Student Chapters from Italy will also organize a barbecue on the Lido beach.
Congress registration fee for undergraduate and graduate students wiil be reduced compared to the regular participant's.

Social Events

An intensive and exciting social programme has been organized.
A welcome reception will be held on Monday on the terrace in front of the beach. The Congress Banquet will take place inside the famous Arsenale where Venetians, over the centuries, perfected the art of ship construction - in a secret complex. Cultural events connected with the congress Theme are going to be finalised. Special attention will be paid to the accompanying person's activities.
For further information please visit the congress website.

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Congress Themes

A. Engineering and Management of Fresh-water Systems

B. Data Acquisition and Processing for Scientific Knowledge and Public Awareness

C. Fluid Mechanics and Hydraulics

D. Maritime and Coastal Research and Engineering

CALL FOR PAPERS

Deadline for paper submission:

December 15th 2006

Pre-submission questionnaire
A prize to win if you help in the organization of IAHR Congress.

details on the web-site: www.iahr2007.corila.it

Contact

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