

REFERENCES

- Abbasi S, Fatemi S, Ghaderi A, Di Francesco S (2021) The effect of geometric parameters of the antivortex on a triangular labyrinth side weir *Water* 13:14
- Abhash A, Pandey K (2020) A review of Piano Key Weir as a superior alternative for dam rehabilitation *ISH Journal of Hydraulic Engineering*:1-11
- Abhash A, Pandey K (2021a) Experimental and Numerical Study of Discharge Capacity and Sediment Profile Upstream of Piano Key Weirs with Different Plan Geometries *Water Resources Management* 35:1529-1546
- Abhash A, Pandey K (2021b) Numerical study of discharge-head relationship of piano key weirs for low heads *Water Resources* 48:235-244
- Abrari L, Talebbeydokhti N, Sahraei S (2015) Investigation of hydraulic performance of piano shaped weirs using three dimensional numerical modeling *Iranian Journal of Science and Technology Transactions of Civil Engineering* 39:539-558
- Akbari M, Salmasi F, Arvanaghi H, Karbasi M, Farsadizadeh D (2019) Application of Gaussian process regression model to predict discharge coefficient of Gated Piano Key Weir *Water Resources Management* 33:3929-3947
- Allahdadi K, Ansari Ghojghar M, Zeinali M, Parsi E (2021) Predicting the discharge coefficient of arched piano key with a trapezoidal cross section *Iranian Journal of Soil and Water Research* 52:95-107
- Anderson R, Tullis B (2012a) Comparison of piano key and rectangular labyrinth weir hydraulics *Journal of Hydraulic Engineering* 138:358-361
- Anderson R, Tullis B (2012b) Piano key weir hydraulics and labyrinth weir comparison *Journal of Irrigation and Drainage Engineering* 139:246-253
- Anderson R, Tullis B (2012c) Piano key weir: Reservoir versus channel application *Journal of Irrigation and Drainage Engineering* 138:773-776

Anderson RM (2011) Piano key weir head discharge relationships. Utah State University,

Arora S, Keshari AK (2020) Monte Carlo Simulation and Fuzzy Modelling of River Water Quality Environmental Processes and Management: Tools and Practices 91:3

Ayoubloo MK, Azamathulla HM, Ahmad Z, Ghani AA, Mahjoobi J, Rasekh A (2011) Prediction of scour depth in downstream of ski-jump spillways using soft computing techniques International Journal of Computers and Applications 33:92-97

Azamathulla HM, Zakaria N (2007) An ANFIS-based approach for predicting the scour below flip-bucket spillway Riverside Kuching, Sarawak:6-8

Badr K, Mowla D (2015) Development of rectangular broad-crested weirs for flow characteristics and discharge measurement KSCE Journal of Civil Engineering 19:136-141

Barbetta S, Camici S, Moramarco T (2015) A reappraisal of bridge piers scour vulnerability: a case study in the Upper Tiber River basin (central Italy) Journal of Flood Risk Management

Barman B, Kumar B, Sarma AK (2018) Turbulent flow structures and geomorphic characteristics of a mining affected alluvial channel Earth Surface Processes and Landforms 43:1811-1824

Begam S, Sen D, Dey S (2018) Moraine dam breach and glacial lake outburst flood generation by physical and numerical models Journal of Hydrology 563:694-710

Beheshti A Local Scour Depth Estimation around Complex Bridge Pier. In: 10th International Congress on Civil Engineering, 2015.

Beheshti A (2016) Scour hole influence on turbulent flow field around complex bridge piers Flow Turbulence and Combustion 97

Belzner F, Merkel J, Pfrommer U, Gebhardt M, Thorenz C (2016) Piano-Key-Wehre und Labyrinth-Wehre unter den Randbedingungen einer Bundeswasserstraße

Bennett S, Best J (1995) Mean flow and turbulence structure over fixed, two-dimensional dunes: Implications for sediment transport and bedform stability
Sedimentology 42:491-513

Bhattacharya P, Ramanathan A, Mukherjee AB, Bundschuh J, Chandrasekharam D, Keshari A (2008) Groundwater for sustainable development: problems, perspectives and challenges. CRC Press,

Bianucci P, Sordo-Ward A, Perez J, Garcia-Palacios J, Mediero L, Garrote L (2013) Risk-based methodology for parameter calibration of a reservoir flood control model
Natural Hazards and Earth System Sciences 13:965-981

Bieri M, Federspiel M, Boillat J-L, Houdant B, Delorme F (2010) Spillway discharge capacity upgrade at Gloriettes dam
International Journal on Hydropower & Dams 17:88-93

Bieri M, Federspiel M, Boillat J-L, Houdant B, Faramond L, Delorme F (2011) Energy dissipation downstream of piano key weirs—case study of Gloriettes dam (France)
Labyrinth and piano key weirs—PKW 2011:123-130

