

6th

International Symposium on Roller Compacted Concrete (RCC) Dams

Zaragoza
Spain

23 to 25, October 2012



Sponsored by



In collaboration with



Collegio de Ingenieros de
Caminos, Canales y Puertos



Rialb Dam (Ebro River Basin Authority)
Winner of the *International Milestone RCC Projects* (Guiyang, 2007)

PRESENTATION

The Spanish National Committee on Large Dams (SPANCOLD), the Chinese National Committee on Large Dams (CHINCOLD), the European Club of ICOLD and the Spanish Institute of Cement and its Applications (IECA), have the honor to invite you to participate in the **6th International Symposium on Roller Compacted Concrete (RCC) Dams**, which will be held in Zaragoza (Spain) from 23 to 25 October 2012.

The construction of the first Roller Compacted Concrete (RCC) dam in Spain was completed in the year 1980. After that, 27 RCC dams have been constructed in the country, one of which is under construction.

But this important development has not only taken place in Spain. The speed of execution and the economy of RCC dams, in comparison with those of conventional concrete, have been the two main reasons that have led this technique to develop very quickly in many parts of the world. Today, it is possible to find more than 400 dams of this type in more than 40 countries, being China, with about 110 dams in operation, the world's leading country in this technology of dam construction.

For all those reasons, since 1991, two pioneering and leading countries in RCC technology, Spain and China, are combining their efforts to prepare the RCC Symposium with a wide range of contents and international scope.

This new Symposium will follow those held in Beijing (China), in 1991, Santander (Spain), in 1995, Chengdu (China), in 1999, Madrid (Spain), 2003, and Guiyang (China), in 2007.

The significant development of RCC dams constructed in recent years and the characteristics of this material, made necessary to organize a new symposium in which it will be possible to analyze and discuss the major developments reached, the new trends and the future of this technology.

This 6th International Symposium on Roller Compacted Concrete Dams is sponsored by the Ministry of Agriculture, Food and Environment (MAGRAMA). The organizers are the Spanish National Committee on Large Dams (SPANCOLD) and the Chinese National Committee on Large Dams (CHINCOLD) along with the European Club of ICOLD (EURDAMS) and the Spanish Institute of Cement and its Applications (IECA), with the collaboration of the International Commission on Large Dams (ICOLD) and the Professional Association of Civil Engineers (CICCP).

A post Symposium study tour has been organized departing from Zaragoza and ending in Bilbao (October 28th), to connect with HYDRO 2012.

ORGANIZING COMMITTEE

PRESIDENTS

X. de Pedro

President of Ebro River Bassin Authority.

J. Polimón

President of the Spanish National Committee on Large Dams (SPANCOLD).
President of the European Club of ICOLD.

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Vicepresident and General Secretary of CHINCOLD.
Vicepresident of the Chinese Institute of water resources and research of hydroelectric energy (IWHR).

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Hu Bin

Director of Quality and Safety Department of China Three Gorges Corporation (CTGC).



Urdalur Dam (Ebro River Bassin Authority)

AWARDS CEREMONY

INTERNATIONAL MILESTONE RCC PROJECTS

To recognize major achievements of dam technology and define milestone projects in this field, with the support of ICOLD, **International Milestone Awards for RCC Dams**, have been set up. These milestone dam projects represent the main achievements and can be used as valuable reference for future development of dams. Recognizing International Milestone Dam Projects is an effective way to focus on, and raise awareness about, achievements in dam technology and promote best practice in the world.

Jia Jhinseng, Honorary President of ICOLD
Kyoto (Juin, 2012)

There are a great number of RCC dams constructed in last three decades around the globe. Some of them, were recognized as **International Milestone RCC Projects** at the 5th Symposium on RCC dams, held at Guiyang, on 2007:

Dam (Hight)	COUNTRY
Longtan (216.5 m)	China
Miel I (188 m)	Colombia
Miyagese (156 m)	Japan
Olivenhein Dam (97.1 m)	USA
Ralco Dam (155 m)	Chile
Rialb (101 m)	Spain
Salto Caxias (67 m)	Brazil
Wolwedans (70 m)	South Africa

The main basic eligibility criteria for an **International Milestone RCC Dam Project** must include:

- 1) Technical innovation in design, construction, operation or other aspects,
- 2) Good performance after completion,
- 3) Attention during the construction and operation stages to environmental protection and social aspects,
- 4) Attention paid to raising awareness of technical achievements and advanced experience.

The Organizing Committee of the **6th Symposium on RCC Dams** would like to invite experts and countries involved on the design or construction of this kind of dams to suggest some of these projects as **International Milestone RCC Dam Projects**.



Representatives from CHINCOLD, SPANCOLD and winner organizations after the awards ceremony of **International Milestone RCC Projects** (Guiyang, 2007)

Proposals should be sent before September, 15 2012 to the email address: imp2012@spancold.es. You will find more information and a document template to send in <http://www.spancold.es/imp2012>.

Once received all the proposals, members of SPANCOLD and CHINCOLD, along with an international team of experts, will appreciate them and selected four International Milestone Projects and a Special Award winner.

During the closing session of the Symposium will be the award ceremony for the representatives of the selected dams (owner, designer, contractor, construction, etc.)



Rialb Dam (Ebro River Bassin Authority)
Winner of the **International Milestone RCC Projects** (Guiyang, 2007)

