

Eduard Egusquiza

PhD in Mechanical Engineering

Full Professor, Universitat Politècnica Catalunya UPC since 1988

Center Industrial Diagnostics

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- Chair of the Committee "Hydraulic Machinery and Systems" of the "International Association of Hydro-environment Engineering and Research" IAHR
- Director of the Center for Industrial Diagnostics (CDIF)
- Director of the PhD program "Mechanical Engineering, Fluids and Aeronautics" UPC
- Director of the chair "Cátedra JG"
- Member of the Technical Committee "Rotordynamics" of IFToMM (International Federation of Mechanism and Machine Science)
- Member of the Committee TC-10 Technical Diagnostics of IMEKO

Research interests

- Dynamic behavior of hydraulic machinery: Unsteady flows, rotor-stator interaction in high head turbines, cavitation.
- Flow induced vibration, fluid-structure interaction problems.
- Dynamic behavior of submerged structures
- Diagnosis of large hydraulic machinery using vibration analysis.
- Advanced monitoring systems

In brief

More than 50 papers in indexed journals

Several publications of conference proceedings

Visiting professor at the UMIST Manchester, NTNU Trondheim, EPFL Lausanne.

Supervisor of several PhD students

Director of several research projects

Last Activities (2011-2017)

Research projects

- "HYPERBOLE" Hydropower Plant Performance and Flexible Operation towards Lean integration of New Renewable Energies" European project 608532 FP7-Energy-2013-2017
- "Dynamic response of a pump-turbine impeller in operation. Phase-I". VOITH HYDRO (Germany) (2009-2013)
- "Dynamic response of a pump-turbine impeller in operation. Phase-II". VOITH HYDRO (Germany) (2013-2016)
- HYDRODYNA "Harnessing the dynamic behavior of hydro-turbines, storage pumps and pump-turbines" European project EUREKA E!4150 HYDRODYNA Phase II.
- "Influence of the blade vorticity on the response of pump-turbine runners" DPI2012-36264. Spanish Ministry of Science (2012-2015)
- "*Fluid-structure interaction in the dynamic response of hydraulic turbine runners*" project: DPI-2009-12287. Spanish Ministry of Science (2009-

2012)

Selected Publications in indexed journals (from 2011)

1. Alexandre Presas, David Valentín, Mònica Egusquiza, Carme Valero, Eduard Egusquiza Sensors-based optimized control of the full load instability in Large Hydraulic Turbines. *Sensors* (2018)
2. Carme Valero, Mònica Egusquiza, Eduard Egusquiza, Alexandre Presas, David Valentin and Matias Bossio. "Extension of Operating Range in Pump-Turbines. Influence of Head and Load". *Energies* **2017**, 10, 2178; doi:10.3390/en10122178
3. Mònica Egusquiza, Eduard Egusquiza, Carme Valero, Alex Presas, David Valentín, Matias Bossio "Advanced condition monitoring of Pelton turbines" *Measurement* Volume 119, April 2018, Pages 46-55.
4. David Valentín, Alexandre Presas, Matias Bossio, Mònica Egusquiza, Eduard Egusquiza and Carme Valero. "Feasibility of Detecting Natural Frequencies of Hydraulic Turbines While in Operation, Using Strain Gauges. *Sensors* 2018, 18, 174; doi:10.3390/s18010174
5. David Valentín, Alexandre Presas, Eduard Egusquiza, Carme Valero, Mònica Egusquiza and Matias Bossio. "Power Swing Generated in Francis Turbines by Part Load and Overload Instabilities". *Energies* 2017, 10, 2124; doi:10.3390/en10122124
6. Mònica Egusquiza, Eduard Egusquiza, David Valentín, Carme Valero, Alex Presas "Failure investigation of a Pelton turbine runner" *Engineering Failure Analysis* 81 (2017) 234-244
7. Matias Bossio, David Valentín, Alexandre Presas, David Ramos Martin, Eduard Egusquiza, Carme Valero, Mònica Egusquiza "Numerical study on the influence of acoustic natural frequencies on the dynamic behaviour of submerged and confined disk-like structures" *Journal of Fluids and Structures*, 73 (2017) 53-69
8. Alexandre Presas, David Valentin, Eduard Egusquiza, Carme Valero, Mònica Egusquiza and Matias Bossio. "Accurate Determination of the Frequency Response Function of Submerged and Confined Structures by Using PZT-Patches". *Sensors* 2017 (Switzerland) 17 (3), 660
9. De La Torre, O., Escaler, X., Egusquiza, E., Farhat, M. "Experimental mode shape determination of a cantilevered hydrofoil under different flow conditions" *Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science* Volume 230, Issue 19, 1 December 2016, Pages 3408-3419
10. Valentin, D.; Presas, A.; Egusquiza, E.; Valero, M. On the Capability of Structural-Acoustical Fluid-Structure Interaction Simulations to Predict Natural Frequencies of Rotating Disklike Structures Submerged in a Heavy Fluid. *Journal of vibration and acoustics. Transactions of the ASME*. 138 - 3, pp. 034502-6. 01/06/2016.
11. Presas, A.; Valentin, D.; Egusquiza, E.; Valero, M.; Seidel, U. "Dynamic response of a rotating disk submerged and confined. Influence of the axial gap". *Journal of fluids and structures*. 62, pp. 332 - 349. 01/04/2016.
12. Egusquiza, E.; Valero, M.; Presas, A.; Huang, X.; Guardo, A.; Seidel, U. "Analysis of the dynamic response of pump-turbine impellers. Influence of the rotor". *Mechanical systems and signal processing*. 68-69, pp. 330 - 341, 2016.
13. Fernandez, U.; Velte, C.; Rethore, P.; Sorensen, N.; Egusquiza, E. "Testing of self-similarity and helical symmetry in vortex generator flow simulations". *Wind energy*. *Wind Energy* 2016; 19 (6), pp. 1043-1052.
14. de la Torre, O.; Escaler, X.; Egusquiza, E.; Farhat, M. Experimental mode shape determination of a cantilevered hydrofoil under different flow conditions. *Proceedings of the Institution of Mechanical Engineers, Part C: Journal of mechanical engineering science*. 22/10/2015
15. Presas, A.; Valentin, D.; Egusquiza, E.; Valero, M.; Seidel, U. On the detection of