Bieri M, Leite Ribeiro M, Boillat J-L, Schleiss A, Laugier F Réhabilitation de la capacité d'évacuation des crues—Intégration de PK-Weirs sur des barrages existants. In: Proc., Colloque CFBR-SHF, Dimensionnement et fonctionnement des évacuateurs de crues, 2009. Société Hydrotechnique de France (SHF) Paris,

Blancher B, Montarros F, Laugier F Hydraulic comparison between Piano Key Weirs and labyrinth spillways. In: Proc. Int. Conf. Labyrinth and Piano Key Weirs Liège B, 2011. pp 141-150

Borghei S, Vatannia Z, Ghodsian M, Jalili M Oblique rectangular sharp-crested weir. In: Proceedings of the Institution of Civil Engineers-Water and Maritime Engineering, 2003. vol 2. Thomas Telford Ltd, pp 185-191

Botha A, Fitz I, Moore A, Mulder F, Van Deventer N (2013) Application of the Piano Key Weir spillway in the Republic of South Africa Labyrinth and Piano Key Weirs II:20-22

Bray S, Ahmadian R, Falconer RA (2016) Impact of representation of hydraulic structures in modelling a Severn barrage Computers & Geosciences 89:96-106

Bremer F, Oertel M (2017) Numerical investigation of wall thickness influence on Piano Key Weir discharge coefficients: A preliminary study. In: Labyrinth and piano key weirs III–PKW 2017. CRC Press, pp 101-108

Breusers H, Raudkivi AJ (1991) Scouring. Balkema Rotterdam,

Carrillo JM, Matos J, Lopes R (2020) Numerical modeling of free and submerged labyrinth weir flow for a large sidewall angle Environmental Fluid Mechanics 20:357-374

Chadwick A, Morfett J, Borthwick M (2013) Hydraulics in civil and environmental engineering. Crc Press,

Chahartaghi MK, Nazari S, Shooshtari MM (2019) Experimental and numerical simulation of arced trapezoidal piano key weirs Flow Measurement and Instrumentation 68:101576

Chi Hien T, Thanh Son H, Ho Ta Khanh M Results of some ‘piano keys’ weir hydraulic model tests in Vietnam. In: Proc., 22nd Int. Congress of Large Dams, Question 87, Response 39, 2006. International Commission on Large Dams (ICOLD), pp 581-595

Cicero G, Delisle J, Lefebvre V, Vermeulen J (2013) Experimental and numerical study of the hydraulic performance of a trapezoidal Piano Key weir Labyrinth and Piano Key Weirs II:265

Cicéro G, Guene C, Luck M, Pinchard T, Lochu A, Brousse P Experimental optimization of a Piano Key Weir to increase the spillway capacity of the Malarce dam. In: 1st IAHR European Congress, Edinburgh, 4–6 mai 2010, 2010.

Crookston B, Anderson R, Tullis B (2018) Free-flow discharge estimation method for Piano Key weir geometries Journal of Hydro-environment Research 19:160-167

Crookston BM (2010) Labyrinth weirs. Utah State University,

Da Singhal G, Sharma N Rehabilitation of Sawara Kuddu Hydroelectric Project–Model studies of Piano Key Weir in India. In: Proc. Intl Workshop on Labyrinths and Piano Key Weirs PKW 2011, 2011. pp 241-250

Dabling M, Tullis B (2012) Piano key weir submergence in channel applications Journal of Hydraulic Engineering 138:661-666

DANESHFARAZ R, GHADERI A, ABRAHAM J, TORABI M (2020) Effect of different channels on discharge coefficient of labyrinth weirs Teknik Dergi 32

Denys F, Basson G, Strasheim J (2017) Fluid structure interaction of piano key weirs. In: Labyrinth and piano key weirs III–PKW 2017. CRC Press, pp 119-126

Eng BM, Lennart F (2018) Numerical uncertainty of Piano Key Weir discharge coefficient estimations by means of 3D CFD modelling-a preliminary study

Erpicum S, Archambeau P, Dewals B, Machiels O, Piroton M (2011a) WOLF 1D PKW-1D numerical model of the flow over a piano key weir

Erpicum S, Machiels O, Dewals B, Archambeau P, Piroton M Considerations about the optimum design of PKW. In: Proc. of the Int. Conf. Water Storage and Hydropower Development for Africa (Africa 2013). Addis Ababa, Ethiopia, 2013.

Erpicum S, Machiels O, Dewals B, Piroton M, Archambeau P Numerical and physical hydraulic modelling of Piano Key Weirs. In: Proceedings of the 4th Int. Conf. on Water Resources and Renewable Energy Development in Asia, 2012.

