



FINAL BULLETIN

HYDRO 2004

A NEW ERA FOR HYDROPOWER

INTERNATIONAL CONFERENCE AND EXHIBITION

18-21 October 2004

Alfândega Congress Centre, Porto, Portugal

The main theme of HYDRO 2004 is 'A New Era for Hydropower' in the light of the recommitment to hydropower by the international lending agencies, and the firm acknowledgement worldwide of the role hydro can play in sustainable development and poverty alleviation. Key topics on the agenda this year are:

New prospects for accelerated hydro development ~ The role of hydro in socio-economic development ~ Benefit sharing ~ Decision-making tools to balance impacts and benefits ~ Multipurpose schemes ~ Aesthetics in dam and powerplant design ~ Management of environmental issues

New approaches to planning and financing ~ Promoting best practice ~ Financing strategies for upgrading and refurbishment ~ Implementing the World Bank's Water Resources Sector Strategy ~ Stakeholder involvement in planning

Innovation in the design and development of hydro equipment ~ Operational issues ~ Condition monitoring and timely R&U ~ Powerplant safety ~ Improving economics and efficiency of plant operation ~ Electrical equipment ~ Innovation and cost reductions in civil works ~ Managing sedimentation ~ Environment-friendly machinery design ~ The role of hydro in power grids



Jointly hosted and organized by:

THE INTERNATIONAL JOURNAL ON
**HYDROPOWER
& DAMS**

&

NETWORK
Events Limited

Co-hosts / Supporting Organizations



HYDRO 2004



PROGRAMME OVERVIEW

SUNDAY 17 October	MONDAY 18 October	TUESDAY 19 October	WEDNESDAY 20 October	THURSDAY 21 October
<p>12.00 hrs Exhibition set-up*. Exhibitors have access to stands to prepare exhibits <i>West Ground Floor</i></p> <p>(*Exhibitors constructing their own stands may have access from Saturday)</p>	<p>08.30 hrs Opening Plenary Session and Keynote Address <i>Archive Hall</i></p> <p>10.00 hrs 1 - Hydro's role and potential <i>Archive Hall</i></p> <p>2 - Machinery: Design and development - <i>Infante Hall</i></p>	<p>09.00 hrs 6 - New approaches to financing <i>Archive Hall</i></p> <p>7 - Machinery: operational issues <i>Infante Hall</i></p> <p>8 - Innovation in civil works - <i>Arrábida</i></p>	<p>09.00 hrs 12 - Social issues and benefit sharing <i>Archive Hall</i></p> <p>13 - Hydro and pumped storage: role in the grid <i>Infante Hall</i></p> <p>14 - Workshop: Turbine flow measurement - <i>Arrábida</i></p>	<p>Depart 07.30 hrs Technical Excursion</p>
<p>The IHA will hold Committee meetings and a Board Meeting in Porto (see opposite page)</p>	<p>LUNCH <i>Exhibition Hall</i></p>	<p>LUNCH <i>Exhibition Hall</i></p>	<p>LUNCH <i>Exhibition Hall</i></p>	<p>LUNCH <i>Pousada de Amares</i></p>
<p>16.00 hrs Conference Registration <i>Alfândega Foyer</i></p> <p>19.00 hrs Chairmen's Meeting <i>Miragaia</i></p> <p>19.45 hrs Reception for Chairmen and Speakers <i>Arrábida</i></p>	<p>14.30 hrs 3 - Planning and development Innovative case studies <i>Archive Hall</i></p> <p>4 - Safety of powerplants and dams <i>Infante Hall</i></p> <p>5 - Hydro and dams in Portugal <i>Arrábida</i></p> <p>20.00 hrs Welcome Reception + Concert <i>Ferreirinha Port Wine Cellars</i></p>	<p>14.00 hrs 9 - Sustainability and environmental issues <i>Archive Hall</i></p> <p>10 - Operation and maintenance <i>Infante Hall</i></p> <p>11 - Workshop: Managing sedimentation <i>Arrábida</i></p> <p>17.30 hrs World Bank Round Table <i>Sala Porto (Alfândega)</i></p>	<p>14.00 hrs 15 - Aesthetics of dams and powerplants <i>Archive Hall</i></p> <p>16 - Refurbishment and upgrading <i>Infante Hall</i></p> <p>17 - Electrical equipment <i>Arrábida</i></p> <p>20.00 hrs Conference Dinner <i>Palácio da Bolsa, Porto</i></p>	<p>Group 1: Visit to Venda Nova II pumped storage</p> <p>Group 2: Visit to Alto Lindoso</p> <p>Group 1: Visit to Alto Lindoso</p> <p>Group 2: Visit to Venda Nova II pumped storage (Return to Porto for free evening)</p>

TECHNICAL PROGRAMME SESSIONS

MONDAY 18 OCTOBER - Morning

Opening Ceremony and Plenary Session

Welcome and Introduction: Alison Bartle, *Hydropower & Dams*
J.C. Teixeira de Freitas, *EDP-CPPE, Portugal*

Opening Addresses:

Prof H.D. Altinbilek, President, IHA
C.B. Viotti, President, ICOLD
Prof Dr Emil Mosonyi, Hon. President, IHA
The Hon. Syda Bbumba, Minister of Energy and Mineral Development, Uganda

♦ **Keynote Address: The World Bank's new Water Resources Strategy and Infrastructure Action Plan: What they mean for Hydro - Jamal Saghir, Director, Energy and Water, The World Bank**

Session 1: Role and potential of hydropower and benefits for social and economic development

Chairman: Prof H.D. Altinbilek, President, IHA

- ♦ **Keynote address:** Hydropower for sustainable development - *Prof H.D. Altinbilek, President, IHA, Turkey*
- ♦ **Keynote address:** The role and importance of hydropower for Uganda - *Hon. Syda Bbumba, Minister of Energy and Mineral Development, Uganda*
- ♦ Hydropower development in Iran: Achievements and plans - *M. Gharavy, IWPC, Iran*
- ♦ The role of WAPDA's vision 2025 programme in the development of the country - *G. Abbas, WAPDA, Pakistan*
- ♦ Hydro potential and development in Cameroon - *J. Kenfack, M. Fogue and T. Tatietsé, Ecole Nat. Supérieure Polytechnique, Cameroon; A.G.H. Lejeune, Université de Liège, Belgium*
- ♦ Ancillary services: Aspects to consider in the analysis of investments in new hydro powerplants in Brazil - *R.T. Simabuku and C.A. Amaral, ANEEL, Brazil*
- ♦ Use of web-based information management applications for hydro development in India - *Y. Prasad and P.C. Jose, NHPC, India*
- ♦ Central Asia - perspectives of water and hydropower potential development - *V.A. Dukhovny, SIC ICWC, Uzbekistan*

Session 2: Design and development of hydraulic machinery

Chairman: J. Gummer, Hydro-Consult Pty Ltd, Australia

- ♦ New CFD developments for hydraulic design - *F. Debeissat, F. Mazzouji, F. Garcia and M. Couston, Alstom Power Hydro, France*
- ♦ Optimization of high specific speed Pelton turbines - *W. Rohne, R. Mack and A. Huber, Voith Siemens Hydro Power Generation, Germany*
- ♦ Low head small turbines and the necessity of a laboratory development - *R. Chenal and V. Denis, MHyLab, Switzerland*
- ♦ Structural study on the spiral case of large hydraulic turbines - *Wu He-Gao and Yang Fang, Wuhan University, China*
- ♦ Further refinement to the Hydromatrix technology - *M. Schneeberger and H. Schmid, VA TECH Hydro, Austria*
- ♦ Transients studies as a basis of design for a small hydroelectric plant - *A.M. Antúnez, Hidroerg, Portugal; C. Aguerre, Voith Siemens Hydro, Spain*
- ♦ Cavitation scale effects and case studies on cavitation model tests - *T. Strobl, R. Huber and A. Keller, TU München, Germany*
- ♦ A high head gate innovation numerical and experimental analysis of hydrodynamic forces - *J. Markovic, R. Prenner and H. Drobir, University of Technology Vienna, Austria; V. Kienberger and W. Sambs, VA TECH Hydro, Austria*

MONDAY 18 OCTOBER - Afternoon

Session 3: Hydropower planning and development: Innovative and challenging case studies

Chairman Dr M. Gharavy, Iran Water & Power Corporation, Iran

- ♦ Accelerated hydropower development in India - case of the Dhauliganga hydro project - *Y. Prasad, G.B. Kumar and A. Gupta, NHPC, India*
- ♦ Developing a series of hydro schemes on canals - *Z. Majeed and G. Abbas Anjum, WAPDA, Pakistan*
- ♦ High-head hydropower potential of Northern Pakistan: first results after 15 years' systematic reconnaissance and studies - *H. Kuntz, International Expert Group for Hydro Development, Germany*