PROGRAMME OF SESSIONS

	23 October (Tuesday)	24 October (Wednesday)	25 October (Thursday)
9:00 - 9:30	Opening Session	Lecture: <i>RCC as dam construction material</i> <i>R. Ibáñez de Aldecoa (Spain)</i>	Session 4: Construction & Quality Control (Part 3) Presentation of oral communications
9:30 - 11:00	Special Conferences: <i>RCC Dams in Spain</i> <i>J.C. de Cea (Spain)</i> <i>RCC and CMD Dams in China</i> <i>JIA Jinsheng (China)</i> <i>New developments in RCC Dams</i> <i>M.H.R. Dunstan (United Kingdom)</i>		
11:00 - 11:30	Opening of the Technical Exhibition <i>Coffee Break</i>	<i>Coffee Break</i>	<i>Coffee Break</i>
11:30 - 13:15	Session 1: New developments in RCC Dams Presentation of oral communications	Session 3: Material & Mixtures (Part 2) Presentation of oral communications	Session 4: Construction & Quality Control (Part 4) Presentation of oral communications Lecture: <i>Performance of RCC Dams</i> <i>E. Schrader (United States)</i>
13:15 - 14:15	<i>Lunch</i>	<i>Lunch</i>	<i>Lunch</i>
14:15 - 16:00	Session 2: Planning & Design (Part 1) Presentation of oral communications	Session 4: Construction & Quality Control (Part 1) Presentation of oral communications	Session 5: Performance & Monitoring Presentation of oral communications
16:00 - 16:30	<i>Coffee Break</i>	<i>Coffee Break</i>	<i>Coffee Break</i>
16:30 - 18:00	Session 2: Planning & Design (Part 2) Presentation of oral communications	Session 4: Construction & Quality Control (Part 2) Presentation of oral communications Special Conference: <i>Lessons learned and innovations for efficient RCC Dams</i> <i>F. Ortega (Spain)</i>	Session 6: Other applications of RCC Presentation of oral communications
18:00 - 18:30	Lecture: <i>Innovations in RCC Dams</i> <i>B. Forbes (Australia)</i>	Closing Session Awards Ceremony: International Milestone Projects	
	20:30 Wellcome Dinner	20:30 Social Event	18:30 Farewell Cocktail

Tuesday, 23 October

09:00 – 09:30 OPENING SESSION

09:30 – 11:00 SPECIAL CONFERENCES

Chairman: *L. Berga (Spain)*

- RCC DAMS IN SPAIN. *J.C. de Cea (Spain)*
- RCC AND CMD DAMS IN CHINA. *JIA Jinsheng (China)*
- NEW DEVELOPMENTS IN RCC DAMS. *M.H.R. Dunstan (United Kingdom)*

11:00 – 11:30 OPENING OF THE TECHNICAL EXHIBITION

11:00 – 11:30 COFFEE BREAK

11:30 – 13:15 SESSION 1. NEW DEVELOPMENTS IN RCC DAMS

Chairman: *F. Hijós (Spain)*

Co-Chairman: *Ji Guojin (China)*

PRESENTATION OF ORAL COMMUNICATIONS

- EXPERIENCES WITH RCC DAMS IN MEXICO. *F. I. Arreguin-Cortes, R. Murillo-Fernández (Mexico)*
- RECENT DEVELOPMENT IN RCC DAMS TECHNOLOGY IN MOROCCO. *A.F. Chraibi (Morocco)*
- CONSTRUCTION OF AN RCC DAM IN A VERY WET CLIMATE. *J. Waters, D. Cameron-Ellis, M.R.H. Dunstan, L. Houlberg, C. Hicks (Australia)*
- DIAMER BASHA DAM STATUS & POTENTIAL RCC MIXES. *E. Schrader, I.U. Haq, M. Arshad Pervez (United States)*
- GUANDI HIGHLY RCC GRAVITY DAM – CHALLENGES, SOLUTIONS AND LESSONS. *Chen Qiang, Hu Xiao-Hong, Zhao Yong-Gang, Zhang Lian-Ming, Yuan Qion (China)*
- PORTUGUES DAM: CHALLENGES AND SUCCESS IN FOUNDATION DOCUMENTATION AND TREATMENT. *S. Myers, J. Conway (Puerto Rico)*
- STRUCTURAL FEATURES OF GOMAL ZAM RCC ARCH-GRAVITY DAM. *Chongjiang Du (Germany)*
- RCC DAM WATER-PROOFING BY MEANS OF HIGH PRESSURE POLYMER INJECTIONS COMPARED TO WATER-PROOF MEMBRANES. *A. Gonzalo (Spain)*
- NEW TECHNOLOGY ON VERTICAL CONVEYANCE OF CONCRETE BY FULL-BIN SYSTEM IN GUANGZHAO DAM PROJECT. *Wu Xiurong, Chen Zurong (China)*
- THE USE OF 400 MM RCC LIFTS IN THE ENLARGED COTTER DAM. *P. Buchanan, D. Nott, B. Egalat, B. Forbes (Australia)*

13:15 – 14:15 LUNCH

14:15 – 16:00 SESSION 2. PLANNING AND DESIGN (PART 1)

Chairman: *J. Yagüe (Spain)*

Co-Chairman: *ZHENG Cuiying (China)*

PRESENTATION OF ORAL COMMUNICATIONS

- DISCUSSIONS ON DESIGN PRINCIPLE FOR SUPER HIGH GRAVITY DAMS BASED ON SIMULATION TEST OF HYDRAULIC FRACTURING. *Jia Jinsheng, Wang Yang, Feng Wei, Chang Qingrui (China)*
- HRB WALDBÄRENBURG: FIRST RCC DAM EXPERIENCE IN GERMANY. *B. Lange, F. Hering, R. Schlegel, G. Leyendecker, F. Ortega (Germany)*
- INFLUENCE OF DIFFERENT LAYER THICKNESS AND INTERMITTENT TIME ON HIGH RCC GRAVITY DAM TEMPERATURE STRESS. *Li Song-Hui, Zhang Guo-Xin, Liu Yi (China)*
- JOINT VISION BY DESIGNER AND CONTRACTOR FOR THE DESIGN OF AN RCC DAM. *L. Canale, Ö. Özen, E. Eroğlu (Switzerland)*
- MAIN DESIGN FEATURES OF A RCC GRAVITY DAM IN PORTUGAL. *A. Camelo, N. Antunes, D. Botelho (Portugal)*

- MINIMUM REQUIREMENTS FOR THE FOUNDATION OF RCC DAMS IN BORDER-LINE TERRAINS. *M. Romana (Spain)*
- MOVING SUCCESSFULLY FROM A CONVENTIONAL CONCRETE INTO AN RCC DESIGN FOR PORTUGUES DAM. *P. Vázquez, A. Gonzalez (Puerto Rico)*
- NONLINEAR BEHAVIOUR OF A ROLLER COMPACTED CONCRETE DAM UNDER STRONG EARTHQUAKE. *D. Grenier, A. Si-Chaib, A. Alami (France)*
- SIMULATION OF TEMPERATURES AND STRESSES DURING CONSTRUCTION OF A RCC DAM. *L.M. Lacoma, J. Rodriguez, J. Marti, F. Martinez (Spain)*
- STUDYING THE EFFECT OF STARTING TIME OF CONCRETE ON THERMAL RESPONSE OF ROLLER COMPACTED CONCRETE DAM. *M. Esmailnia Omran, Z. Ghadiri (Iran)*