Erpicum S, Nagel V, Laugier F (2011b) Piano Key Weir design study at Raviege dam Labyrinth and Piano Key Weirs—PKW 2011:43-50

Ervine D, Elsayy E The effect of a falling nappe on river aeration. In: Proc 16th IAHR Congress, Sao Paulo, Brazil, 1975. p 390

Falvey HT (1980) Air-water flow in hydraulic structures NASA STI/Recon Technical Report N 81:26429

Falvey HT (2003) Hydraulic design of labyrinth weirs. ASCE Press (American Society of Civil Engineers) Reston, VA,

Fleit G, Baranya S, Bihs H (2017) CFD modeling of varied flow conditions over an ogee-weir Periodica Polytechnica-Civil Engineering

Gabriel-Martin I, Sordo-Ward A, Garrote L, Castillo LG (2017) Influence of initial reservoir level and gate failure in dam safety analysis. Stochastic approach Journal of Hydrology 550:669-684

Gaur A, Biggs TW, Gumma MK, Parthasaradhi G, Turrall H (2008) Water scarcity effects on equitable water distribution and land use in a major irrigation project—case study in India Journal of irrigation and Drainage Engineering 134:26-35

Gebhardt M, Herbst J, Merkel J, Belzner F (2018) Sedimentation at labyrinth weirs—an experimental study of the self-cleaning process Journal of Hydraulic Research

Ghaderi A, Daneshfaraz R, Abraham J, Torabi M (2020a) Effect of Different Channels on Discharge Coefficient of Labyrinth Weirs, J Teknik Dergi 32

Ghaderi A, Daneshfaraz R, Dasineh M, Di Francesco S (2020b) Energy dissipation and hydraulics of flow over trapezoidal–triangular labyrinth weirs Water 12:1992

Ghasemzadeh F, Parsa B, Noury M Numerical study of overflow capacity of spillways (with an emphasis on PK-weirs). In: E-proceedings of the 36th IAHR World Congress, Hague, The Netherlands, 2015.

Ghosh MK, Kumar G, Sen D Local scour characteristics downstream of diversion barrages. In: Proceedings of the Institution of Civil Engineers-Water Management, 2009. vol 5. Thomas Telford Ltd, pp 309-319

Goel A (2009) Estimation of Scour Downstream of Spillways using Artificial Neural Networks Journal of the Institution of Engineers India Civil Engineering Division 90:14-18

Grass AJ (1971) Structural features of turbulent flow over smooth and rough boundaries Journal of Fluid Mechanics 50:233-255

Guo X, Liu Z, Wang T, Fu H, Li J, Xia Q, Guo Y (2019) Discharge capacity evaluation and hydraulic design of a piano key weir Water Supply 19:871-878

Gupta S, Deshpande R (2004) Water for India in 2050: first-order assessment of available options Current science:1216-1224

Haun S, Olsen NRB, Feurich R (2011) Numerical modeling of flow over trapezoidal broad-crested weir Engineering Applications of Computational Fluid Mechanics 5:397-405

Herbst J, Gebhardt M, Merkel J, Belzner F, Thorenz C (2018) Sediment transport over labyrinth weirs

Ho Ta Khanh M (2012) Utilization of Piano Key Weirs for low barrages Hydro 2012

Hu H, Qian Z, Yang W, Hou D, Du L (2018) Numerical study of characteristics and discharge capacity of piano key weirs Flow Measurement and Instrumentation 62:27-

Jamieson E, Rennie C, Jacobson R, Townsend R (2011) 3-D flow and scour near a submerged wing dike: ADCP measurements on the Missouri River Water Resources Research 47

Javaheri A, Kabiri-Samani A (2012) Threshold submergence of flow over PK weirs Int J of Civil and Geological Eng 6:46-49

Jayatillake H, Perera K (2013) Design of a Piano-Key Weir for Giritale Dam spillway in Sri Lanka Labyrinth and Piano Key Weirs II:151

Johnson H (1936) The New York State flood of July 1935. US Government Printing Office,

Jüstrich S, Pfister M, Schleiss AJ (2016) Mobile riverbed scour downstream of a Piano Key weir Journal of Hydraulic Engineering 142:04016043

Kabiri-Samani A, Javaheri A (2012) Discharge coefficients for free and submerged flow over Piano Key weirs Journal of Hydraulic Research 50:114-120

Karamvand A, Hajikandi H, Sharafati A (2020) Comparison of Discharge Coefficient Between Arced Piano Key Weir and Non-Arc Piano Key Weirs

Karimi M, Attari J, Saneie M, Ghazizadeh MJ (2017) Experimental study of discharge coefficient of a piano key side weir. In: Labyrinth and Piano Key Weirs III–PKW 2017. CRC Press, pp 109-116

Karimi M, Attari J, Saneie M, Jalili Ghazizadeh MR (2018) Side weir flow characteristics: comparison of piano key, labyrinth, and linear types Journal of Hydraulic Engineering 144:04018075

Karimpour F, Venayagamoorthy S (2014) A simple turbulence model for stably stratified wall-bounded flows Journal of Geophysical Research: Oceans 119:870-880

Karimpour F, Venayagamoorthy SK (2013) Some insights for the prediction of near-wall turbulence Journal of Fluid Mechanics 723:126-139

Karimpour F, Venayagamoorthy SK (2015) On turbulent mixing in stably stratified wall-bounded flows *Physics of Fluids* 27:046603

Keshari AK (2000) Optimal allocation of water withdrawals in river basin *Journal of Water Resources Planning and Management* 126:37-38

Keshari AK Groundwater Quality Modeling: A Retrospect. In: Proceedings of 2nd International Conference on Water Quality Management, Organised by CBIP and INCOLD, 2003.