Monday 18 October - Welcome Reception and Concert



- ♦ Planning and development of the Lajeado and Peixe Angical hydropower stations in Brazil – *A.N. Candido da Silva, EDP, Brasil, J.E. Costanzo, Investco, Brazil, A. de Padua Bemfica Guimarães, Enerpeixe, Brazil*
- ♦ Kalpasar project – A unique tidal power project for the long-term water and energy security of Gujarat State – *R.K. Gupta and M.B. Joshi, Narmada, India*
- ♦ Promoting small and medium hydropower plants in Armenia – *M. Horn and S. Palt, Fichtner Consulting Engineers, Germany*
- ♦ Hydro potential in drinking water pipe systems – *H. Ramos, D. Covas and L. Araujo, Instituto Superior Técnico, Portugal*
- ♦ New ways of constructing hydropower plants in southern Germany – *M. Rau, E.ON Wasserkraft GmbH, Germany*

Session 4: Safety of powerplants and dams

Chairman: J-P. Katz, EDF, France

- ♦ Hydraulic surge during load rejection of 250 MW units of the MES hydropower plant in Iran – *A. Kiani, IWPC, Iran; H. Brekke, NTNU, Norway; B. Leyland, Consultant, New Zealand; T. Jacob, Stucky Consulting Engineers, Switzerland; S. Pejovic, ASME, Canada.*
- ♦ Power station design to minimize the risks – *S. Muj, M. Ion, G. Popa and F. Popescu, Politehnica University of Timisoara, Romania*
- ♦ Ensuring safety for EDF hydro plants: a least cost approach – *J-P. Katz, EDF, France*
- ♦ Transformer explosion and fire incidents: guidelines for cost evaluation and risk limitation – *N. Rolland and P. Magnier, SERGI, France*
- ♦ Safety control of dams – EDP production – *I. Ferreira, Portugal*

Session 5: Hydropower and multipurpose water resources development in Portugal

Chairman: J.C. Teixeira de Freitas, EDP-CPPE, Portugal

- ♦ Alqueva/Pedrogão project - *M.P. Miranda and M.C. Maia, EDP Produção EM, Portugal*
- ♦ Fish pass at the Pedrogão dam: design and hydraulic model studies – *J. Dias da Silva, EDP Produção EM, Portugal; J. Falcao de Melo and A. Pinto de Magalhães, LNEC, Portugal*
- ♦ Hydropower and the multipurpose developments in the Azores archipelago – *M. da Silva, EDA, Azores; D. Estrela, EEG, Azores; J. Vazquez and L. Gusmao, COBA, Portugal*
- ♦ Remote control of Portuguese hydraulic powerplants – *M. Camacho, EDP, Portugal*
- ♦ The Alto Lindoso/Touvedo hydropower plants – *A. Freitas da Costa, EDP, Portugal; J.C. Teixeira de Freitas, CPPE, Portugal*
- ♦ Telecontrol of hydro plants in Portugal – *A.M. Pinto, EDP, Portugal*
- ♦ Baixo Sabor/Alto Coa: Alternative technical options and compared environmental impact evaluation – *C. Lima, D.S. Matos, N. Portal and L.L. dos Santos, EDP, Portugal*
- ♦ The Picote II – repowering project – *J.S. Costa and M.M. Sarmiento, EDP, Portugal*
- ♦ Mitigation of environmental impacts – *V. Soares, EDP, Portugal*

TUESDAY 19 OCTOBER - Morning

Session 6: New approaches to project financing and planning

Chairman: Jamal Saghir, Director, Energy and Water, The World Bank

- ♦ A review of Asian Development Bank policies related to the water and power sectors – *E.M. Baardsen, Asian Development Bank, The Philippines*
- ♦ Hydropower and decarbonisation – *G. Westermann and E. Howard, European Investment Bank, Luxembourg*
- ♦ New policies in financing water resources development

schemes – *R. Manrique, Inter-American Development Bank (to be confirmed)*

- ♦ Financing and development of the Esti project in Panama – *R.E. Israelsen, MWH Americas Ltd, USA*
- ♦ Potential roles for the private sector in developing hydropower – *N. Raghavan, Larsen and Toubro Ltd, India*
- ♦ Recent developments in hydropower financing – *Kreditanstalt für Wiederaufbau, Germany (speaker to be confirmed)*
- ♦ Staged project development: Easing the financial burden – *J-M. Devernay, EDF, France*
- ♦ Loan financing on government-to-government agreements: Risk involved for project owners in developing countries – *H. Kuntz, International Expert Group for Hydropower Development, Germany*
- ♦ The role of the private sector and hydro development in Pakistan – *Z. Ahmad and S. Ullah, Ministry of Water and Power, Pakistan*
- ♦ Public-private partnerships: Time to rethink the model – *C. Head, Consultant, UK*
- ♦ Financing hydropower in the golden era of sustainability – *S. Whisker, Mott MacDonald, UK*

Session 7: Operational issues relating to hydraulic machinery

Chairman: I.T. Laczó, MWH Global, USA

- ♦ Experimental study and unsteady simulation of the Flindt draft tube rotating vortex rope – *T.C. Vu and B. Nennemann, GE Hydro, Canada; G.D. Ciocan, M.S. Iliescu and F. Avellan, EPFL, Switzerland*
- ♦ The characteristic analysis of rotor dynamics to large-scale Francis turbines – *Wang Zhengwei and Yu Jiang, Tsinghua University, China; Cao Jianmian and Shi Qinghua, DongFang Electrical Machinery Co, China*
- ♦ Is it possible to avoid cavitation pitting and reduce sand erosion – *H. Brekke, Norconsult AS, Norway*
- ♦ Some case histories of site efficiency and index testing of hydraulic turbines – *J.H. Gummer, Hydro-Consult Pty Ltd, Australia*
- ♦ The stable operation study on Wanjiashai hydropower station Francis turbine – *Wang Zhengwei, Tsinghua University, China; Zhou Lingjiu, China Agricultural University, China*
- ♦ Part-load instabilities in Francis turbines and pump turbines – *M. Sick, P. Dörfler and M. Sallaberger, VA TECH Hydro, Switzerland and A. Braune, Ansys, Germany*
- ♦ Unusual water pressures rise at turbine inlet by pseudo water column separation – *S. Otsuka, T. Shishido and Y. Ishiguro, Electric Power Development Company, Japan*
- ♦ Existing problems at the Bakhtiary hydro project – *L. Zakizadeh, Mahab Ghodds, Iran*

Session 8: Innovation and cost savings in civil works

Chairman: F. Isambert, ISL, France

- ♦ **Keynote address:** Some innovative low cost solutions in civil engineering – *F. Lempérière, Hydro Co-op, France*
- ♦ Long-term planning: Use of the latest methodologies for construction of hydroelectric projects – *M.M. Madan, Parbati Hydroelectric Projects, India*
- ♦ Competitive design choices in an EPC contract with an extremely compressed time schedule and high liquidated damages for delay – *G. Frostberg and M. Stenmark, Swedpower International, Sweden; I. Carter, Montgomery Watson Harza Europe, UK*
- ♦ Spillway with improved dissipation efficiency: a side dissipation beam – *D. Ciuha, IBE, Slovenia, and J. Mlačnik, Institute for Hydraulic Research, Slovenia*
- ♦ Unique operation of cofferdam removal at Karun 1 powerhouse extension plant – *N. Saadat, A. Najafi and M. Taheri-Poor, Sadid Jahan Sanat Co, Iran*
- ♦ Innovative solution for soil stabilization by jet grouting: Case study of the 520 MW Omkarshwar project, India – *D.C. Tripathi,*



- Narmada Hydroelectric Development Corp, India*
- ◆ Rehabilitation of Matala dam – *D.S. Matos and A. Camelo, EDP, Portugal*
 - ◆ Rehabilitation of asphalt liners: A case study – *A. Fehr, Walo Bertschinger AG, Switzerland*
 - ◆ Upgrading and refurbishment of the Senhora do Porto powerplant canal – *P. Manuel dos Santos Magalhaes, and J.L. Machado do Vale, CPPE-EDP, Portugal*

TUESDAY 19 OCTOBER - Afternoon

Session 9: Hydro, sustainability and environmental management Chairman: Hon. P. Rae, Chairman, Hydro Tasmania, Australia