16:00 – 16:30 COFFEE BREAK

16:30 – 18.00 SESSION 2. PLANNING AND DESIGN (PART 2)

Chairman: *J. Yagüe (Spain)*

Co-Chairman: *ZHENG Cuiying (China)*

PRESENTATION OF ORAL COMMUNICATIONS

- DESIGN OF FOUNDATION REMEDIATION FOR A RCC DAM. *E. Yildiz, A. Fikret Gürdil (Turkey)*
- THE DEVELOPMENT OF THE DESIGN OF CHANGUINOLA 1 DAM. *G. Erlendsson, D. Cameron-Ellis, Q.H.W. Shaw, M.R.H. Dunstan (Denmark)*
- THE FOUNDATION OF HARDFILL DAMS. EFFECTS OF SEISMICITY. *M. Romana, A.R. Martinez-Sidera (Spain)*
- THE INFLUENCE OF LOW STRESS-RELAXATION CREEP ON LARGE RCC ARCH & GRAVITY DAM DESIGN. *Q. Shaw (South Africa)*
- THERMAL RESPONSE OF RCC DAMS CONSIDERING THE EFFECT OF RESERVOIR FILLING SCHEDULE. *P. Khanzaei, F. Hejazi, A.A. Abdulrazeg, M. Saleh Jaafar, T. Ahmed Mohammed (Malaysia)*
- THREE RECENT GEOMEMBRANE PROJECTS ON NEW RCC DAMS. *A. Scuro, G. Vaschetti (Switzerland)*
- STUDY AND APPLICATION OF IMPROVED EQUIVALENT STRESS OF FINITE ELEMENT METHOD OF GRAVITY DAMS. *Yang Huichen, Jia Jinsheng, Zheng Cuiying (China)*
- DE HOOP DAM: SOUTH AFRICAN RCC ADVENTURES. *H.J. Wright, J. Van Zyl (South Africa)*

18:00 – 18:30 LECTURE

- INNOVATIONS IN RCC DAMS. *B. Forbes (Australia)*

20:30 WELCOME DINNER

Wednesday, 24 October

09:00 – 09:30 LECTURE

- RCC AS DAM CONSTRUCTION MATERIAL. *R. Ibáñez de Aldecoa (Spain)*

09:30 – 11.00 SESSION 3. MATERIAL AND MIXTURES (PART 1)

Chairman: *A. Zaragoza (Spain)*

Co-Chairman: *F. Delorme (France)*

PRESENTATION OF ORAL COMMUNICATIONS

- ACCELERATE CURING TEST: HISTORY. DEVELOPMENT AND APPLICATIONS. *J. E. López, E. Schrader (Colombia)*
- APPLICATION RESEARCH ON LOW HEAT AND HIGH PERFORMANCE HYDRAULIC MASS CONCRETE. *Zhang Xihe, Yang Jindi, Tan Jianjun (China)*
- CHANGES IN THE WORLD ECONOMY INFLUENCES THE CHOICE OF CEMENTITIOUS MATERIALS AT CHANGUINOLA 1. *E. Lose, M.R.H. Dunstan (Denmark)*

- CHOICE OF POZZOLANS FOR USE IN THE CEMENTITIOUS CONTENT OF LARGE RCC DAMS. *U Myint Zaw, Ondrej Voborny, Nguyen Hong Ha, David Morris, M.R.H. Dunstan (Burma)*
- RAW MATERIALS SELECTION AND RCC MIXTURE OPTIMIZATION IN EL PUENTE DE SANTOLEA'S DAM. *J. Gracia, M. Cabedo (Spain)*
- EXPERIENCE MADE WITH RETARDER ADMIXTURES AT TWO RCC DAMS IN MYANMAR. *U Myint Zaw, U Zaw Min San, S.L.L. Cowie, C. Rohrer (Burma)*
- FEASIBILITY STUDY OF USING ONE PORTION OF AGGREGATE IN KAHIR RCC DAM. *M. Shahgholi, M. Jafarbegloo, M.R. Hajialikhani (Iran)*
- LIMESTONE FILLER USED AS MINERAL ADMIXTURE IN THE RCC MIX FOR LA BREÑA II DAM (SPAIN). *R. Ibáñez de Aldecoa, G. Noriega, F. Romero, A. Sandoval, M. Sanz (Spain)*
- MIXTURE DESIGN AND OPTIMIZATION OF RCC OF GUAN-DI HYDROPOWER STATION. *Chenlei Nieqiang (China)*

11:00 – 11:30 COFFEE BREAK

11:30 – 13:15 SESSION 3. MATERIAL AND MIXTURES (PART 2)

Chairman: *A. Zaragoza (Spain)*

Co-Chairman: *F. Delorme (France)*

PRESENTATION OF ORAL COMMUNICATIONS

- PRACTICE OF HIGH-INTENSITY BASALT GRAVEL AGGREGATE PRODUCTION SYSTEM IN GUANDI HYDROPOWER STATION. *Zhao Yunliang, Zhang Chaofeng (China)*
- RCC MIX DESIGN DEVELOPMENT FOR ENCISO DAM. *M. Allende Álvarez, D. Cruz García, F. Ortega Santos (Spain)*
- RCC MIXTURES FORMULATION FOR TABELLOUT DAM. *M. Khalfallah, A. Si-Chaib, K. Mokrani (France)*
- RCC TRIAL MIX PROGRAMME FOR THE LAI CHAU GRAVITY DAM - HIGH CEMENTITIOUS CONTENT RCC WITH VERY LOW CEMENT CONTENTS. *Nguyen Pham Hung, M. Conrad, D. Morris, M.R.H. Dunstan (Vietnam)*
- RESULTS OF MIX DESIGNS IN ZIRDAN RCC DAM. *M. Jafarbegloo, M.R. Hajialikhani (Iran)*
- RIZZANESE RCC DAM : USE OF LOW COST RCC IN A THICK CROSS SECTION. *F. Delorme, A. Lochu, R. Valon (France)*
- THE EXPERIMENTAL ANALYSIS OF ALKALI-CARBONATE REACTIONS ON RCC DAMS IN IRAN. *N. Tavakoli Shirazi, G. Hossein Akbari (Iran)*
- THE LOW STRESS RELAXATION CREEP CHARACTERISTICS OF FLYASH-RICH RCC. *Q.H.W. Shaw, M.R.H. Dunstan (South Africa)*
- THE OPTIMIZATION OF THE RCC MIX DESIGN OF THE SPRING GROVE DAM IN SOUTH AFRICA. *J. Nyakale, D.B. Badenhorst, F. Ortega Santos (South Africa)*
- USE OF A HIGH SHRINKAGE AGGREGATE IN A NEW RCC DAM. *D. Nott, B. Forbes, D. Brigden (Australia)*