- natural frequencies and mode shapes of submerged rotating disk-like structures from the casing. *Mechanical systems and signal processing*. 60-61, pp. 547 - 570. 08/2015.
16. Parra, J.; Guardo, A.; Egusquiza, E.; Alavedra, P. Thermal performance of ventilated double skin façades with Venetian blinds. *Energies*. 8, pp. 4882 - 4898. 27/05/2015.
 17. Alvarez, J.A.; Egusquiza, E. Analysis of damage caused by siloxanes in stationary reciprocating internal combustion engines operating with landfill gas. *Engineering failure analysis*. 50, pp. 29 - 38. Elsevier, 04/02/2015.
 18. Egusquiza, E.; Valero, M.; Valentin, D.; Presas, A.; Rodriguez, C. Condition monitoring of pump-turbines. *New challenges. Measurement*. 67, pp. 151 - 163. 05/2015.
 19. A. Presas, D. Valentin, E. Egusquiza, C. Valero, U. Seidel. On the detection of natural frequencies and mode shapes of submerged rotating disk-like structures from the casing. *Mechanical Systems and Signal Processing*. Accepted. 2015
 20. Valentin, D.; Presas, A.; Egusquiza, E.; Valero, M. Experimental study on the added mass and damping of a disk submerged in a partially fluid-filled tank with small radial confinement. *Journal of fluids and structures*. 50, pp. 1 - 17. 16/07/2014
 21. Presas, A., Egusquiza, E., Valero, C., Valentin, D., Seidel, U. Feasibility of using PZT actuators to study the dynamic behavior of a rotating disk due to rotor-stator interaction (2014) *Sensors (Switzerland)*, 14 (7), pp. 11919-11942.
 22. O. De La Torre, X. Escaler, E. Egusquiza, M. Farhat "Numerical and experimental study of a nearby solid boundary and partial submergence effects on hydrofoil added mass" *Computers&Fluids*, Volume 91, 5 March 2014, Pages 1-9
 23. D. Valentin, A. Guardo, E. Egusquiza, C. Valero, P. Alavedra Assessment of the economic and environmental impact of double glazed façades ventilation systems. *Energies* 2013, 6, 5069-5087
 24. C. Rodriguez, B. Mateos, E. Egusquiza "Monitoring of rotor-stator Interaction in pump-turbine using vibrations measured with on-board sensors rotating with shaft" *Shock and vibration* (2014)
 25. D. Valentin, E. Egusquiza, A. Guardo, C. Valero, P. Alavedra. "Use of Coanda Nozzles for Double Glazed Façades Forced Ventilation" *Energy and buildings*, 62 (2013) 605-614
 26. De La Torre, O.; Escaler, X.; Egusquiza, E; Farhat, M "Experimental investigation of added mass effects on a hydrofoil under cavitation conditions" *FLUIDS & STRUCTURES* 2012
 27. X. Huang; C. Valero, E. Egusquiza, A. Presas, A. Guardo "Numerical and experimental analysis of the dynamic response of large submerged trash-racks" *Computers&Fluids*
 28. C. G. Rodriguez; P Flores; F G Pierart; L R Contzen; E Egusquiza "Capability of structural-acoustical FSI numerical model to predict natural frequencies of submerged structures with nearby rigid surfaces" *Computers&Fluids* 64 (2012) 117-126
 29. E. Egusquiza, C. Valero, X. Huang, E. Jou, A. Guardo, C. Rodriguez "Failure investigation of a large pump-turbine runner" *engineering failure analysis*. 23 (2012) 27-34
 30. Xavier Escaler, Oscar de la Torre, Eduard Egusquiza Title: "Analysis of chatter marks damage on the Yankee dryer surface of a tissue machine" *Engineering failure analysis*. 23-, 44-54. Elsevier, 2012
 31. Egusquiza, E; Valero, C; Estevez, A; Guardo, A "Failures due to ingested bodies in hydraulic turbines" *Engineering failure analysis*. 18 - 1, pp. 464 - 473. Elsevier, 2011