- ◆ IHA Sustainability guidelines: Development and compliance protocol – *A. Scanlon, Hydro Tasmania, Australia*
- ◆ Environmental legislation in India: Tradition to transition – *R. Chandra and V.B. Bhatt, Narmada Hydroelectric Development Corporation Ltd, India*
- ◆ Global trends and Hydro-Québec sustainability reporting experience – *F. Levert and P-L Desgagné, Hydro-Québec, Canada*
- ◆ Emissions of GHG from hydroelectric reservoirs: A perspective between tropical and boreal regions? – *A. Tremblay, Hydro-Québec, Canada*
- ◆ A Boolean approach for preliminary assessment of environmental impacts of water resources development projects: A case study in the Nile Basin region – *O.E.I. Patrick, J. de Schutter and P. Boeriu, UNESCO-IHE, The Netherlands*
- ◆ Implementing environmental management systems in hydro plants: The Douro Production Centre – *T. Rocha, EDP Produção EM; J.M. Faria Martins, Companhia Portuguesa de Produção de Electricidade SA, Portugal*
- ◆ Siah Bisheh pumped-storage project's dam and the environment – *M. Gharavy and A.H. Izad-Doustdar, IWPC, Iran*
- ◆ Management of water level and design of flushing floods for environmental river maintenance downstream of the Riba-Roja reservoir, Spain – *A. Palau, E. Rosico and A. Meseguer, Endesa, Spain; R. Batalla, University of Lleida, Spain*
- ◆ Environmental project experience during construction of the Lajeado and Peixe Angical hydro stations – *A.N. Candido da Silva and N.K. Kano, EDP Brasil, SA, Brazil*
- ◆ Hydro and the decommissioning issue – *F. Isambert, ISL, France*

Session 10: O&M and condition monitoring

Chairman: R.T. Simabuka, Agência Nacional de Energia Elétrica (ANEEL), Brazil

- ◆ Practical results of operation and maintenance on an adjustable speed machine in pumped-storage power stations – *H. Sasamoto, N. Haneda, T. Shiozaki and K. Kubota, Tokyo Electric Power Co, Japan*
- ◆ Protection and air gap continuous monitoring and vibrations in hydraulic generators; Operative experiences – *D. Marco Lopez and D. Jordi Vich, Union Fenosa, Spain; D. Publio Beltran and D. Alvaro Perez, TSI, Spain; D. Joao Vicente, TecVib, Spain*
- ◆ Vibration diagnosis – Benefits for commissioning and long-term operation – *U. Seidel and M. Rieg, Voith Siemens Hydro Power Generation, Germany*
- ◆ Problems of water power engineering following from the need for reactive power compensation in an electric power system - *A. Adamkowski and M. Lewandowski, Polish Academy of Sciences (IMP PAN), Poland; W. Wiktoro, EGO Odra Ltd, Poland; S. Lewandowski, Polish Hydropower Plant Association, Poland*
- ◆ Mechanical behaviour of high head Francis units – *A. Coutu, GE Hydro, Canada; H. Aunemo, GE Hydro, Norway; B. Badding, GR*

Global Research Center, USA

- ◆ An efficient cost-effective hydro-unit monitor – *B. Bajic, Korto Cavitation Services, Luxembourg*
- ◆ Seven years monitoring experience at CEMIG – *E.W. Soares, CEMIG, Brazil; M. Hastings, Brüel & Kjaer Vibro, Denmark*
- ◆ Decision analysis applied to risk management in hydro maintenance – *F. Alessandroni, F. Beaudouin, C. Garreau and J. Lonchamp, EDF, France*
- ◆ 3-D digitalization: A new approach in the reconstruction and refurbishment of hydropower plants – *Z. Baršić, D. Tvrtković and N. Abramovic, Civil Engineering Institute of Croatia, Croatia; M. Gomerčić, GOM mbH, Croatia*

Session 11: Workshop on sedimentation management

Chairman: S. Alam, Consultant, France

Keynote Address: Concepts of sediment management in hydro reservoirs old and new, to assure sand-free water supply to the turbines - *S. Alam, Consultant, France*

- ◆ Reservoir and sediment management for Aniwhenua Hydro, NZ - *J.N. Duder, T. Fisher and K Dodson, New Zealand*
- ◆ Sediment flushing through the delta of the Dez reservoir – *H. Samadi-Borujeni, S. Emamgholizade and S. Anders Brandt, Khuzestan Water and Power Authority, Iran*
- ◆ Risks caused by the application of rating curves for the estimation of suspended sediment yields of mountain rivers – *S.M. Palt and M. Horn, Fichtner Consulting Engineers, Germany*
- ◆ Prediction of reservoir siltation: Case studies for Turkey – *S.Y. Altun, State Hydraulic Works, Turkey, I. Sarvary, Vituki Water Resources Research Center, Hungary and S. Tigrek, Middle East Technical University, Turkey*

Workshop Discussion topics:

1. How to restore sand-free water supply to turbines in hydro projects where the reservoir is completely full of sediment.
2. Structural arrangements for new hydro projects with large variations in the pool level.
3. Structural arrangements for new hydro projects with small variations in the pool level.
4. Structural arrangements for run-of-river projects.
5. Use of available technologies: very small scale physical modelling and/or numerical modelling to confirm the validity of concepts proposed.

World Bank Round Table on Project Financing

Chairman: B. Trembath, The World Bank

◆ **Keynote address:** C. Head, author of World Bank Discussion Paper 420: Financing of Private Hydropower Projects, and member of the IHA Committee on Finance and Economics.

As a follow-up to the morning session, the objective is to explore options for financing hydropower and multipurpose projects, with particular emphasis on overcoming the obstacles which are currently inhibiting access to private funding. The gathering will provide an opportunity to bring together representatives of the private and public sectors including the multi-lateral development banks, in an informal atmosphere to discuss this important subject. There will be input from the IHA Committee on Finance and Economics.

WEDNESDAY 20 OCTOBER - Morning

Session 12: Social issues and benefit sharing

Chairman: D. Roux, Hydro-Québec, Canada

Co-Chairman: P-L. Desgagné, Hydro-Québec, Canada

- ◆ **Keynote address:** Options assessment, dialogue or talking? - The 3Rs principle – *A. Palmieri, Lead Dams Specialist, The World Bank*



- ◆ Benefit sharing from hydropower development in Nepal – *D.B. Singh, Dept of Electricity Development, Govt of Nepal, Nepal*
- ◆ Benefit sharing: The case study of the Pesamit agreement – *K. Seelos, Hydro-Québec, Canada*
- ◆ Case study of best practice for environmental and social management and effective environmental mitigation measures – *R. Allen, Theun-Hinboun Power Co Ltd, Laos*
- ◆ Cross-cultural communication: creating a consultation framework for informed decision-making by affected people – *S. Jackson and S. Knippel, Hobbs & Associates, Canada*
- ◆ Environmental management and social development at the Chamera II hydro project, India – *B. Mukand, V. Kumar and A.K. Tripathi, NHPC, India*
- ◆ Integrating indigenous knowledge in the environmental impact assessment process: The case of the Tataskweyak Cree of Northern Manitoba and the proposed Keeyask generating station – *A.B. Ransom, E.E. Hobbs and J.I. Keeper, Hobbs & Associates, Canada*
- ◆ Small powerplants and social management: They can make a difference – *A. Fonseca dos Santos, Brascan, Brazil*
- ◆ Aiming towards sustainable hydropower development: Strategic environmental and social preparedness for 2000 MW Subansiri Lower project in India – *R. Chandra and A.K. Tripathi, NHPC, India*

Session 13: The role of hydro and pumped storage in national power systems

- ◆ Ancillary generation services for the security of large interconnected power systems: The major role of hydropower plants in mixed hydro-thermal systems – *J. Nicolas, B. Caillaud and J. Bouilliez, EDF, France*
- ◆ Thermal or hydraulic powerplants? A comparison from the viewpoint of the operation of the electrical systems – *M.A.P. Lefèvre and R.J.G. Correa da Silva, Itaipu, Brazil; J.M. Ordacgi Filho, ONS, Brazil*
- ◆ Using the operational reserve of hydro power stations for demand supply during critical periods – *A. Bastos, M.N. Tavares and H Azevedo, REN, Portugal*
- ◆ Hydrology versus wind – *S. Vilela and R. Pereira, REN, Portugal*
- ◆ A new DC link for NZ? – *B. Leyland, Consulting Engineer, New Zealand*
- ◆ Hydropower is one of the important strategic lines of the Ukrainian power complex – *S. Potashnik, Ukrhydroenergo State Generating Company, Ukraine; V. Osadchuk and V. Ryaboshapko, Ukrhydroproject Ltd, Ukraine*
- ◆ Purulia pumped storage in India and its role in the power system – *B. Das, Erinco India PVT Ltd, India*
- ◆ Design of Romania's Tarnita-Lapustesti pumped-storage scheme – *G. Popa, G. Lazar and A.T. Constantin, Politehnica University of Timisoara, Romania*
- ◆ The Venda Nova II pumped storage scheme – *M.A. Oliveira, V. Ribeiro, V. Apolinário, J.A. Costa, EDP, Portugal*

Session 14: Workshop on turbine flow measurement

Chairman: Prof B. Petry, IHE-UNESCO, The Netherlands; and Chair of IHA committee on Research and Education

- ◆ A discussion of uncertainties and potential for improvement of the acoustic transit time method – *T. Staubli and T. Tresch, HTA Lucerne, Switzerland; P. Gruber, Rittmeyer AG, Switzerland*
- ◆ Cost-effective turbine flow measurement in short intakes – *D.D. Lemon and J. Lampa, ASL AQFlow Inc, Canada*

An inter-active discussion is planned among participants, with introductory lectures followed by short presentations. Discussion topics will include: Recent developments in flow measurement at high, medium and low head powerplants; and, progress reports on the work of code committees of IEC and ASME.