13:15 – 14:15 LUNCH

14:15 – 16:00 SESSION 4. CONSTRUCTION AND QUALITY CONTROL (PART 1)

Chairman: *WU Shiyong (China)*

Co-Chairman: *R. Lafuente (Spain)*

PRESENTATION OF ORAL COMMUNICATIONS

- DIGITAL MONITORING SYSTEM AND APPLICATION ON LUDILA PROJECT. *Zhang Guo-Xin, Li Song-hui, Liu Yi (China)*
- FEEDBACK ANALYSIS ON CAUSES AND MECHANISM OF CRACK FORMATION AND EFFECTS OF TEMPERATURE CONTROLLING AND CRACK PROTECTING DURING CONSTRUCTION OF RCC DAMS. *Liu Youzhi, Xu Bo, Zhang Guo-Xin, Shi Ziming, Liu Tao (China)*
- INVESTIGATION OF DIFFERENT PARAMETERS ON SHEAR STRENGTH AND PERMEABILITY OF CONSTRUCTION JOINTS. *Mokhtar Pouryani, F. Ghadermazy, H.R. Araghyan, Sh. Mahzarnya (Iran)*

- QUALITY CONTROL IN ZIRDAN RCC DAM. *M. Jafarbegloo, M.R. Hajialikhani (Iran)*
- DEVELOPMENT OF THE RCC FOR MIDDLE VAITARNA DAM, INDIA. *V.B. Astankar, G.V. Rao, S. Mane, M.R.H. Dunstan (India)*
- RCC DAM CONSTRUCTION QUALITY CONTROL – NUCLEAR GAUGE DENSIMETER CALIBRATION. *J.E. López, E. Schrader (Colombia)*
- USE OF A GEOGRAPHIC INFORMATION SYSTEM AS A TOOL DURING THE CONSTRUCTION OF THE PIRRIS RCC DAM IN COSTA RICA. *D. Núñez Morales, F. Ortega Santos (Costa Rica)*
- A UNIQUE CEMENT AND FLY ASH SUPPLY SYSTEM FOR THE CHANGUINOLA I PROJECT IN PANAMA. *A. Lighthart, C. Hicks (Holland)*
- ASSESSMENT OF RCC CONSTRUCTION METHODOLOGY BETWEEN YEYWA AND UPPER PAUNGLAUNG RCC DAMS IN MYANMAR. *U Myint Zaw, U Zaw Min San, S.L.L. Cowie, C. Rohrer (Burma)*

16:00 – 16:30 COFFEE BREAK

16:30 – 18:30 SESSION 4. CONSTRUCTION AND QUALITY

CONTROL (PART 2)

Chairman: *WU Shiyong (China)*

Co-Chairman: *R. Lafuente (Spain)*

PRESENTATION OF ORAL COMMUNICATIONS

- CHARACTERIZATION AND QUALITY CONTROL OF RCC DAM PRESA DEL PUENTE (TERUEL, SPAIN). *J. Arroyo Alonso, L. Fernández Almiñana, A. Sánchez Lallana (Spain)*
- CONSTRUCTION OF PIRRÍS RCC DAM IN COSTA RICA. *I. Arguedas Gamboa, A. Rivera Hernández, F. Ortega Santos (Costa Rica)*
- CONSTRUCTION TECHNOLOGY OF RCC DAM COMPOSED OF SANDSTONE AGGREGATE IN TROPICAL RAINFOREST. *Zhu Hong bin, Yang Bai hua, Fu Jian ping, Cui Dan (China)*
- DESIGN AND BUILD OF RIZZANESE RCC DAM. *A. Lochu, F. Delorme, P. Carlioz (France)*
- DESIGN AND CONSTRUCTION OF NAKAI RCC DAM, LAOS. *G. Stevenson, R. Douglas, M. Matsuzaki (Canada)*
- DYNAMIC CONSTRUCTION SIMULATION OF HIGH ROLLER COMPACTED CONCRETE DAM. *Denghua Zhong, Haotian Chang, Mingchao Li (China)*
- EL PUENTE DE SANTOLEA'S DAM EXPERIENCE. *M. Cabedo, B. Roldán, J.I. López (Spain)*
- RAPID CONSTRUCTION TECHNOLOGY OF GUANDI RCC GRAVITY DAM. *Zhao Yunliang, Zhang Chaofeng (China)*
- ENCISO DAM: GEOLOGICAL AND GEOTECHNICAL CONSTRAINTS OF THE FOUNDATION. CONSOLIDATION TREATMENT. *M. Allende Álvarez, D. Cruz Garcia, A. Soriano Martínez, A. Andriño Sigilo, D. Chuliá Sanz (Spain)*

18:30 – 19:00 SPECIAL CONFERENCE

- LESSONS LEARNED AND INNOVATIONS FOR EFFICIENT RCC DAMS. *F. Ortega (Spain)*

20:30 SOCIAL EVENT

Thursday, 25 October

09:00 – 11:00 SESSION 4. CONSTRUCTION AND QUALITY

CONTROL (PART 3)

