

3rd International Workshop on Labyrinth and Piano Key Weirs – PKW 2017

Qui Nhon, Vietnam – 21-24 February 2017



Van Phong Dam (VNCOLD - Vietnam)

Organized by



Vietnam National Committee on Large
Dams & Water Resources Development



Université de Liège – Hydraulique de
l'Environnement Naturel et Construit



Electricité de France – Centre
d'Ingénierie Hydraulique



Ecole Polytechnique Fédérale de
Lausanne – Laboratoire de
Constructions Hydrauliques

Tuesday, February 21, 2017

Transfer for all workshop participants will be organized from Qui Nhon airport to Seagull Hotel, depending upon flights arrival.

16h-18h: Secretariat opening

19h30: Welcome banquet

Wednesday, February 22, 2017

6h-9h: Breakfast

8h-8h30: Secretariat opening

8h30-8h50: Opening addresses:

- VNCOLD Chairman – **Pham Hong Giang**
- Binh Dinh Provincial People's Committee Chairman – **Ho Quoc Dung**
- Chairman of Vietnam Union of Science and Technology Associations – **Dang Vu Minh**
- Organizing Committee – **F. Laugier**

8h50-10h10: Special Session: Honoring University of Biskra

Keynote lecture (Chairman: F. Laugier)

- **Ouamane A.** "Twenty years of research at Biskra University for P.K. Weirs, Labyrinths and Fuse Plugs"

Technical Session: R&D – Submergence (Chairman: F. Laugier)

- **Belaabed F., Athmani B., Ouamane A. & Laiadi A.** "Study of the influence of submergence on the upstream flow of Piano Keys Weir"
- **Nguyen Thanh H., Tang Duc T. & Ho Ta Khanh M.** "Research on Piano Key weirs capacity for free and submerged flow"

10h10-10h40: Coffee break

10h40-12h10: Technical Session A: Projects - Studies (Chairman: B. Tullis)

- **Epicum S., Archambeau P., Dewals B., Piroton M., Tralli H. & Alende J.** "A piano key weir to increase the discharge capacity of the Oule Dam (France) spillway"
- **Chapuis A., Thomas M., Deroo L., Richit C. & Touzet C.** – Speaker: **Guillemot T.** "Piano Key weirs on a lateral spillway: from an analytical preliminary design to a detailed design validated by a physical model"
- **Azizi K., Attari J. & Moridi A.** "Estimation of discharge coefficient and optimization of Piano Key Weirs"
- **Gebhardt M., Merkel J., Belzner F. & Thorenz C.** "A comparison of side weirs and labyrinth weirs at Ilmenau River"

12h10-14h00: Lunch

14h00-14h35: Keynote lecture (Chairman: J. Vermeulen)

- **Ho Ta Khanh M.** "History and development of Piano Key weirs in Vietnam from 2004 to 2016"

14h35-15h40: Technical Session B: R&D - Fluid-Structure interactions and aeration (Chairman: B. Blancher)

- **Vermeulen J., Lassus C. & Pinchard T.** "Design of a Piano Key Weir aeration network"
- **Lodomez M., Piroton M., Dewals B., Archambeau P. & Epicum S.** "Could Piano Key weirs be affected by nappe oscillations?"
- **Denys F.J.M., Basson G.R. & Strasheim J.A.v.B.** "Fluid Structure Interaction of Piano Key Weirs"

15h40-16h10: Coffee break

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16h10-17h20: Technical Session C: Projects – Construction (I) (Chairman: M. Ho Ta Khanh)

- **Booyse D.** “The raising of Hazelmere Dam by means of Piano Key Weir”
- **Jayatillake H.M.** & Perera K.T.N. “Adoption of a type-D Piano Key Weir spillway with tapered noses at Rambawa Tank, Sri Lanka”
- **Dinh Sy Q.,** Nguyen Luong A. & Nguyen Manh H. “Study, design and construction of the Van Phong Piano Key Weir”