WEDNESDAY 20 OCTOBER - Afternoon

Session 15: Aesthetics in dam and powerplant design

Chairman: Prof Dr E. Mosonyi, Germany

Co-Chair: Dr H. Kreuzer, Switzerland

- ◆ **Keynote address:** Aesthetics of hydro plant design - *Prof Dr E. Mosonyi, Emeritus Professor, Germany*
- ◆ **Keynote address:** Aesthetics of dams - *Dr H. Kreuzer, Consultant, Switzerland*
- ◆ **Keynote address:** One century of aesthetics of dams and power stations - *Prof Michael Jakob, University of Geneva, Switzerland*
- ◆ Aesthetics of Austrian dams and power plants – *A. Krisch, Verbundplan GmbH, Austria*
- ◆ Small hydro aesthetics – *P. Giacomelli, Studio Frosio, Italy*
- ◆ Designing a small Italian hydro scheme for a rural area – *STE, Italy*
- ◆ Aesthetics of dams and hydro plants: The use of Landscape & Visual Impact Assessment (LVIA) techniques - *E. Parry and K. Hanson, British Hydropower Association*

Session 16: Refurbishment and upgrading

Chairman: F.J. Coelho da Rocha e Silva, Hidroelétrica de Cahora Bassa, Portugal/Mozambique

- ◆ **Keynote address:** R&U: World Bank framework for decision making - *J-M. Devernay, EDF, France (with introduction by A. Palmieri, The World Bank)*
- ◆ Cahora Bassa power station: Refurbishment and remote control – *F.J. Coelho da Rocha e Silva, Hidroelétrica de Cahora Bassa, Mozambique/Portugal*
- ◆ Upgrading multipurpose hydro schemes: Increasing the capacity of Tavropos reservoir – *J. Thanopoulos, PPC, Greece*
- ◆ Refurbishment of the Castelo do Bode hydro plant in Portugal – *J.C.Teixeira de Freitas, EDP Production/CPPE, Portugal*
- ◆ Fierza station rehabilitation on the Drin river, Albania – *J.H. Gummer, Hydro-Consult Pty Ltd, Australia; H. Obermoser, Colenco Power Engineering, Switzerland*
- ◆ Miljacka hydro plant refurbishment: technical solutions – *Z. Sever and V. Juric, Elektroprojekt Consulting Engineers, Croatia*
- ◆ Advanced design of Francis runners for refurbishment projects – *M. Sallaberger, Ch. Genter, M. Haas and Ch. Michaud, VA TECH Hydro AG, Switzerland*
- ◆ Hydro turbine rehabilitation – *B. Michel, M. Couston and M. François, Alstom Power Hydro, France; M. Sabourin, Alstom Canada Inc., Canada*

Session 17: Electrical Equipment

Chairman: B. Leyland, Consultant, New Zealand

- ◆ Determination of characteristic electrical and thermal values of synchronous generators using numerical approaches – *E. Schlemmer, J. Shonauer, E. Farnleitner and F. Muller, VA TECH Hydro, Austria*
- ◆ Application of plastic thrust bearings for pumped-storage plants – *H. Goto, R. Fujimoto, K. Sano and T. Suganami, Mitsubishi Electric Corporation, Japan; J. Yahara and T. Fujioka, Shikoku Electric Power Co. Inc, Japan*
- ◆ Challenges of modern insulation systems – *C. Kramer, T. Hildinger, Voith Siemens Hydro Power Generation, Brazil*
- ◆ Computational modelling of stator core faults in large hydro generators and turbogenerators – *T.W.L. Chan and D. Bertenshaw, Adwel International Ltd, UK; A.C. Smith and C.W. Ho, UMIST, UK*
- ◆ Improved no-load loss calculation for large hydro generators – *A. Schwery and G. Traxler-Samek, Alstom Ltd, Switzerland*
- ◆ Behaviour of large bearings: Polymer coated bearings in comparison to Babbitt bearings – *A. Fuerst, Alstom Generator Business, Switzerland*
- ◆ High performance thermoplastics for bearing loss reduction – *C.A. Mahieux, Alstom Generator Technology Center, Switzerland*

Closing Plenary session: Conclusions and Closing Addresses



TECHNICAL EXCURSION: THURSDAY 21 OCTOBER

TECHNICAL EXCURSION

Thursday 21 October

A full-day Technical Excursion will be available for all participants on Thursday 21 October, which can be booked as part of the Conference programme. The tour will take delegates through spectacular rural scenery of the Peneda Gerês National Park, and will visit two of Portugal's most important hydro installations operated by EDP-CPPE.

Venda Nova II

- Participants will visit the 191.6 MW Venda Nova II pumped-storage scheme, nearing completion in the northwest of Portugal. This scheme makes use of the existing infrastructure and hydraulic system of the Vila Nova/Venda Nova hydro scheme, which has been in operation since 1951. The new pumped-storage plant will improve the operational efficiency of a major cascade of hydro plants on the Cavado, Rabagão and Homem rivers.

The first reversible Francis unit at Venda Nova II (supplied by Voith Siemens of Germany) is due for testing at the time of the Conference in October. (For more details of this scheme, see article in *Hydropower & Dams*, Issue 3, 2004.)

The group will drive along the banks of the Rabagão river to view the upper reservoir and Venda Nova dam, and there will also be a tour around the new underground powerhouse and part of the system of tunnels.

Alto Lindoso

- The other technical visit will be to Alto Lindoso, the country's largest hydro station (630 MW) completed in 1992 on the Lima river, near the Spanish border. Its total catchment area is 1525 km². The lake is impounded by a 110 m-high concrete arch dam, and the powerhouse is equipped with two 215 MW Alstom units, operating under a maximum head of 288 m. It has some impressive architectural and aesthetic features, as well as a



complex system of tunnels. Average production from the plant is 910 GWh/year. There will be a chance to make a brief visit to the small and scenic village of Lindoso nearby, with its traditional stone maize storage units, characteristic of this rural area (see photo below, centre).

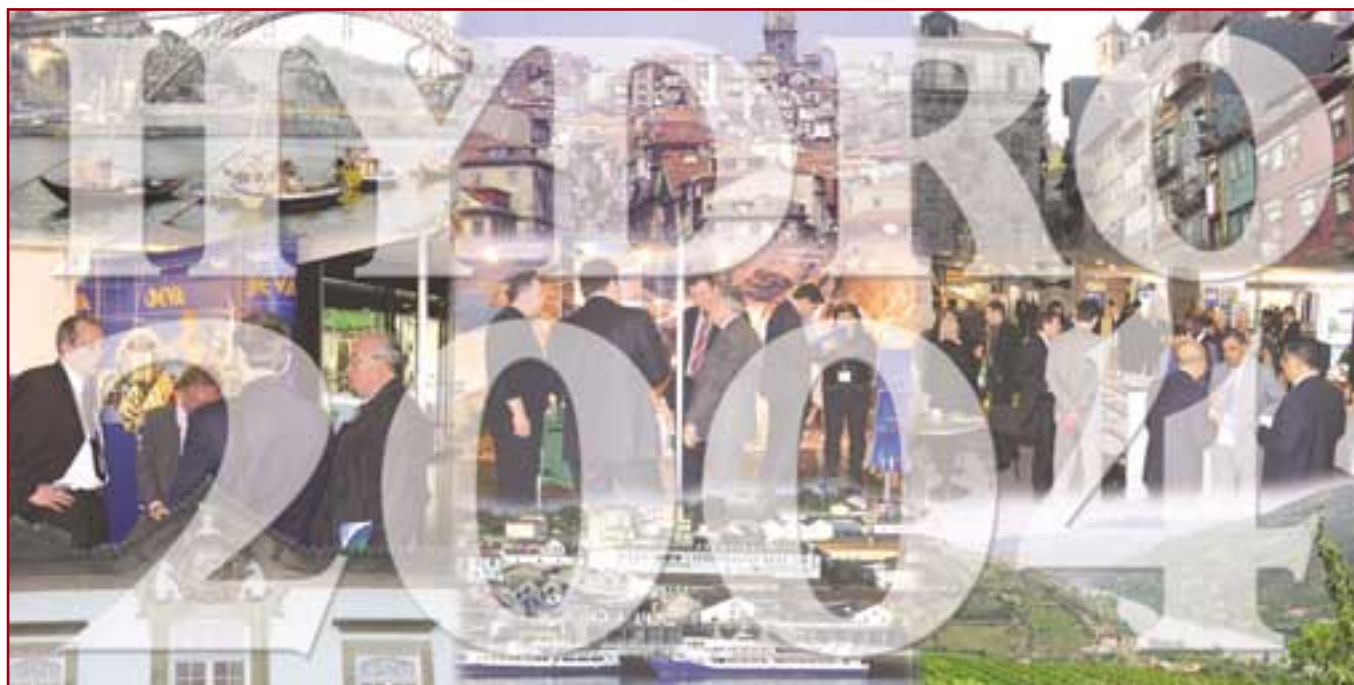
Lunch

Lunch, between the two technical visits, will be at the Pousada de Amares, which is at the beautifully restored 12th Century monastery of Santa Maria do Bouro, used for many years by Cistercian monks. Many original features remain, and both the interior and courtyard, with its orange trees, will provide a magnificent and relaxing background for continuing discussions among conference participants.