Khanh HT (2004) M., Hien, TC and Quat, DS (2012) Research and development of PK Weirs in Vietnam since:91-96

Khanh MHT (2013) The Piano Key Weirs: 15 years of Research & Development–Prospect Labyrinth and piano key weirs II:3

Khanh MHT (2017) History and development of Piano Key Weirs in Vietnam from 2004 to 2016. In: Labyrinth and piano key weirs III–PKW 2017. CRC Press, pp 3-16

Khassaf SI, Al-Baghdadi MB (2015) Experimental study of non-rectangular piano key weir discharge coefficient *International Journal of Energy and Environment* 6:425

Khassaf SI, Al-Baghdadi MBN (2018) Experimental investigation of submerged flow over piano key weir *International Journal of Energy and Environment* 9:249-260

Khassaf SI, Aziz LJ, Elkatib ZA (2016) Hydraulic behavior of piano key weir type B under free flow conditions *Int J Sci Technol Res* 5:158-163

Kumar B, Ahmad Z (2020) Experimental study on scour downstream of a piano key weir with nose

Kumar B, Kadia S, Ahmad Z (2019) Evaluation of discharge equations of the Piano Key Weirs *Flow Measurement and Instrumentation* 68:101577

Kumar B, Kadia S, Ahmad Z (2021a) Discharge Characteristics of Piano Key Weirs with and Without Upstream Siltation *International Journal of Civil Engineering*:1-12

Kumar B, Kadia S, Ahmad Z (2021b) Sediment Movement over Type A Piano Key Weirs Journal of Irrigation and Drainage Engineering 147:04021018

Kumar B, Rao AR (2010) Metamodeling approach to predict friction factor of alluvial channel Computers and electronics in agriculture 70:144-150

Kumar R, Singh R, Sharma K (2005) Water resources of India Current science:794-811

Kwon H-H, Moon Y-I (2006) Improvement of overtopping risk evaluations using probabilistic concepts for existing dams Stochastic Environmental Research and Risk Assessment 20:223-237

Laugier F (2007) Design and construction of the first Piano Key Weir spillway at Goulours dam INTERNATIONAL JOURNAL ON HYDROPOWER AND DAMS 14:94

Laugier F, Lochu A, Gille C, Leite Ribeiro M, Boillat J-L (2009) Design and construction of a labyrinth PKW spillway at Saint-Marc dam, France Hydropower & Dams 16:100-107

Laugier F, Pralong J, Blancher B Influence of structural thickness of sidewalls on PKW spillway discharge capacity. In: Proc. Intl Workshop on Labyrinths and Piano Key Weirs PKW 2011, 2011. pp 159-165

Le Blanc M, Spinazzola U, Kocahan H (2011) Labyrinth fusegate applications on free overflow spillways—Overview of recent projects Labyrinth and Piano Key Weirs 261-268

Leite Ribeiro M, Bieri M, Boillat J-L, Schleiss A, Delorme F, Laugier F Hydraulic capacity improvement of existing spillways—design of a piano key weirs. In: Proceedings (on CD) of the 23rd Congress of the Int. Commission on Large Dams CIGB-ICOLD, 2009. vol EPFL-CONF-148541. pp 100-118

Leite Ribeiro M, Bieri M, Boillat J-L, Schleiss A, Singhal G, Sharma N (2011) Discharge capacity of piano key weirs *Journal of Hydraulic Engineering* 138:199-203

Lempérière F, Ouamane A (2003) The Piano Keys weir: a new cost-effective solution for spillways *International Journal on Hydropower & Dams* 10:144-149

Lempérière F, Vigny J (2011) General comments on labyrinth and Piano Keys Weirs–The future Labyrinth and piano key weirs–PKW 2011:289-294

Lempérière F, Vigny J, Ouamane A General comments on Labyrinth and Piano Key Weirs: The past and present. In: proceedings of the International Conference Labyrinth and Piano Key Weirs, 2011. pp 17-24

Lewin J, Ballard G, Bowles DS (2003) Spillway gate reliability in the context of overall dam failure risk USSD Annual Lecture, Charleston, South Carolina

Lodomez M, Pirotton M, Dewals B, Archambeau P, Erpicum S (2017) Could piano key weirs be subject to nappe oscillations? In: *Labyrinth and piano key weirs III–PKW 2017*. CRC Press, pp 135-144