19h30: Dinner

Thursday, February 23, 2017

6h-9h: Breakfast

8h30-9h05: Keynote lecture (Chairman: M. Pfister)

- **Erpicum S.** “Hydraulics of Piano Key Weirs: a review”

9h05-10h10: Technical Session D: R&D – Geometry and Hydraulics (Chairman: M. Pfister)

- **Bremer F.L.** & Oertel M. “Numerical investigation of wall thickness influence on Piano Key weir discharge coefficients: a preliminary study”
- Karimi M., **Attari J.,** Saneie M. & Jalili Ghazizadeh M.R. “Experimental study of discharge coefficient of a Piano Key Side Weir”
- Laiadi A., Athmani B., **Belaabed F.** & Ouamane A. “The effect of the geometric shape of the alveoli on the performance of Piano Key Weirs ”

10h10-10h40: Coffee break

10h40-12h10: Technical Session E: R&D – Hydraulics and Energy dissipation (Chairman: J. Vermeulen)

- **Cicero G.M.,** Laugier F. & Vermeulen J. “Synthesis of Piano Key weir experimental studies at LNHE”
- Mehboudi A., **Attari J.** & Hosseini S.A. “Flow regimes over the trapezoidal piano key weirs”
- **Pfister M.,** Jüstrich S. & Schleiss A.J. “Toe scour formation at Piano Key weirs”
- Truong Chi H. & **Ho Ta Khanh M.** “Experimental study for energy dissipation using stilling basin downstream of P.K. weirs type A”

12h10-14h00: Lunch

14h00-14h35: Keynote lecture (Chairman: A. Ouamane)

- **Laugier F.** “Overview of design and construction of 11 Piano Key Weirs spillways developed in France by EDF from 2003 to 2016”

14h35-15h40: Technical Session F: Projects – Construction (II) (Chairman: A. Ouamane)

- Valley P. & **Blancher B.** “Construction and testing of two Piano Key Weirs at Charmines dam”
- Cubaynes M., **Laugier F.** & Nagel V. “Construction of a Piano Key Weir spillway at La Ravière dam”
- **Dabertrand F.,** Vermeulen J. & Blancher B. “Construction of a Piano Key Weirs spillway at Record dam”

15h40-16h10: Coffee break

16h10-17h20: Technical Session G: R&D – Future applications and developments (Chairman: S. Erpicum)

- **Belzner F.,** Merkel J., Gebhardt M. & Thorenz C. “Piano Key and Labyrinth Weirs at German Waterways: recent and future research of the BAW”
- Ribi J.-M., Spahni B., Dorthe D. & **Pfister M.** “Piano Key weir as overflow on sedimentation basin of wastewater treatment plant”
- **Tullis B.P.,** Young N. & Crookston B.M. “Physical modeling size-scale effects for Labyrinth Weirs with half rounded crests”

17h20-17h30: World Register of Piano Key Weirs - Laugier F.

17h30-17h40: Closing address:

- VNCOLD Chairman – **Pham Hong Giang**
- Organizing Committee – **S. Erpicum**

19h30: Farewell banquet

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Friday, February 24, 2017- Technical tour

6h-9h: Breakfast

8h: Departure from the hotel by bus to the Van Phong barrage (~40 km)

9h-10h30: Visit of the Van Phong barrage

10h30-11h30: Visit of the Van Phong irrigated area

11h30-12h30: Travel to a restaurant 5 km from Dinh Binh RCC dam (~ 40 km)

12h30-14h: Lunch in the restaurant

14h-15h30: Visit of the Dinh Binh RCC dam

15h30-17h30: Return to the Seagull hotel (~ 80 km)

19h30: Dinner

NB: Exterior shoes are recommended for the technical tour.

Saturday, February 25, 2017

6h-9h: Breakfast

Transfer to Qui Nhon airport depending upon flights departure time.

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