The Pousada is located between the spectacular Peneda Gerês National Park and the city of Braga.

The cost of this excursion (see registration form) covers privately chartered buses from the official HYDRO 2004 hotels, local English-speaking guides, lunch at the Pousada de Amares, and any costs arising from the site visits.





Best practice in powerplant design, construction, operation and refurbishment will be one of the main themes of the International Technical Exhibition which will run alongside the HYDRO 2004 conference.

All major companies involved in developing, designing, constructing, supplying and implementing hydro plants and equipment will have an opportunity to demonstrate their expertise and experience, with emphasis on innovation, and on improving the efficiency and economics of hydro stations.

This event represents a unique opportunity for networking with high level delegates from about 60 countries, including the developing countries with major new hydro projects under way and planned, and industrialized countries with refurbishment projects high on their national agendas. Conference participants will include planners, financing agencies, developers, plant owners and operators and consultants, including decision makers from many countries with major programmes of future hydro development. Those participating in the Exhibition will therefore have the attention of many of the world's key hydro decision-makers during the event.

The Exhibition will be available to all conference participants. Others wishing to visit the Exhibition only, as guests/clients of Exhibitors, may do so free of charge by prior arrangement with the Organizers.

The Exhibition will take place in a spacious area of the Alfândega Centre, known as West Ground Floor. Lunches for all participants will be served there each day, as well as the morning and afternoon refreshments.

The price of a standard booth of 6 m² (3 m long by 2 m wide) is **UK£1600 / Euro 2400** and includes: panelling for posters; a table and chairs; spotlights; and, a company name sign. Please note that some stands larger than the 6 m² units are available (see plan opposite). Other items of furniture, or accessories for the booths, can be ordered direct from our Exhibition sub-contractor:

Construtora da Ferraria S.A

Contact: Ms Carla Nunes or Mr Luis Figueira de Sousa, Juía Santa Marinha de Lodares - PO Box 178, 4620-215 Lousada, Portugal
Tel: + 351 255 810 230 ~ Fax: + 351 255 810 239 ~ Email: cferraria@mail.telepac.pt

Some sponsorship opportunities are still available for **HYDRO 2004** (for example, apéritifs or refreshment breaks). This can be a pleasant and memorable way of bringing your organization to the attention of the international participants.

To obtain further details of sponsorship options, or to reserve a stand, please contact:

Mr Gaël Bozec or Mr Paul Tinton:

Tel: + 44 20 8288 9009 / Fax: +44 20 8643 8200 Email: sales@hydropower-dams.com

Industry Sponsors who will host lunches or refreshments during HYDRO 2004:





TECHNICAL EXHIBITION AND EVENT SPONSORSHIP

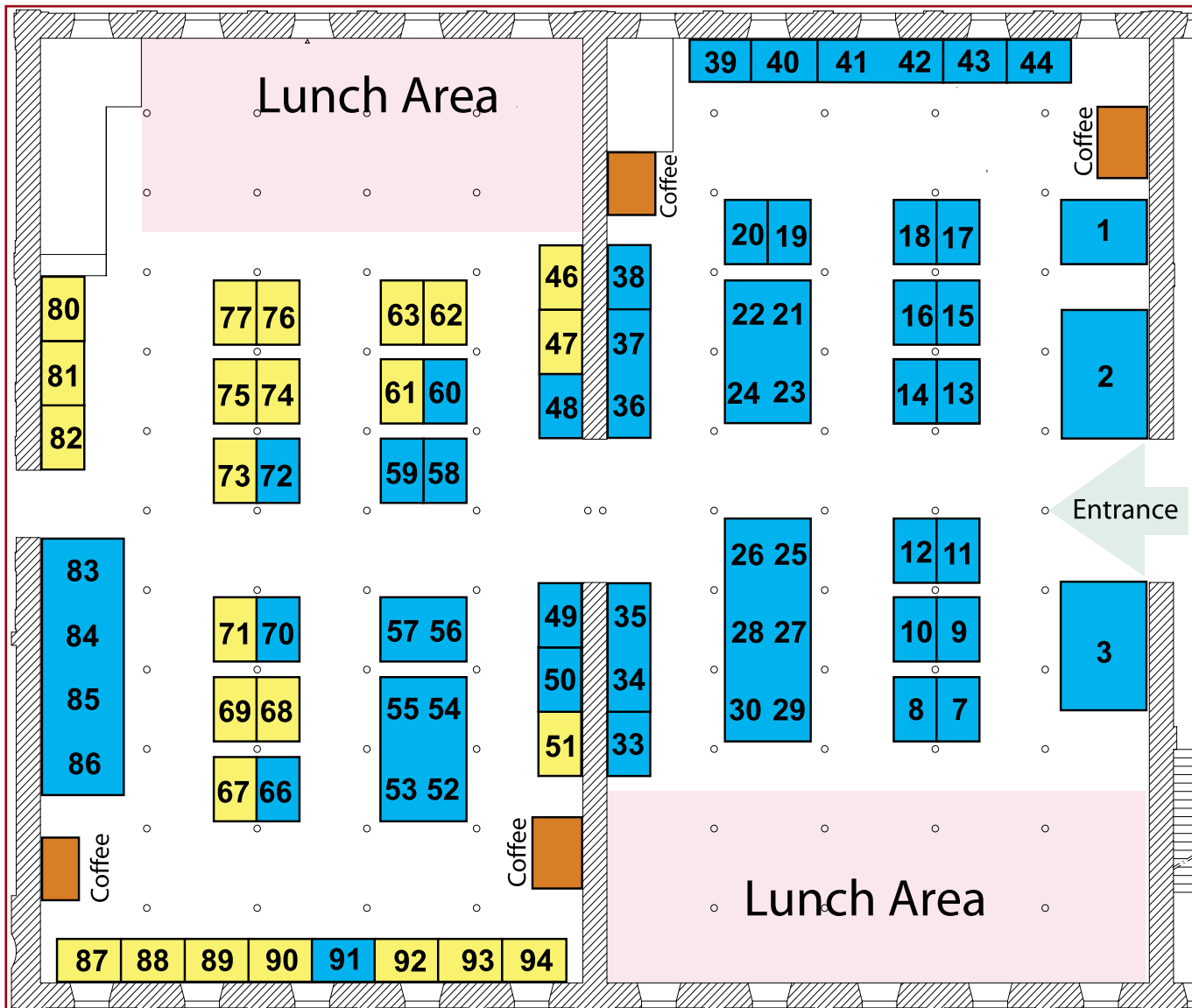


The plan below shows (in blue) the stands which were booked by late June 2004 (see also list of Exhibitors below). The layout of the two halls, with integrated lunch areas and coffee points, will ensure that all conference participants will have plenty of opportunities to view the exhibits over the three days of the event.

To reserve space, or for information on poster displays, contact: Gaël Bozec or Paul Tinton as soon as possible on:

Tel: + 44 20 8288 9009 ~ Fax: + 44 20 8643 8200 ~ Email: sales@hydropower-dams.com

- Alstom Power - 21/24 • Andritz AG - 56/57 • ATB Riva Calzoni - 01 • Bauer Spezialtiefbau GmbH - 72 • Bernard Bonnefond - 40 • Bieri Hydraulik - 15
- Boart Longyear - 41/42 • British Hydropower Association and UK Trade & Investment - 25-30 including: (Adwel International Ltd • Allen Gears
- GD Belliss & Morcom • DTI, New & Renewable Energy Programme • Gilbert Gilkes & Gordon • Glenfield Valves • Scott Wilson Piésold • Hydroplan UK
- Mott Macdonald • Orkot Composites • Tenmat • Carpi Tech SA - 11 • Doguš Construction Group - 20 • DSD Stahlbau GmbH – DSD Noell - 58 • Dyrhoff AS - 07
- EDP Group - 83-85 • Enerfin Inc - 16 • Federal-Mogul Deva GmbH - 18 • GE Hydro - 03 • GTO Sediment - 50 • HCI - 60 • Hobbs & Associates - 91
- Hydrokarst - 49 • ICOLD - 86 • Korto Cavitation Services - 13 • Künz - 43 • Liebherr-Mischtechnik GmbH - 38 • Mavel a.s. - 14 • Mecamidi - 44 • MHyLab - 08
- Özaltin Construction - 34/35 • Panolin AG - 17 • P & S Tensioning Systems Ltd - 09 • Rascor International - 12 • Roctest Ltd - 33 • Rubberart Artefatos de Borracha Ltd - 19
- SDCEM SA - 66 • Sergi - 39 • Slope Indicator - 41/42 • Stucky Ltd - 10 • Tecnasol - 41/42 • Unifin International - 70 • VA TECH Hydro - 02 • Vibro-Meter - 36/37
- Voith Siemens Hydro - 52/55 • VostokHydroEnergoStroi - 48 • Vriens - 11 • Walo Bertschinger AG - 59



ACCOMPANYING PERSONS' PROGRAMME



Accompanying persons are offered a three-day programme of cultural and touristic excursions, visiting some of the most important sights in Porto and the surrounding areas.