Chairman: *P. Vazquez-Ruiz (Puerto Rico)*

Co-Chairman: *YANG Baihua (China)*

PRESENTATION OF ORAL COMMUNICATIONS

- LESSONS LEARNED IN ZIRDAN RCC DAM. *M.R. Hajialikhani, M. Jafarbegloo (Iran)*

- NOT ONLY SIZE MATTERS CONSTRUCTING NAKAI RCC DAM FOR NAM THEUN 2 PROJECT IN LAOS. *A. Rousselin, F. Delorme, B. Taquet (France)*
- PRACTICAL EXPERIENCES FOR CONSTRUCTION OF RECENT RCC DAMS IN IRAN CONSIDERING ADVANCED TECHNOLOGIES. *A. Dolatkhazi, R. Peyrovdin, M. Navidi Kashani, S. Mahzarnia (Iran)*
- RCC DAM CONSTRUCTION – CONVEYORS OR TRUCKS. *J.E. López, E. Schrader, L. Gaekel (Colombia)*
- RCC DAM CONSTRUCTION TECHNIQUE INNOVATION OF JINANQIAO HYDROPOWER STATION ON JINSHAJIANG RIVER. *Li Xianzhen (China)*
- RCC DAMS BUILT BY SPANISH CONSTRUCTION COMPANIES ABROAD. *A. Capote del Villar, R. Ibáñez de Aldecoa, V. Flórez Casillas (Spain)*
- APPLICATION OF RCC DAM CONSTRUCTION TECHNIQUE IN XIANGJIABA HYDROPOWER STATION. *Gao Peng, Mei Xuedong, Peng Gang, Wang Yi (China)*
- REVIEW OF THE CONSTRUCTION OF THE SON LA RCC DAM. *Nguyen Hong Ha, Marco Conrad, David Morris (Vietnam)*
- SCENARIO OF RCC DAMS IN MEXICO. *A. Garduño Gallo, M.A. Montero Catalán (Mexico)*
- LONGITUDINAL JOINT BEHAVIOR IN A TWO STAGE CONSTRUCTION OF CASTANHÃO DAM. *W. Jardim, M. Pinto (Brasil)*

11:00 – 11:30 COFFEE BREAK

11:30 – 12:45 SESSION 4. CONSTRUCTION AND QUALITY CONTROL (PART 4)

Chairman: *P. Vazquez-Ruiz (Puerto Rico)*

Co-Chairman: *YANG Baihua (China)*

PRESENTATION OF ORAL COMMUNICATIONS

- STUDY ON EXISTING PROBLEMS AND COUNTERMEASURES OF ROLLER COMPACTED. *Dong Hao-Wen, Tang Shun-Cheng, Ji Wei (China)*
- IMMERSION VIBRATED RCC (IVRC) FIRST WORLD EXPERIENCE AT DE HOOP RCC DAM IN SOUTH AFRICA. *J.F. van Niekerk, J. van Niekerk, F. Ortega Santos (South Africa)*
- CONSTRUCTION OF GUANDI RCC DAM. *Shiyong Wu, Shangyuan Yan, Lei Yao, Dan Zhao, Fugang He (China)*
- THE SPECIFICATION OF THE EFFECTIVE METHOD FOR DEMOLITION OF HARDENED ROLLER COMPACTED CONCRETE (RCC) USED IN KERMAN GHADROUNI DAM. *M. Abbasi, M.R. Jamshidi Jam (Iran)*
- DESIGN AND CONSTRUCTION ADVANTAGES OF HARDFILL SYMMETRICAL DAMS - CASE STUDY: SAFAF DAM IN EASTERN ALGERIA. *T. Guillemot, M. Lino (France)*
- NEW PROGRESS OF CEMENT-SAND-GRAVEL DAMMING IN CHINA. *Wu Xiurong, Chen Zhen Hua, Lin Shengzhu (China)*
- STUDY ON DESIGN OF MIXING PROPORTION FOR CEMENTED SAND AND GRAVEL (CSG). *Feng Wei, Jia Jinsheng, Ma Fengling (China)*
- CRACKING PREVENTION OF GUANDI RCC GRAVITY DAM. *Li Guoshan, Zhu Haixia, Zhao Yong-Gang, Zhang Lian-Ming (China)*
- FINAL DESIGN OF A 135-M HIGH RCC DAM IN VENEZUELA. *F. Ortega Santos, C. Granell, A. Soriano, A. Andres, A. Bello, A. Hitcher (Germany)*

12:45 – 13:15 LECTURE

- PERFORMANCE OF RCC DAMS. *E. Schrader (United States)*

13:15 – 14:15 LUNCH

14:15 – 16:00 SESSION 5. PERFORMANCE AND MONITORING

Chairman: *A. Soriano (Spain)*

Co-Chairman: *SUN Yuelin (China)*

PRESENTATION OF ORAL COMMUNICATIONS

- DAM SAFETY MONITORING TO ASSESS VAL DAM BEHAVIOR. *R. Gómez López de Munain, J. Merino Vidruero, M. G. de Membrillera Ortuño (Spain)*
- EVALUATION OF SAFETY AND STRUCTURAL STABILITY OF JEGIN RCC DAM DURING OPERATION PERIOD. *M. Esmaelinia Omran, H. Mahdilo Torkamani (Iran)*
- MONITORING MODEL FOR DISPLACEMENT FIELD OF RCCD. *Chen Xudong, Gu Chongshi, Xu Baosong (China)*
- PROPOSING A STANDARDIZED APPROACH TO STRESS-STRAIN INSTRUMENTATION FOR RCC DAMS. *M. Conrad, Q.H.W. Shaw, M.R.H. Dunstan (Switzerland)*
- QUANTITATIVE MICROCRACK ANALYSIS OF RCC SUFFERED DIFFERENT FREEZING-THAWING DAMAGE DEGREES BY DIP TECHNIQUE. *Shuguang Li, Wei Feng, Juntao Tian, Gaixin Chen, Yihui Lu (China)*
- SEEPAGE ANALYSIS OF GUANGZHAO RCC GRAVITY DAM. *Xiaohui Qian, Hao Yang, Lin Luo (China)*
- THE SUMMARY OF SAFETY MONITORING AND OPERATION ABOUT RCC GRAVITY DAM IN CHINA. *Du Xiaokai, Zhao Quansheng, Dang Lincai (China)*
- THE TENSILE STRENGTH OF RCC FOR DAMS. *T.P. Dolen, M.R.H. Dunstan (United States)*
- THERMAL INDUCED CRACKING PERFORMANCE OF RCC DAMS. *K.D. Hansen, B.A. Forbes (United States)*