Machiels O, Erpicum S, Archambeau P, Dewals B, Pirotton M Large scale experimental study of piano key weirs. In: *Proc. 33rd IAHR Congress: Water Engineering for a Sustainable Environment*, 2009. IAHR, pp 1030-1037

Machiels O, Erpicum S, Archambeau P, Dewals B, Pirotton M Piano Key Weir preliminary design method–Application to a new dam project. In: *Proc. Int. Conf. Labyrinth and Piano Key Weirs Liège B*, 2011a. pp 199-206

Machiels O, Erpicum S, Dewals B, Archambeau P, Pirotton M (2010) Piano Key Weirs: the experimental study of an efficient solution for rehabilitation *WIT Transactions on Ecology and the Environment* 133:95-106

Machiels O, Erpicum S, Dewals BJ, Archambeau P, Piroton M (2011b) Experimental observation of flow characteristics over a Piano Key Weir Journal of hydraulic research 49:359-366

Machiels O, Piroton M, Pierre A, Dewals B, Erpicum S (2014) Experimental parametric study and design of Piano Key Weirs Journal of hydraulic research 52:326-335

Maghsoodi R, Roozgar MS, Sarkardeh H, Azamathulla HM (2012) 3D-simulation of flow over submerged weirs International Journal of Modelling and Simulation 32:237-243

Mehboudi A, Attari J, Hosseini S (2016) Experimental study of discharge coefficient for trapezoidal piano key weirs Flow Measurement and Instrumentation 50:65-72

Mehboudi A, Attari J, Hosseini S (2017) Flow regimes over trapezoidal piano key weirs. In: Labyrinth and Piano Key Weirs III–PKW 2017. CRC Press, pp 65-73

Micovic Z, Hartford DN, Schaefer MG, Barker BL (2016) A non-traditional approach to the analysis of flood hazard for dams Stochastic environmental research and risk assessment 30:559-581

MISHRA K, SEN D (2011) Sedimentation behind barrages and oblique river flow International Association of Hydrological Sciences (IAHS) Publication 349:193e202

Mohammadpour R, Ghani AA, Azamathulla HM (2013) Estimation of dimension and time variation of local scour at short abutment International journal of river basin management 11:121-135

Monjezi R, Heidarnejad M, Masjedi A, Purmohammadi MH, Kamanbedast A (2018) Laboratory investigation of the discharge coefficient of flow in arced labyrinth weirs with triangular plans Flow Measurement and Instrumentation 64:64-70

Muslu Y (2001) Numerical analysis for lateral weir flow Journal of irrigation and drainage engineering 127:246-253

Najafzadeh M, Barani G-A, Azamathulla HM (2013) GMDH to predict scour depth around a pier in cohesive soils Applied ocean research 40:35-41

Najafzadeh M, Lim SY (2015) Application of improved neuro-fuzzy GMDH to predict scour depth at sluice gates Earth Science Informatics 8:187-196

Nhu V-H, Khosravi K, Cooper JR, Karimi M, Kisi O, Pham BT, Lyu Z (2020) Monthly suspended sediment load prediction using artificial intelligence: testing of a new random subspace method Hydrological Sciences Journal 65:2116-2127

Nosedá M, Stojnić I, Pfister M, Schleiss AJ (2019) Upstream erosion and sediment passage at piano key weirs Journal of Hydraulic Engineering 145:04019029

Noui A, Ouamane A Study of optimization of the Piano Key Weir. In: Proc Int Conf Labyrinth Piano Key Weirs-PKW2011, London: Taylor & Francis, 2011. pp 175-182

Novak P (2005) Developments in hydraulic engineering. CRC Press,

Novak P, Guinot V, Jeffrey A, Reeve DE (2010) Hydraulic modelling: An introduction: Principles, methods and applications. CRC Press,

Novak P, Moffat A, Nalluri C, Narayanan R (2007) Hydraulic structures. CRC Press,

Oertel M DISCHARGE COEFFICIENTS OF PIANO KEY WEIRS FROM EXPERIMENTAL AND NUMERICAL MODELS. In: E= proceedings of the 36th IAHR world congress, 2015.