Monday 18 October

Half-day Porto City Tour - Morning

This first trip aims to familiarize participants with the host city of HYDRO 2004. Porto, which has traditionally been associated with trade and navigation, overlooks the river Douro and the sea. It is known for its diversity of architecture, striking bridges, magnificent monuments and churches, and waterfront cafés.

The visit starts at the Serra do Pilar, an observation point facing the river and the historical area, which has been designated a World Heritage Site by UNESCO. Just in front is the Medieval wall, the Cathedral (from the XI/XII centuries), and the Episcopal Palace (XVIII century). Two other major landmarks to be seen from this point are the old bridges of D. Luís I and D. Maria Pia, designed by Gustave Eiffel.

The City Tour will take participants through the historical centre, to the Cathedral and to S. Bento railway station where an important collection of historical ceramic tiles can be seen, a masterpiece of Jorge Colaço (XIX century).

As a 'City of River and Sea', Porto is honoured by an impressive lineage of merchants and sailors. Henry the Navigator (Dom Henrique, 1394-1460), was born in a house in Porto built on the ruins of a Roman forum, which will be seen. The tour will also include the Rua das Flores (the jewellers' street) famous in the city for its filigree silver.

From the XVIII century, Porto offers the beautiful Torre dos Clérigos by Nicolau Nazoni, the Church of S. Francisco (also known as the Golden Church) which is a masterpiece of Portuguese baroque, and the Palácio da Bolsa (the old Stock Exchange) with its Patio das Nações and unique Arab room.

Lunch is included for the group, and will include some typical specialities of Porto.

A transfer back to the hotels is available after lunch, or participants may choose to stay in Porto for further sightseeing and shopping.

In the evening a Welcome Reception and Concert for all participants will be held at Casa Ferreirinha (Port Wine Cellars) on the banks of the Douro.

Tuesday 19 October

Full-day trip with cruise and wine tasting in the Douro valley

This full-day trip through the scenic Port wine region of the Douro valley will give accompanying persons the opportunity to see mountains covered with vineyards as well as olive and almond groves.

The group will travel by coach to the picturesque small village of Pinhão. There will then be a river cruise to Régua, passing the Baugaste dam and lock. At Régua there will be a wine tasting, and lunch at a typical farm of the Douro region, with some local entertainment.

Coaches will begin the return journey to Porto at around 16.30 hrs, to arrive at about 18.30 hrs. (The evening will be free.)



Wednesday 20 October

Half-day tour of Guimarães - Morning

This beautifully preserved city has played a major role in Portugal's history; it was the birthplace of the Portuguese nation in 1140. In sight of its castle, in 1128, Afonso Henriques defeated his Countess mother's Portuguese army, and became the first King of Portugal.

There will be a tour of the main sights of Guimarães, which was recently classified by UNESCO as a World Heritage City.

Lunch will be at Casa de Sezim, in the heart of the nearby small town of Minho. Casa de Sezim is renowned not only for its majestic entrance and impressive façade, but also for its XIX century panoramic wallpapers, now considered as rare artefacts. The house became the ancestral home of the present family in 1376. Original documents exist to show that the house was given by Maria Mendes Serrazinha to Afonsa Martins, a descendent of D. João de Freitas, a companion of the first King of Portugal. Transfer to the hotel will be in the afternoon, in good time for the Conference Dinner in the evening at Palácio da Bolsa.

The accompanying persons' sightseeing tours are based on a minimum of 20 participants on each tour, and include privately chartered bus transportation, local English-speaking guides, lunches each day, and sightseeing activities as described above.

In the event of bad weather on Tuesday, the river cruise may be substituted by an alternative activity in the area.



STUDY TOUR - 22 to 24 October

The post-conference Study Tour will give participants the opportunity to learn more about the technical achievements and cultural heritage of Portugal.

Friday 22 October

The group will leave Porto after breakfast and travel east through the Douro valley (the land of Port wine) to Régua, to visit the run-of-river hydro plant and the central telecontrol centre for Portugal's hydropower plants. After a briefing and tour, the group will continue to the historic city of Viseu for lunch, and brief sightseeing. After lunch participants will continue south to Aguieira, Portugal's spectacular 89 m-high multiple arch dam, which is part of a multipurpose water resources scheme,



The Régua run-of-river plant

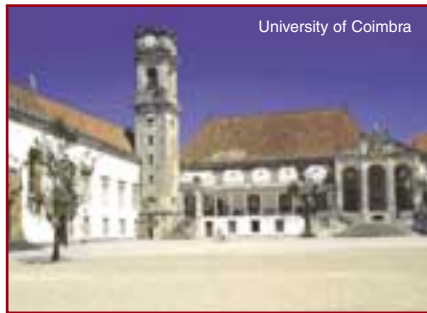
including a pumped-storage plant. After a tour and technical briefing, the group will travel on to the picturesque university town of Coimbra, for an overnight stay at Hotel Astória.

Saturday 23 October

After breakfast there will be a sightseeing tour of Coimbra, which became a nucleus for the development of Portuguese culture from the 14th Century. A highlight will be a walk around the campus of the famous University, considered to be an outstanding example of Coimbra's baroque architecture, particularly its impressive library. The Sé Velha Cathedral will also be visited.

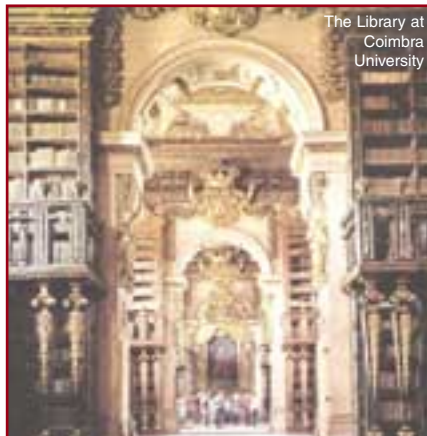


Aguieira dam



University of Coimbra

The group will then continue travelling south to the recently refurbished Castelo do Bode dam and hydro plant on the River Zêzere, where three 46 MW units and two mini hydro units have been in operation since 1950. The recent major refurbishment has involved the gates, turbines, generators, transformers and control system.



The Library at Coimbra University

Lunch will be in Tomar, where there will be a brief opportunity for sightseeing. The final part of the journey will be south to the capital city of Lisbon, for dinner and an overnight stay at Hotel Vip Touristique.



Castelo do Bode dam and powerplant



View of the Zêzere river

Sunday 24 October

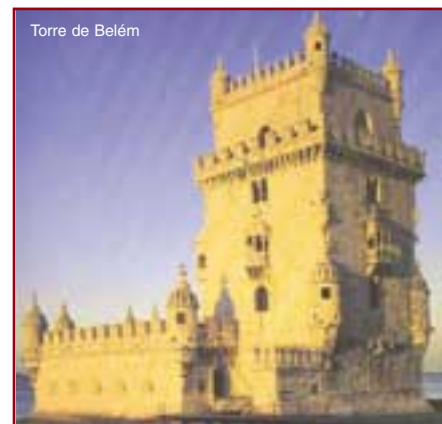
The Tour will end with a morning City Tour, and an opportunity to see some of the most important sites in Lisbon. There will be a chance to admire the surrounding scenery of the Seven Hills of Lisbon, and the Tejo river, from the spectacular Castelo de S. Jorge. Other highlights of the tour will be a view of



Lisbon

some of the elegant squares (Praça do Marquês de Pombal, Praça da Liberdade and Praça Rossio) and the lower part of the city (Baixa Pombalina). There will also be a visit to the Mosteiro dos Jerónimos and the Torre de Belém. The tour will end at approximately 13.30 hrs, and transfer to the airport, located very close to the centre of town, will take about 20 minutes.

The price for the Tour includes two nights accommodation in three star hotels, private bus transportation, lunches on Friday and Saturday, all sightseeing tours mentioned in the programme, and transfers to Lisbon airport. The tour is based on a minimum of 20 participants, travelling together



Torre de Belém



PORTO

Porto, Portugal's second largest city after the capital Lisbon, is on the country's 'green coast' and is characterized by a great diversity of architecture, as well as its panoramic beauty. The town, on the banks of the river Douro, is an important centre for industry and business relations, and offers breathtaking scenery in all directions.