Other publications in Conference Proceedings

40 publications in proceedings of International Congresses and Conferences

Press publications

- "All hands to the pump (Pump-turbines, renewables and dynamics)" Hydrolink 2-2013
- "All hands to the pump" Public Service Review: European Union (issue 22), September 2011
- "10 Question to Professor Eduard Egusquiza" Hydrolink 2011

INDUSTRIAL ACTIVITIES

Industrial Projects

- On-line remote monitoring for pump-turbine units. Endesa-Enel (1999-2018).
- Vibration Diagnostics and Predictive Maintenance of all 300 hydropower plants of Endesa-Enel (Spain) ((1999-2018)
- On-line monitoring Pump-turbines Eon Company (from 2014)
- Trash-rack analysis and design. Iberdrola (2009-2012)
- Simulation and diagnostic services for Agbar, Endesa thermal power plants, Roca radiadores, Mediclinics,...

OTHER ACTIVITIES

Academic awards.

- Hector teaching Award 2014-15. Karlsruhe Institute of Technology (Germany)
- "Best Teaching Performance in Energy Engineering & Management" Master course
- "Award for the Best Scientific Paper & Presentation" for "Advanced Condition Monitoring of Pelton Turbines" IMEKO TC10 Conference Technical Diagnostics in the Cyber-Physical Era Budapest 5,6 June 2017

Invited lectures

- University of Tsinghua (China) 2012; University of Xi'an 2012; IAHR Symposium 2012 Beijing(China); IAHR workshop 2013 Lausanne (Switzerland); Amazing cavitation bubbles Royal Society Meeting 2014 (UK); Invited lecture 2013 Universidad de Santiago (Chile)
- Member of the Scientific/Technical Committee in several International conferences

Expert activities

- Consultant for several companies (Endesa Generación, Iberdrola, Voith,..)

Reviewer in the journals

- Int. Journal of Hydraulic Research, Journal of Fluids Engineering ASME, Computers and Fluids, Engineering Failure Analysis, Mechanical Systems and Signal Processing, Journal of Fluids and Structures, Industrial & Engineering Chemistry Research, Journal of the International Measurement Confederation IMEKO, Int. Journal of Rotating machinery, Intern. Journal on Hydraulic Machinery and Systems, Engineering Computations, Proceedings Institution of Mechanical Engineers, International Journal for Numerical Methods in Fluids, Journal of Shock and Vibration, NSERC Engineering Research Council of Canada,...

A handwritten signature in blue ink, which appears to be 'Eduard Egusquiza', is written on a light-colored background.

Eduard Egusquiza
Barcelona, March 27, 2018