Ouamane A Nine years of study of the Piano KeyWeir in the university laboratory of Biskra “lessons and reflections.”. In: Proc Int Conf Labyrinth Piano Key Weirs-PKW2011, London: Taylor & Francis, 2011. pp 51-58

Ouamane A, Debabeche M, Lempérière F, Vigny J (2017) Twenty years of research in Biskra University for Labyrinths and Piano Key Weirs and associated fuse plugs. In: Labyrinth and piano key weirs III–PKW 2017. CRC Press, pp 17-26

Ouamane A, Lempérière F Design of a new economic shape of weir. In: Proceedings of the International Symposium on Dams in the Societies of the 21st Century, 2006. pp 463-470

Pandey K, Abhash A, Tripathi RP, Dayal S (2019a) Flow-field Near Forty-Five Degree Dividing Open Channel

Pandey M, Azamathulla HM, Chaudhuri S, Pu JH, Pourshahbaz H (2020) Reduction of time-dependent scour around piers using collars Ocean Engineering 213:107692

Pandey M, Lam WH, Cui Y, Khan MA, Singh UK, Ahmad Z (2019b) Scour around spur dike in sand–gravel mixture bed Water 11:1417

Pandey M, Sharma P, Ahmad Z, Singh UK, Karna N (2018) Three-dimensional velocity measurements around bridge piers in gravel bed Marine Georesources & Geotechnology 36:663-676

Patev R, Putcha C (2005) Development of fault trees for risk assessment of dam gates and associated operating equipment International Journal of Modelling and Simulation 25:190-201

Paxson G, Tullis B, Hertel D (2013) Comparison of Piano Key Weirs with labyrinth and gated spillways: Hydraulics, cost, constructability and operations Labyrinth and Piano Key Weirs II:123-130

Pfister M, Schleiss AJ, Tullis B (2013) Effect of driftwood on hydraulic head of Piano Key weirs Labyrinth and Piano Key weirs II:255-264

Phillips M, Lesleighter E (2013) Piano Key Weir spillway: Upgrade option for a major dam Labyrinth and piano key weirs II 159

Pralong J et al. (2011) A naming convention for the piano key weirs geometrical parameters Labyrinth and piano key weirs:271-278

Pramanik N, Panda RK, Sen D (2010) Development of design flood hydrographs using probability density functions Hydrological processes 24:415-428

Pramanik N, Panda RK, Singh A (2011) Daily river flow forecasting using wavelet ANN hybrid models Journal of Hydroinformatics 13:49-63

Pu JH (2019) Turbulent rectangular compound open channel flow study using multi-zonal approach Environmental Fluid Mechanics 19:785-800

Pu JH, Pandey M, Hanmaiahgari PR (2020) Analytical modelling of sidewall turbulence effect on streamwise velocity profile using 2D approach: a comparison of rectangular and trapezoidal open channel flows Journal of Hydro-Environment Research 32:17-25

Ramanathan A, Bhattacharya P, Keshari A, Chandrasekharam D (2009) Assessment of groundwater resources and management. IK International Pvt Ltd,

Ribeiro M, Boillat J-L, Schleiss A, Laugier F, Albalat C (2007) Rehabilitation of St-Marc dam. Experimental optimization of a piano key weir Proc of the 32ndCongress of IAHR

Ribeiro ML, Pfister M, Schleiss AJ Overview of Piano Key weir prototypes and scientific model investigations. In: Proceedings of the 2nd International Workshop on Labyrinth and Piano Key Weirs, 2013. pp 273-281

Ribeiro ML, Pfister M, Schleiss AJ, Boillat J-L (2012) Hydraulic design of A-type piano key weirs Journal of Hydraulic Research 50:400-408

Ribi J-M, Spahni B, Dorthe D, Pfister M (2017) Piano Key Weir as overflow on sedimentation basin of wastewater treatment plant. In: Labyrinth and Piano Key Weirs III-PKW 2017. CRC Press, pp 175-184

Samal DR, Gedam SS (2013) Assessing the impact of land use change on stream flow in a semi-urban river basin, Maharashtra, India International Journal of Hydrology Science and Technology 3:351-363

Sarma B, Sarma AK, Mahanta C, Singh V (2015) Optimal ecological management practices for controlling sediment yield and peak discharge from hilly urban areas Journal of Hydrologic Engineering 20:04015005

Savage BM, Johnson MC (2001) Flow over ogee spillway: Physical and numerical model case study Journal of Hydraulic Engineering 127:640-649

Schleiss A From labyrinth to piano key weirs: A historical review. In: Proc. Int. Conf. Labyrinth and Piano Key Weirs Liège B, 2011. pp 3-15

Sen D (2010) Flood hazards in India and management strategies. In: Natural and Anthropogenic Disasters. Springer, pp 126-146

Sharma A, Kumar B (2016) Probability distribution of turbulence in curvilinear cross section mobile bed channel Water science and Technology 73:1472-1482

Sharma N, Tiwari H (2013) Experimental study on vertical velocity and submergence depth near Piano Key Weir Labyrinth and Piano Key Weirs II-PKW:93-100

Sharma N, Tiwari H, Singhal G (2012) Piano-key weir technology: a possible solution of Dam safety in narrow river and existing dams Dams and Spillways in Himalayan Regions

Shemshi R, Kabiri-Samani A Effect of piano-key shape inlet on critical submergence at a vertical pipe intake. In: IOP Conference Series: Earth and Environmental Science, 2012. vol 5. IOP Publishing, p 052029

