

Mechatronics Faculty Scientific Seminar
20.11 (Wednesday), 10:30 in Seminar Centre (room 14)

Title: Influence of frequency change during sandstone erosion by pulsed waterjet

Abstract:

Pulsating water jet technology for rock erosion application has been emphasized in this study. The erosion phenomena are explored as an eroded depth, eroded width and volume eroded of the sandstone at frequency $f = 20,000\text{--}40,000$ Hz by using pulsed water jet. The surface was eroded at pressure 20–40 MPa; standoff distance 20 mm; nozzle diameter 1.6 mm; and feed rate of the jet 125–200 mm/s. The eroded depth, eroded width, and volume of the eroded sections were evaluated through non-contact-type optical profilometer. The result shows the relationship between feed rate of the jet, pressure, and standoff distance, which affects the erosion depth and width and volume removal. At $f = 40,000$ Hz, the maximum value of erosion depth, width, and volume removal was obtained. The microstructural analysis Field Emission Scanning Electron Microscopy (FESEM) examined the erosion topography, plastic deformation, and failure analysis at a frequency $f = 20,000\text{--}40,000$ Hz. The results reveal that the frequency change affects erosion, and failure was observed at 40,000 Hz. This is the result of the deeper and narrow eroded surface caused by the enhanced number of impacts (200–320 impact per mm) and concentrated stream of a jet at 40,000 Hz.

Biography of the presenter

Somnath Chattopadhyaya has published 129 SCIE journal articles till date out of which 80 are of **Q1 and Q2** category. He has already guided 27 research scholars who were awarded PhD. His h-index is **28** (as per WoS core collection), **39** (as per Google Scholar). He is presently **Professor and Head of the Department of Mechanical Engineering of Indian Institute of Technology (Indian School Mines), Dhanbad, India.**



He is the member of the editorial board of the Advances in Science and Technology Research Journal under the patron of Polish Academy of Sciences. He is the member of the international advisory board of the interdisciplinary council of OPOLE University of Technology, Poland. He is the Steering Committee Member of the Heritage Network of Institutions of Indo-European higher Academic Institutions. He is also the member of international editorial board of Metrology & Hallmark journal under the patron of Polish Ministry of Sciences. He has **8 years** of industrial and **25 years** of teaching and research experience. He has received **best researcher Canara Bank award** from IIT(ISM) and few more awards from international conferences held in Europe.

WELCOME!

dr inż. Vibekananda Dutta & dr hab. inż. Michał Józwik