name of the unit:

DIVISION OF TURBINES AND COMPRESSORS

Institute of Turbomachinery, Lodz University of Technology

symbol:

I-12

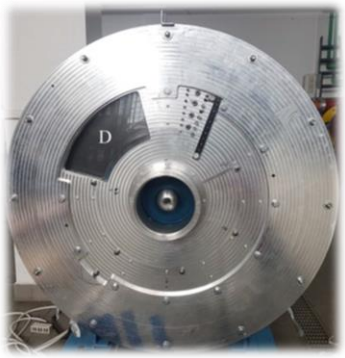
http://www.imp.p.lodz.pl

head of the unit:	potential promoters:	contact person
Prof. Władysław Kryłłowicz, PhD, DSc		Grzegorz Liśkiewicz, PhD phone: 48-42-631-23-70 grzegorz.liśkiewicz@p.lodz.pl

scope of activities:

The main fields of the team's research interests cover the following items:

- unsteady flow-phenomena in radial diffusers of centrifugal compressors;
- issues of aerodynamic instabilities in the stages of centrifugal compressors;
- fluid-structure interactions in turbo-compressors;
- revamp and retrofit of process centrifugal compressors;
- design of small steam turbines for decentralized power generation;
- problems of in-field applications of industrial turbomachinery;
- design projects of Organic Rankine Cycle (ORC) circuits and turbines.



present activities:

- Investigations of compressor surge at the dedicated test-rig.
- Investigations of rotating stall in vaneless radial diffuser (carried out at the specialized single-stage blower test-bench).
- Development of aerodynamic design methods of multi-stage centrifugal compressors.
- Investigations of forced-response of compressor impeller wheels to fluid-induced excitations at nominal and off-design conditions.
- Design and development of small steam turbines (up to 300 kW).

future activities:

Development of three currently existing centrifugal compressor test-rigs with focus on increase of their maximal rotational speeds and extension of measurement instrumentation's capabilities.

The portfolio of research groups was created as part of the Programme "STER" – Internationalisation of doctoral schools" as part of the realization of the project "Curriculum for advanced doctoral education & taining – CADET Academy of Lodz University of Technology".

publications/patents, awards, projects:

Publications:

- Liśkiewicz G, Kabałyk K. i inni: Experimental Analysis of Surge -Detection System based on Pressure Derivatives at Part – Speed Operation, J. Eng. Gas Turbines and Power, May 2021, Vol.143., 0511018
- Kryłłowicz W., Szewczyk W. i inni: A blower for high temperaturę fumes in a paper machine, Engineering Stuctures 196 (2019) 109279
- Kabalyk K., Jaeschke A. i inni: Structural response of a single-stage centrifugal compressor to fluid-induced excitations at low-flow operating condition: experimental and numerical study, Energies, 2021, (article in press)
- Grapow F., Olasek K. i inni: Experimental Study of Vaneless Diffuser Rotating Stall Development and Cell-Merging Phenomena, J. Turbomachinery, May 2021, Vol. 143, 051008

Research projects:

- Investigations of vaneless diffuser air injection for stability improvement and performance range extension of centrifugal compressors, Nr.0200 /DIA/ 2015/44
- Industrial centrifugal compressors: safety and efficiency, Nr Lider/447/L-6/14/NCBR/2015

keywords:

steam turbine, radial compressor, compressor surge, fluid-structure interaction

list of internship proposal in this research team:

- development of software for aerodynamic design and optimization of centrifugal compressors,
- experimental and numerical investigations of aero-instabilities in centrifugal compressors,
- development of methods for fatigue assessments in compressors' impellers via fluid-structure interaction modelling (FSI).