It is easily accessible from all parts of the world; Porto's Sa Carneiro international airport is served by many international airlines, and has direct flights from most European

capital cities. International delegates arriving in Portugal via Lisbon will have a short onward flight.

Portugal is a member of the European Union and signatory to the 1995 Schengen Agreement. Information on visa requirements is available at: www.portugalinsite.com (select information: passports and visas).

The conference will be held within the historic Alfândega (old customs house) building, which retains much of its original character and charm, while offering a spacious and modern convention and exhibition centre.

HYDRO 2004 ACCOMMODATION

Rooms have been reserved for HYDRO 2004 participants, with favourable rates and in various price categories, at several recommended hotels in Porto (see registration form for more details).

A daily shuttle bus service will be available between hotels in the centre of town and the Alfândega conference centre, as well as to the social events.

NB: Only delegates booking their accommodation through the HYDRO 2004 Secretariat are entitled to use this free shuttle service.



TAP AIR PORTUGAL is the official airline for the HYDRO 2004 Conference

Registered participants are offered special rates on all international flights to and from Portugal:

- 20% reduction on all Business class fares (Top Executive);
- 10% reduction on all Economy class fares.

This discount is also valid for one accompanying person per registered delegate.

Please contact your nearest TAP Air Portugal office, where you can obtain details on flight schedules, tariffs and booking. Identify yourself by presenting your confirmation of registration and quoting the code IT4TPC10001.

Further information is available on the website: www.tap-airportugal.com



SUPPORTING ORGANIZATIONS

Hydropower & Dams expresses sincere thanks to members of the International Technical Committee (see Box) who have worked hard by reviewing some of the many abstracts submitted this year, or by advising or supporting us on other aspects of the HYDRO 2004 conference programme.

We also thank representatives of our supporting organizations, The World Bank, IHA, ICOLD and the EDP Group, for their input to the technical programme.

The substantial participation in the programme of representatives of the major international financing agencies, environmental experts and government representatives from most of the developing countries with major water resources development plans under way will ensure constructive discussions in Porto.

With about 118 000 MW of hydro capacity currently under construction in nearly 100 countries, and a further 300 000 MW planned, we hope this conference will contribute to encouraging and refining hydropower development plans worldwide.



International Technical Committee

H.D. Altınbilek, Turkey	E. Mosonyi, Germany
S. Alam, France	C.S. Ospina, Colombia
J. Antunes Sobrinho, Brazil	A. Palmieri, World Bank
A. Bergeret, France	B. Petry, The Netherlands
H. Bidasala-Igaga, Uganda	W. Pircher, Austria
H. Brekke, Norway	Y. Prasad, India
J-M. Devernay, France	Hon. P. Rae, Australia
M.A. Ferreira Costa, Portugal	H. Roo, Venezuela
B. Fischer-Aupperle, Germany	J. Rupčić, Croatia
A. Fonseca dos Santos, Brazil	R. Schilling, Germany
M. François, France	A. Schleiss, Switzerland
L. Gagnon, Canada	K. Seelos, Canada
M. Gharavy, Iran	M. Shifarew, Ethiopia
J. Gummer, Australia	J-J Simond, Switzerland
C.R. Head, UK	D. Sousa Silva, Portugal
F. Isambert, France	N.J. Strzelewicz Portal, Portugal
R. Israelsen, USA	F. Strohmer, Austria
J. Karmacharya, Nepal	J.C. Teixeira Freitas, Portugal
H. Keck, Switzerland	B.P. Trembath, USA
J-E. Klimpt, Canada	B. Trouille, USA
H. Kreuzer, Switzerland	W. Um, ADB, The Philippines
T. Kunz, Switzerland	C.V.J. Varma, India
W. Kyaw, Myanmar	C.B. Viotti, Brazil
R. Lafitte, Switzerland	J.G. Warnock, UK
F. Lempérière, France	G. Wedam, Austria
B. Leyland, New Zealand	D. Williams, UK
F. Louis, France	Zhang Jinsheng, China
R.M. Moreira Leitão, Portugal	



SOCIAL PROGRAMME

SOCIAL AND CULTURAL PROGRAMMES

- Speakers and chairmen are invited to a briefing and reception on the evening of Sunday 17 October, at the Alfândega conference centre.
- A Welcome Reception and Concert for all participants will be hosted by Hydropower & Dams and NetWork Events at the Ferreirinha port wine cellars, on the bank of the Douro, on the evening of Monday 18 October. (Tuesday evening will be kept free for private parties or to have time at leisure to explore the city of Porto and to dine in one of the many cafés on the banks of the river Douro.)



- On the evening of Wednesday 20 October, the Gala Farewell Dinner will be hosted by Electricidade de Portugal, at the magnificent Palácio da Bolsa (the old stock exchange building) in the centre of Porto.

- A touristic and cultural programme has been planned for accompanying persons on each day of the conference; this will include a tour of Porto, a trip through the Douro valley, and a visit to the historic town of Guimarães. See full details under 'Accompanying Persons' Programme'.

All delegates, exhibitors and accompanying persons are invited to lunch each day (in the conference centre, or on the excursions, respectively), and to the social programme in the evenings.



BOOKING CONDITIONS



The Conference **HYDRO 2004: A New Era for Hydropower** is organised jointly by **The International Journal on Hydropower & Dams** and **NetWork Events Ltd.**

Registration and Payment

The total fees for conference registration, accompanying persons' programme accommodation, technical excursion and study tour (if applicable) should be calculated and totalled in the 'Total GBP' column on the second page of the registration form.

Payment can be by cheque (drawn on a UK bank) or a bank draft, made payable to NetWork Events Ltd; by bank transfer or by credit card. Once your booking form is received, you are liable for full payment or cancellation fees.

- If you are paying by cheque or bank draft, the registration form should be mailed to NetWork Events Ltd, together with your payment.
- If you are paying by bank transfer, the form can be faxed to NetWork Events Ltd (please attach a copy of the bank transfer instruction). All bank charges must be paid by you.
- If you are paying by credit card, we can accept Visa, Mastercard, Eurocard, JCB, Delta or Switch (we regret that we do not accept payment by American Express or Diners Card).

You can also register on-line at www.networkevents.ltd.uk/events/hydro2004. A letter and invoice showing confirmed reservations, the total cost, will be mailed to you with your hotel details.

Accommodation

The conference organisers have reserved accommodation at five hotels, ranging from high standard 3 star hotels to 4 star deluxe. Please indicate on the registration form the type of room you require: single occupancy (one person) or double-occupancy (two persons) and your check-in and check-out dates. Hotels will be allocated on the basis of category requested, and your confirmation will show the hotel name and details. All payments for accommodation booked by the HYDRO 2004 Secretariat must be paid in advance to NetWork Events Ltd. Please read the cancellation terms set out below.

PLEASE NOTE: Most hotels are located in town, at some distance from the Alfândega Congress Centre. Transfer buses have therefore been arranged between the selected HYDRO 2004 hotels and the Congress Centre, and also for the social events in the evening. Transfers will only be available for those

booking accommodation through the HYDRO 2004 Secretariat. Any participant making independent arrangements for accommodation will need be responsible for making alternative travel arrangements.

Conference and Accommodation Prices

The conference and study tours are subject to minimum numbers as follows: the conference, 120 paying participants; the study tour, technical excursion and accompanying persons' programme, 20 paying participants. In the unlikely event that fewer than the minimum number of participants make reservations for any component of the conference (including the study tours), the organisers reserve the right to cancel that component and to refund the price, or alter the content (within reason) and/or the price payable for that component.

Cancellations

Participants wishing to cancel reservations must inform NetWork Events Ltd in writing by fax or e-mail. Cancellation charges will be payable as shown in the Table below. Substitution of delegates after a reservation has been made is acceptable at any time, and no extra fee is payable.

Liability/Insurance

All reservations made by the organisers in respect of services provided by hotels, and companies providing transport, are made by the organisers as agent, not as principal. The organisers accept no responsibility for death, injury, loss or accident, delay arising from any act or default of any person, or any other matter arising in connection with such services or transport. The organisers make no warranty in this connection. All services provided are subject to local laws. The organisers cannot accept responsibility for loss or damage to personal property; delegates and exhibitors are therefore strongly advised to take out adequate personal insurance. The organisers reserve the right to amend any part of the conference programme or arrangements if necessary. In the unlikely event that it is necessary to cancel any of the conference arrangements, an appropriate refund will be made and thereafter the liability will cease.

Passport and visa requirements for Portugal

It is the responsibility of all conference participants to check their own passport and visa requirements. Portugal is a signatory to the 1995 Schengen Agreement. Information on visa requirements can be checked at: www.portugalinsite.com (select information on passports and visas).