16:00 – 16:30 COFFEE BREAK

16:30 – 18:00 SESSION 6. OTHER APPLICATIONS OF RCC

Chairman: *K. Hansen (United States)*

Co-Chairman: *J.M. Buil (Spain)*

PRESENTATION OF ORAL COMMUNICATIONS

- RCC USE IN COFFERDAMS. *K.D. Hansen, D.L. Johnson (United States)*
- LESSON LEARNED - MORE THAN 100 RCC OVERTOPPING SPILLWAYS IN THE UNITED STATES. *R.P. Bass, T. Fitzgerald, K.D. Hansen (United States)*
- SOME KEY EXPERIENCES ON THE RCC COFFERDAM CONSTRUCTION OF THE THREE GORGES PROJECT. *Chen Xianming, Li Jinghua, Xiong Jihong (China)*
- RCC IN SMALL PROJECTS. *L. Pinilla B. (Chile)*
- HYDRAULIC SCALE MODEL OF A 50 METERS HIGH STEPPED SPILLWAY ON A RCC DAM IN THE SULTANATE OF OMAN. *P.E. Loisel, P. Jehanno, C. Guilbaud, S. Al Hadhrami (France)*
- STEPPED SPILLWAYS WITHOUT SIDEWALLS: SCALE MODEL STUDY. *S. Estrella, M. Sánchez-Juny, J. Pomares, J. Dolz, R. Ibáñez de Aldecoa, M. Domínguez, J. Rodríguez, L. Balairón (Spain)*
- STUDY ON UNDERFLOW ENERGY DISSIPATION TECHNOLOGY OF HIGH RCCD FLOOD DISCHARGE. *Peng Wen-ming, Zhang Lian-ming, Zhao Yong-gang, Hu Xiao-hong (China)*
- THE HIGHEST RCC DAM IN THE LAO P.D.R. -INTRODUCTION OF NAM NGIEP 1 HYDROPOWER PROJECT- *N. Kita, T. Kamachi, M. Asakawa, T. Tada (Afghanistan)*

18:00 – 18:30 CLOSING SESSION

AWARDS CEREMONY:

INTERNATIONAL MILESTONE PROJECTS

18:30 FAREWELL COCKTAIL

GENERAL INFORMATION

LANGUAGE:

The official language of the symposium will be English.
Simultaneous translation in Spanish will be available.

SYMPOSIUM DATE:

October 23rd, 24th and 25th, 2012.

SYMPOSIUM VENUE:

Zaragoza Auditorium
C/ Eduardo Ibarra, 3
50009, Zaragoza



GENERAL SECRETARIAT:



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Fax: +34 91 533 89 86
rcc2012@spancold.es
www.spancold.es

TECHNICAL SECRETARIAT:



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REGISTRATIONS

REGISTRATION FEES

Type of Participant	Before 07/09/2012	After 07/09/2012
Participant	750 €	900 €
Accompanying person	350 €	350 €
Student	150 €	150 €
Study tour	500 €	500 €

** The Study tour has a limited number of seats and a minimum number of participants must be achieved for the visit to be made.*

The Participant fee includes:

- Documentation and access to the sessions of the Symposium.
- Working lunches.
- Coffees in the morning and afternoon breaks.
- Opening session.
- Social event.
- Welcome dinner.
- Farewell cocktail.

The Accompanying person fee includes:

- Credentials for the accompanying person.
- Opening session.
- Social event.
- Welcome dinner.
- Farewell cocktail.
- Accompanying person programme.

The Student fee includes:

- Documentation and access to the sessions of the Symposium.
- Working lunches.
- Coffees in the morning and afternoon breaks.
- Opening session.
- Farewell cocktail.

RULES FOR PARTICIPANTS REGISTRATION

The registration should be made exclusively through the electronic form that you could find at the Symposium Official Website (www.rcc2012.es). Complete the requested fields and you will receive a message confirming your pre-registration and your access data to the personal area (user and password). If you already have these data because of a previous registration on the system (either for submitting papers or making a hotel reservation), you should access to your personal area and click on the registration field.

The registration will be confirmed upon receiving the corresponding payment and you will receive a confirmation email.

The registration deadline is Friday, October 19th. Those who want to register after this date must do it directly on the congress venue.

ACCOMODATION

For your accommodation in Zaragoza during the congress, we can offer you the following hotels:

HOTELS AND PRICES		
	Single Room	Double Room
MELIÁ ZARAGOZA ****	97 €	109 €
GOYA HOTEL ****	73 €	79 €
CONFORTEL ROMAREDA ****	97 €	109 €

Room price per night - accommodation + breakfast.

VAT included.

GENERAL CONDITIONS

Bookings will be made exclusively through the Symposium Official Website (www.rcc2012.es)

Hotel bookings are subject to a cancellation policy imposed by the respective business. For this reason, we can only consider bookings as confirmed once paid and notified the Technical Secretariat.

Important:

- From the moment the reservation is made, you will have 10 days to make the payment and notify the Technical Secretariat to this respect (by email to rcc@meetandforum.com or fax to 91 517 87 89). Otherwise, the reservation will be automatically cancelled.

If you book your accommodation through the website:

- You can only be sure that your reservation has been processed if you receive an email confirming that we have properly received your payment.
- It is imperative that we have a valid email to confirm your reservation.

PAYMENT METHODS

- **By bank transfer:** It is imperative that you send us copy of the transfer by email to rcc@meetandforum.com or by fax to the number + 34 91 517 87 89 **stating the congress and participant names**. Once we check the deposit in our bank statement, we will notify the confirmation of the accommodation booking to the email shown on the form.

Bank: Banco Caminos
Holder: Comité Nacional Español de Grandes Presas
Account n°.: 0234 0001 0390 2107 5809
IBAN: ES22 0234 0001 0390 2107 5809
SWIFT: CCOCESMM

- **By credit card.**

Note: Payment must be made in EUROS. Transfer and foreign exchange costs will be borne by the participant.