Shukla S, Khire MV, Gedam SS Effects of urbanization on river basin ecosystem-A framework. In: Geoscience and Remote Sensing Symposium (IGARSS), 2013 IEEE International, 2013. IEEE, pp 3861-3863

Singh RK, Pandey M, Pu JH, Pasupuleti S, Villuri VGK (2020) Experimental study of clear-water contraction scour *Water Supply* 20:943-952

Sorensen RM (1985) Stepped spillway hydraulic model investigation *Journal of Hydraulic Engineering* 111:1461-1472

Suryawanshi R, Gedam S, Sankhua R (2012) Inflow forecasting for lakes using Artificial Neural Networks *WIT Transactions on Ecology and the Environment* 159:143-151

Tanchev L (2014) *Dams and appurtenant hydraulic structures*. CRC Press,

Thornton CI, Meneghetti AM, Collins K, Abt SR, Scurlock SM (2011) Stage-Discharge Relationships for U-, A-, and W-Weirs in Un-submerged Flow Conditions *JAWRA Journal of the American Water Resources Association* 47:169-178

Tiwari H, Sharma N (2016) Interaction between flow hydrodynamics and bed roughness in alluvial channel *ISH Journal of Hydraulic Engineering* 22:40-49

Tiwari H, Sharma N (2017a) Empirical and Mathematical Modeling of Head and Discharge Over Piano Key Weir. In: *Development of Water Resources in India*. Springer, pp 341-354

Tiwari H, Sharma N (2017b) Turbulence study in the vicinity of piano key weir: relevance, instrumentation, parameters and methods *Applied Water Science* 7:525-534

Tullis BP, Young J, Chandler M (2007) Head-discharge relationships for submerged labyrinth weirs *Journal of Hydraulic Engineering* 133:248-254

Ujeniya VD, Mehta KG (2015) Experimental Optimization of a Piano Key Weir for Rehabilitation of Wanakbori Dam *INCOLD Journal (A Half Yearly Technical Journal of Indian Committee on Large Dams)* 4:10-13

Valley P, Blancher B (2017) Construction and testing of two Piano Key Weirs at Charmines dam. In: Labyrinth and Piano Key Weirs III–PKW 2017. CRC Press, pp 237-244

Vermeulen J, Lassus C, Pinchard T (2017) Design of a Piano Key Weir aeration network. In: Labyrinth and piano key weirs III–PKW 2017. CRC Press, pp 127-133

Vermeulen J, Laugier F, Faramond L, Gille C (2011) Lessons learnt from design and construction of EDF first Piano Key Weirs Labyrinth and piano key weirs-PKW 2011:215-224

Villemonte JR (1947) Submerged weir discharge studies Engineering news record 139:54-56

Yu P, Tang H, Xiao Y, Fu H, Chen JM, Liang D Effects of a diversion dyke on river flow: a case study. In: Proceedings of the Institution of Civil Engineers-Water Management, 2015. vol 5. Thomas Telford Ltd, pp 210-219

A. Papers Published in Journals

1. **Amiya Abhash & K. K. Pandey (2020):** “A review of Piano Key Weir as a superior alternative for dam rehabilitation”, ISH Journal of Hydraulic Engineering, DOI:10.1080/09715010.2020.1767516.
2. **Abhash A, Pandey K (2021b):** “Numerical study of discharge-head relationship of piano key weirs for low heads” Water Resources 48:235-244, DOI:<https://doi.org/10.1134/S0097807821020020>
3. **Abhash A, Pandey K (2021a):** “Experimental and Numerical Study of Discharge Capacity and Sediment Profile Upstream of Piano Key Weirs with Different Plan Geometries” Water Resources Management 35:1529-1546, DOI:<https://doi.org/10.1007/s11269-021-02800-y>
4. **Abhash A, Pandey K, Tripathi RP (2021):** “Study of flow over piano key weir of different plan shapes with free and partially submerged outlet conditions” Water Supply, DOI:<https://doi.org/10.2166/ws.2021.086>

B. Book Chapter

1. **Abhash A, Pandey K (2018):** Non-Linear Regression Analysis between Discharge and Head for Piano Key Weirs with Increasing Developed Length (L/W) Ratio and Constant Channel Width Water Sci., Technol.Library, Vol. 107 Water Resources Management And Reservoir Operation, 978-3-030-79399-9, 492730_1_En (20) [IN PUBLICATION].

C. Papers Published in Conferences

1. **Abhash A, Pandey K (2018):** “Non-Linear Regression Analysis between Discharge and Head for Piano Key Weirs with Increasing Developed Length (L/W) Ratio and Constant Channel Width HYDRO International Conference

Paper Id 430 NIT Patna

2. **Amiya Abhash, Ravi Tripathi, Rahul Soni, K.K.Pandey (2019):** Numerical study of flow through Linear Weir Proceeding of Sustainable and Recent Innovation in Science and Engineering (SUNRISE-19) National Conference on Sustainable and Recent Innovation in Science and Technology S1917 ISBN No: - 978-93-5391-715-9 28-29

PERMISSIONS FOR REPRINT AND INCLUSION AS CHAPTER IN THESIS

1. ISH Journal of Hydraulic Engineering, TAYLOR & FRANCIS

Dear Mr Abhash,

IF the entire thesis is not going to be published online or offline then you may go ahead with inclusion of the said paper as a chapter of your thesis, as desired by you.