Date cancellation received	On or before 03 September 2004	From 04 to 18 September 2004	On or after 19 September 2004
All registration fees	10% of fee is forfeited	50% of fee is forfeited	No refund
Study tours and technical excursion	10% of fee is forfeited	No refund unless place can be resold	No refund
Hotel accommodation	One night's accommodation charge is forfeited	No refund of the accommodation as charged in the confirmation invoice, unless the organizers are able to resell the accommodation, whereupon there will be a cancellation charge of the cost of one night's accommodation per room booked	

DISCOUNTS

Reduced registration fees for HYDRO 2004 are available for subscribers to Hydropower & Dams, and members of the IHA (see Registration Form opposite)

For details of subscribing to *H&D*, contact Maria Flintan: subs@hydropower-dams.com

For further details of the IHA, contact Joanne Ardis: ja@hydropower.org

HYDRO 2004 CONTACT DETAILS

For enquiries concerning registration and accommodation, contact:

Mrs Helen Green, Conference Co-ordinator, NetWork Events Ltd, The Old Manor House, Compton, West Sussex PO18 9EX, UK

Tel: +44 (0)23 9263 1331 Fax: + 44 (0)23 9263 1797

Email: hydro@networkevents.ltd.uk

NB: Registration forms and payment should be sent to NetWork Events Ltd.

On-line registration at: www.networkevents.ltd.uk/events/hydro2004

For further details of the programme, please contact:

Mrs Margaret Bourke, *Hydropower & Dams*, Westmead House, 123 Westmead Road, Sutton, Surrey SM1 4JH, UK.

Tel: + 44 (0)20 8643 5133 Fax: + 44 (0)20 8643 8200

Email: conf@hydropower-dams.com

Website: www.hydropower-dams.com

HYDRO 2004: A New Era for Hydropower

Alfândega Conference and Exhibition Centre, Porto, Portugal ~ 18-21 October 2004

REGISTRATION FORM

(Deadline for early booking discount: 3 September 2004)

This registration form is a self-billing order form, which should be sent to NetWork Events Ltd with your payment for all items booked on the form. By completing this form you are agreeing to the Booking Conditions within this brochure. Fees are payable in UK Pounds Sterling (GBP). Each conference/exhibition participant should complete a separate form.

PLEASE COMPLETE THE FORM IN CAPITAL LETTERS, AND ENCLOSE A PORTRAIT PHOTOGRAPH TO BE USED ON A PHOTOBOARD AT THE CONFERENCE

Title (Mr/Ms/Mrs/Dr/Prof/etc):	Given name:	Family name:
Name as it should appear on your badge:		
Job title:		
Organization		
Organization's postal address (inc. zip/post code and country)		
Tel (inc. country code):		Fax (inc. country code):
Email address:		Web site:
Data Protection: I do not wish my email address to be passed to any third party <input type="checkbox"/> I do not wish any contact details to be passed to a third party. <input type="checkbox"/>		

FEES	Until 03 Sep 04	From 04 Sep 04	Total GBP
FULL PARTICIPANT FEE: Includes attendance of conference and exhibition; pack containing all documentation; morning and afternoon refreshments; lunches during the conference; social programme	GBP 650	GBP 715	
REDUCED PARTICIPANT FEE: For subscribers to Hydropower & Dams and members of the IHA (please give your subscription number to the journal, or IHA membership number here to confirm eligibility	600	715	
SPEAKER FEE: Includes all facilities described above for Full Participants, plus additional reception on 17 October. NB: This fee applies to <u>one</u> person per paper (main author or presenter)	395	395	
FIRST EXHIBITOR FEE: (One full participant fee is included with exhibition booking) Stand No:	Free of charge		
SECOND EXHIBITOR FEE: (Covers attendance of conference sessions, CD of conference papers, social programme and lunches) Stand No:	475		
EXHIBITOR ASSISTANT FEE: (Includes exhibition attendance, lunches, refreshments and social programme, but not attendance of the conference sessions)	275		
ACCOMPANYING PERSON FEE: (For family members or friends accompanying delegates; the fee includes three excursions with lunch, and all evening social events). NB: Accompanying persons not registered by completing this section are not able to attend lunches or social events. Name to appear on badge (inc. title Mrs/Miss/Mr/Dr/etc):	275		
TECHNICAL EXCURSION - Thursday 21 October - Full day Full-day excursion, available to all participants, including a visit to the Venda Nova II pumped-storage plant, the Alto Lindoso dam and hydro plant, and lunch at a historic pousada.	58 per person		

PLEASE TOTAL THE COSTS ON THIS PAGE AND CARRY THEM OVER TO THE SECOND PAGE

SUB-TOTAL OF FEES CARRIED OVER FROM PREVIOUS PAGE

ACCOMMODATION (Please refer to Booking Conditions in this brochure)

As the accommodation is generally in the centre of Porto, and not adjacent to the Alfândega Congress Centre, we are organizing daily bus transfers between the hotels and the Centre, and for the evening social events on 18 and 20 October. Transportation to the HYDRO 2004 hotels is included in your fees. NB: If you wish to book your own accommodation in Porto, no transfers can be provided. Please indicate below the category of hotel you require (rates are per room per night, and include breakfast, services and taxes). If you require a room for double occupancy, please specify whether you prefer a twin bedded or double bedded room. We will request this but cannot guarantee availability.

Room price
×
no. of nights
GBP

SOLE USE BEDROOM WITH PRIVATE BATHROOM
(for one person)

TWIN OR DOUBLE ROOM WITH PRIVATE BATHROOM
(for 2 persons)

- 4 star Superior **GBP 89 per night**
- 4 star Standard **GBP 65 per night**
- 3 star Superior **GBP 54 per night**
- 3 star Standard **GBP 42 per night**

- 4 star Superior **GBP 99 per room per night**
- 4 star Standard **GBP 69 per room per night**
- 3 star Superior **GBP 59 per room per night**
- 3 star Standard **GBP 47 per room per night**

Please indicate preference: Twin beds Double bed

Check-in date: October Check-out date: October Total number of nights:

Special requests (eg, non-smoking room):

Name of partner for twin occupancy

(If you wish to share a room with another delegate, then you must both request the arrangement, and both send registration forms to NetWork Events Ltd at the same time. Only one person should make the payment for the hotel.)

POST-CONFERENCE STUDY TOUR (Departing Porto 22 October, ending in Lisbon on 24 October)

GBP

(Tour price includes transportation by coach, accommodation in three star hotels, meals and guides)

- Single room **GBP 425**
- Sharing twin room **GBP 365** (per person)

TOTAL PAYMENT FOR FEES/SERVICES ORDERED ON THIS FORM (Include total from first page)

GBP

(Registration fees, accommodation, technical excursion, study tour, etc.)

Please quote your company VAT / Mwst / TVA / ALV / IVA/ BTW / MOMS number:

SOCIAL EVENTS (Included in the Registration Fee)

I/we will attend (please tick boxes as applicable)

Participant Accompanying Person

- Monday 18 October - Welcome Reception and Concert at Casa Ferreirinha Yes Yes
- Wednesday 20 October - Conference Dinner hosted by the EDP Group at Palácio da Bolsa Yes Yes

DIETARY REQUIREMENTS

- Participant : Vegetarian meals required Other dietary requirements (please specify)
- Accompanying Person: Vegetarian meals required Other dietary requirements (please specify)

- EXHIBITION/SPONSORSHIP** Please send information about: Exhibiting at HYDRO 2004 Sponsorship of refreshments
- HYDROPOWER & DAMS** Please send information about: Subscribing to the journal

PAYMENT Payment can only be made in GB Pounds (UK Pounds Sterling) in the following ways:

- ✓ Enclose a bank draft or cheque drawn on a UK bank, payable to NetWork Events Ltd. Payment enclosed for: GBP.....
- ✓ Credit Card: I hereby authorise you to debit my card with the total value of the events and services booked by me on this form.
PLEASE NOTE: Your card statement will read 'Debited by NetWork Events Ltd', and not by HYDRO 2004.
- ✓ I wish to pay by: Visa Mastercard Eurocard JCB Switch Delta (AMEX and Diners are not accepted)

Name of cardholder:	Card expiry date:	Card number:
Address for which card issued:		Cardholder's signature:

✓ I confirm that payment will follow by bank transfer. (Please quote **HYDRO2004** and **name of attendee**, and ensure that all bank charges are paid.)

**Barclays Bank plc, PO Box 6, Portsmouth, Hampshire, PO6 3DH, UK. Account name: NetWork Events Ltd Account No.: 60293903
Sort Code: 20-69-34 Swift Code: BARCGB22 IBAN GB91 BARC2069 3460 2939 03**

**NetWork Events Ltd, The Old Manor House, Compton, West Sussex, PO18 9EX, United Kingdom
Tel: + 44 (0)23 9263 1331 Fax: +44 (0)23 9263 1797 E-mail: Hydro@networkevents.ltd.uk**

Online registration: www.networkevents.ltd.uk/events/hydro2004