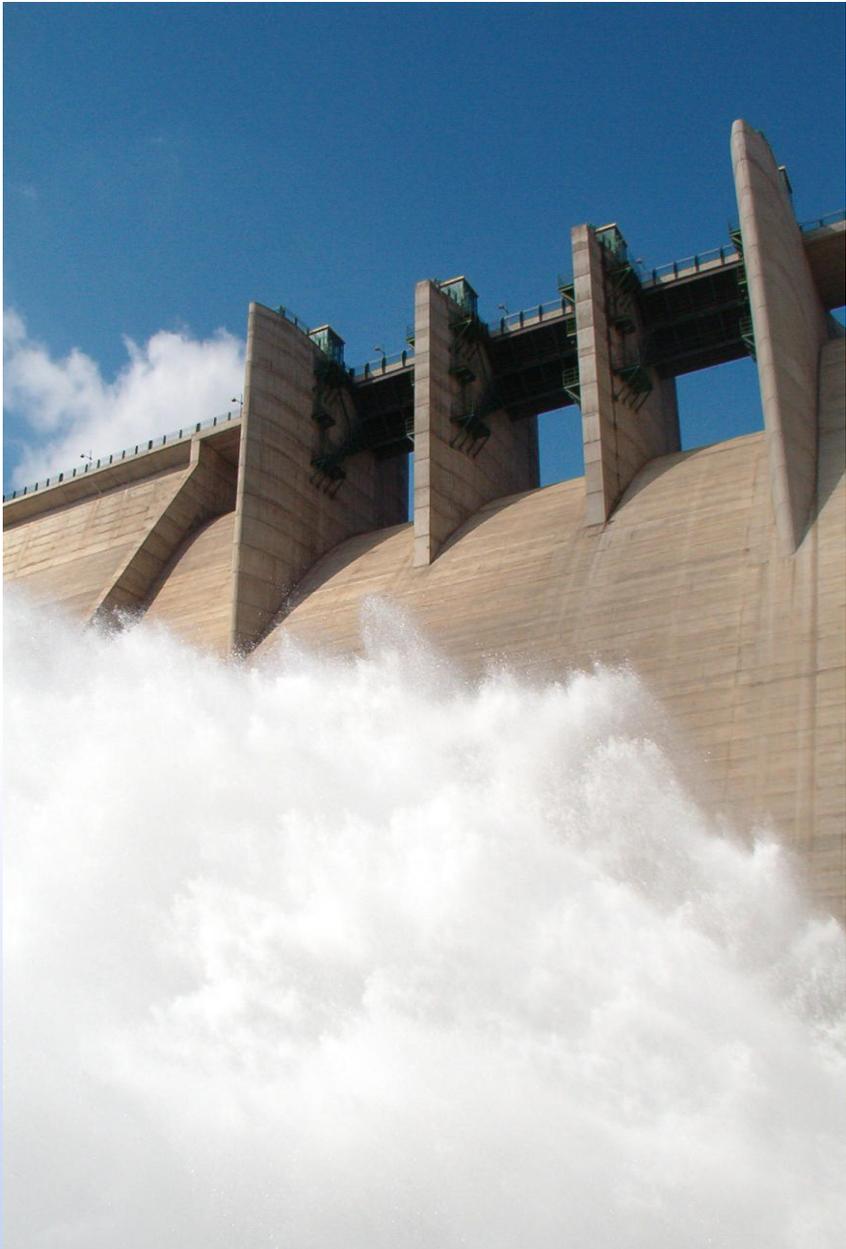
CANCELLATION POLICY

- Bookings cancellations will depend on the hotel chosen.
- You should read the cancellation policies in the information relating to each hotel.
- Reimbursements will be made within a month after the congress closing.

Cancellations should be made in writing and notified to the Technical Secretariat: rcc@meetandforum.com.



La Breña II (ACUASUR)



Rialb Dam (Ebro River Basin Authority)

ACCOMPANYING PERSONS PROGRAMME

TUESDAY, OCTOBER 23RD

GUIDED VISIT TO THE STONE MONASTERY

The **STONE MONASTERY**, founded in 1194 by thirteen Cistercian monks from the Monastery of Poblet, in the old Castle of old stone and next to the Stone River. It was dedicated to Santa Maria de la Blanca and catalogued as a National Monument on February 16, 1983. The place in which the property is located was declared a Historic Site on December 28, 1945.

The construction of the monastery went through three stages:

1. The primitive Gothic (s. XIII)
2. The Gothic Renaissance (s. XVI)
3. The Clasica-Barroca (s. XVIII)

Tucked away between rugged sierras of the Sistema Ibérico, the Stone Monastery Natural Park offers one of the most rewarding experiences can be found in the world, in a journey of two hours and a half by an unusual vergel around water and their movement in waterfalls and grottos.

Among the most emblematic places of the monastery, we will visit:

- **THE CISTERCIAN CLOISTER OF THE 12TH CENTURY**
- **THE CHAPTERHOUSE**
- **THE 18TH CENTURY BAROQUE ALTAR**
- **THE CILLA**
- **THE MONASTIC KITCHEN**
- **THE REFECTORY OR DINING HALL**

and in the Natural Park:

- **THE IRIS GROTTTO**
- **THE DEVIL'S PENALTY AND THE MIRROR LAKE**
- **THE WATERFALLS IN THE PARK**
 - **BATH OF DIANA**
 - **WHIMSICAL**
 - **PONYTAIL**
 - **TRINIDAD**
 - **THE CHORREADEROS**
 - **IRIS**
 - **LOS FRESNOS**
 - **LONELY**



Cloister of the Monastery



Waterfall "Caprichosa"



Waterfall "Horse tail"

ACCOMPANYING PERSONS PROGRAMME

WEDNESDAY, OCTOBER 24TH

VISIT OF ZARAGOZA

GUIDED VISIT TO THE PALACE OF THE ALJAFERÍA

It is one of the most important of Zaragoza and the Spanish-Moorish architecture. Built in the second half of the eleventh century on the initiative of Al-Muqtadir, as the residence of the Hudies Kings of Saragusta, reflecting the splendor attained by the kingdom taifa in the period of political and cultural peak.



GUIDED VISIT INSIDE THE BASILICA OF NUESTRA SEÑORA DEL PILAR

According to tradition is the first Marian shrine of Christianity. It is preserved and venerated the Pillar is also an artistic Center of the first order that brings together works of great value of different times, especially the frescoes painted by Goya.



GUIDED VISIT TO THE SEO

La Seo was built with the aim of adopting an international modern style for the old Mudejar tower which featured an aspect of deterioration.

The building construction started in the 12th century in Romanesque style in the aljama mosque and has been the subject of many reforms and expansions until 1704.

The building underwent two expansions, one in the mid-9th century (856) and the second, attested in 1023 under the Taifa King of Zaragoza Mundhir I.