Best wishes,

--M C Deo

Chairman, Editorial Board, ISH Journal of Hydraulic Engineering, Taylor and Francis, UK (<http://www.tandf.co.uk/journals/tish>; CiteScore = 3.2 (Scopus); SNIP (Source Normalized Impact per Paper = 1.031; SCIMago Journal Rank (SJR) = 0.366); For manuscript submissions: <https://mc.manuscriptcentral.com/tish>

Professor M C Deo, Ph D; Department of Civil Engineering, Indian Institute of Technology Bombay, Powai, Mumbai 400076, India, <http://www.civil.iitb.ac.in/~mcdeo/>

2. WATER RESOURCES, SPRINGER

SPRINGER NATURE LICENSE

TERMS AND CONDITIONS

Jul 01, 2021

This Agreement between IIT (BHU), VARANASI -- AMIYA ABHASH ("You") and Springer Nature ("Springer Nature") consists of your license details and the terms and conditions provided by Springer Nature and Copyright Clearance Center.

License Number 5100000198593

License date Jul 01, 2021

Licensed Content Publisher Springer Nature

Licensed Content Publication	Water Resources
Licensed Content Title	Numerical Study of Discharge-Head Relationship of Piano Key Weirs for Low Heads
Licensed Content Author	Amiya Abhash et al
Licensed Content Date	Apr 4, 2021
Type of Use	Thesis/Dissertation
Requestor type	academic/university or research institute
Format	print and electronic
Portion	full article/chapter
Will you be translating?	no
Circulation/distribution	50000 or greater
Author of this Springer Nature content	yes
Title	Experimental and Numerical study of flow around Piano Key Weir
Institution name	IIT (BHU), VARANASI
Expected presentation date	Jul 2021

	IIT (BHU), VARANASI
	C/O Dr. K.KPandey
	Department of Civil Engineering
Requestor Location	IIT (BHU),VARANASI
	VARANASI, UTTAR PRADESH 221005
	India
	Attn: IIT (BHU), VARANASI
Total	0.0 SD

3. WATER RESOURCES AND MANAGEMENT, SPRINGER

WATER RESOURCES MANAGEMENT, SPRINGER
 SPRINGER NATURE LICENSE
 TERMS AND CONDITIONS
 Jun 28, 2021

This Agreement between IIT (BHU), VARANASI -- AMIYA ABHASH ("You") and Springer Nature ("Springer Nature") consists of your license details and the terms and conditions provided by Springer Nature and Copyright Clearance Center.

License Number 5097620161833

License date Jun 28, 2021

Licensed Content
 Publisher Springer Nature

Licensed Content
 Publication Water Resources Management

Experimental and Numerical Study of Discharge Capacity and

Licensed Content Title Sediment Profile Upstream of Piano Key Weirs with Different Plan Geometries

Licensed Content

Amiya Abhash et al

Author

Licensed Content Date Mar 21, 2021

Type of Use Thesis/Dissertation

Requestor type academic/university or research institute

Format print and electronic

Portion full article/chapter

Will you be translating? no

Circulation/distribution 50000 or greater

Author of this Springer yes

Nature content

Title Experimental and Numerical study of flow around Piano Key Weir

Institution name IIT (BHU), VARANASI

Expected presentation

Jul 2021

date

IIT (BHU), VARANASI

C/O Dr. K.KPandey

Department of Civil Engineering

Requestor Location IIT (BHU), VARANASI

VARANASI, UTTAR PRADESH 221005

India

Attn: IIT (BHU), VARANASI

Total 0.00 USD

4. WATER SUPPLY, IWA PUBLISHING

Emma Buckingham <ebuckingham@iwap.co.uk> Tue, Jun 8, 2021 at 3:16 PM
To: "amiyaa.rs.civ16@itbhu.ac.in" <amiyaa.rs.civ16@itbhu.ac.in>
Cc: Journal Production <journalproduction@iwap.co.uk>, Natasha Healy <nhealy@iwap.co.uk>

Dear Amiya,

Thank you for your email. Your paper was published Open Access under the terms of the Creative Commons Attribution Licence (CC BY 4.0), which permits copying, adaptation and redistribution, provided the original work is properly cited (<http://creativecommons.org/licenses/by/4.0/>). This means that you do not need to seek our permission to include it in your thesis.

Kind regards,

Emma

Emma Buckingham
[Quoted text hidden]

2 attachments



image001.gif
582K



image001.gif
582K