STUDY TOUR PROGRAMME

FRIDAY 26/10/2012

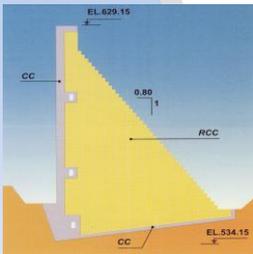
Visit to Val Dam
Lunch in Tarazona
Accommodation in Logroño

SATURDAY 27/10/2012

Visit to Enciso Dam
Lunch in San Millán de la Cogolla
Accommodation in Logroño

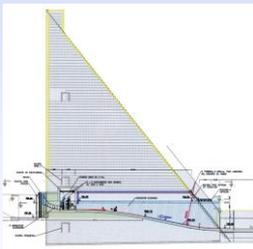
SUNDAY 28/10/2012

Short stop at Arriarán Dam
Arrival to Bilbao for connecting with Hydro 2012



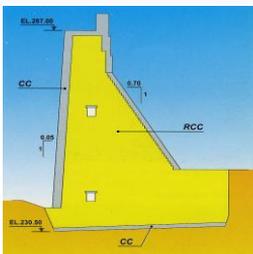
EL VAL DAM

Owner: **State**
End of the works: **1998**
Dam Typology: **RCC**
Crest Level (m): **629,1**
Height (m): **94,4**
Crest Length (m): **373**
Volume of the Dam (m³): **667.000**
Reservoir Volume (m³): **25.000.000**



ENCISO DAM (UNDER CONSTRUCTION)

Owner: **State**
End of the works: **2014**
Dam Typology: **RCC**
Crest Level (m): **879,0**
Height (m): **103**
Crest Length (m): **376**
Volume of the Dam (m³): **704.960**
Reservoir Volume (m³): **48.000.000**



ARRIARÁN DAM

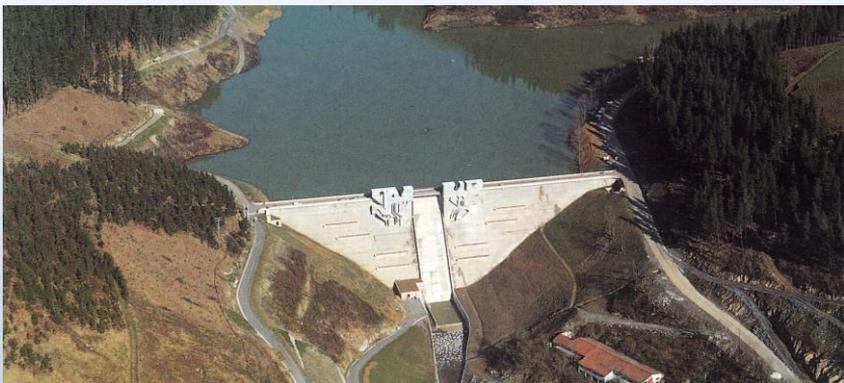
Owner: **Water Consortium of Guipúzcoa**
End of the works: **1993**
Dam Typology: **RCC**
Crest Level (m): **287,0**
Height (m): **57,0**
Crest Length (m): **200**
Volume of the Dam (m³): **110.000**
Reservoir Volume (m³): **3.200.000**



El Val Dam



Enciso Dam



Arriarán Dam

REGISTRATION BULLETIN

Last Name _____ First Name _____
Address _____
Zip Code _____ City _____ State _____
Country _____ Company _____
Position _____
Accompanying Person _____
Phone _____ Fax _____ E-Mail _____

	Before 07/09/2012	After 07/09/2012		
 Registration fees	<input type="checkbox"/> 750 €	<input type="checkbox"/> 900 €		
This fee includes: assistance to the technical sessions and documentation of the Symposium. It also includes lunch and coffee breaks, participation in planned events, as the Welcome Dinner and Farewell Cocktail, as well as the service of transportation between hotels and the Zaragoza Conference and Exhibition Centre.				
 Accompanying persons	<input type="checkbox"/> 350 €	<input type="checkbox"/> 350 €	N. People	TOTAL
This fee includes the participation in planned social events and visits included in the accompanying programme.				
		€
 Students	<input type="checkbox"/> 150 €	<input type="checkbox"/> 150 €		
This fee includes documentation and access to the sessions of the Symposium, working lunches, coffees in the morning session and afternoon breaks and participation in planned social events.				
 Study Tour	<input type="checkbox"/> 500 €	<input type="checkbox"/> 500 €	N. People	TOTAL
		€

| Payment Method

By **bank transfer**: it is imperative that you send us copy of the transfer by email to rcc@meetandforum.com or by fax to the number + 34 91 517 87 89 **stating the congress and participant names**. Once we check the deposit in our bank statement, we will notify the confirmation of the accommodation booking to the email shown on the form.

Bank: Banco Caminos
Holder: Comité Nacional Español de Grandes Presas
Account n.º: 0234 0001 0390 2107 5809
IBAN: ES22 0234 0001 0390 2107 5809
SWIFT: CCOCESMM

In compliance with that stipulated in the 1599 Organic Act, of 13 December, of protection of data of a Personal nature, we inform you that the data contained in this newsletter registration will be incorporated into the automated file management of ENVENOS whose leaders are MEETFORUM S.L. and SPANCOLD for the correct rendering of services that the company offers to its clients.

Also we inform you that you can exercise your rights of access, rectification, cancellation and opposition to the responsible for the file in our offices in c/ Laurel, 10, Ground floor A - 28005 Madrid or by e-mail to rcc@meetandforum.com, must be identified by ID card, passport or residence card.

I authorize SPANCOLD to provide data to the number of telephone, fax and e-mail address of contact relating to his person to the participants of the courses and/or events in which I have participated if they expressly request.

ACCOMMODATION BULLETIN

Last Name _____ First Name _____
 Address _____
 Zip Code _____ City _____ State _____
 Country _____ Company _____
 Position _____
 Accompanying Person _____

 Phone _____ Fax _____ E-Mail _____
 Date of Entry _____ Date of Departure _____

	Single Room	Double Room	N. Nights	TOTAL
MELIÁ ZARAGOZA ****	<input type="checkbox"/> 97 €	<input type="checkbox"/> 109 €€
HOTEL GOYA ****	<input type="checkbox"/> 73 €	<input type="checkbox"/> 79 €€
CONFORTEL ROMAREDA ****	<input type="checkbox"/> 97 €	<input type="checkbox"/> 109 €€

Room price per night - accommodation + breakfast.
 VAT included.



PAYMENT METHOD

By bank transfer: it is imperative that you send us copy of the transfer by email to rcc@meetandforum.com or by fax to the number + 34 91 517 87 89 **stating the congress and participant names.** Once we check the deposit in our bank statement, we will notify the confirmation of the accommodation booking to the email shown on the form.

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