

STUDENTS' ANNUAL ACTIVITY REPORT

CYCLE 34 YEAR 2019

- Name and Surname **HADI DASTANI**
- Dottorato in **INGEGNERIA MECCANICA**
- Department **DIMEAS**
- Coordinator **Prof. Luca GOGLIO**
- Tutor **Prof. Daniele Botto**
- Macroarea

Structural mechanics
Contact mechanics
Dry friction
Modelling, Experimental validation

- Short description of research activity (maximum 20 lines)

During this year, experimental activities related to damping and contact stiffness calculations were the main part of research. Due to complexity of experimental procedure to find reliable results, the first step focused on proper test configuration. New method has been developed by using shaker for excitation of blade without direct contact between shaker tip and the blade. It has several advantages such as flexibility of changing applied loads, decrease damping effects of loading, stability of results. During experimental procedure, variation of frequencies and damping calculations has been investigated by using both acceleration measurements and velocity measurement by laser. Having in hand the experimental results pace the way for further analysis for what happens in contact area of blade root and disk. Different axial loads has been applied on test machine to trace the desired values in different working conditions. Alongside the experimental activities, numerical investigations has been performed. The model of blade with related attachments has been analysed using ANSYS software to get the variation of frequencies in different states, i.e. in free/free conditions and in the presence of different axial loads. Furthermore, reduction technique is used for models to reduce the time of calculation with focusing on contact area between root blade and disk. Friction modelling by Jenkin elements in the mass/spring system with single degree of freedom and two degree of freedom has been developed by MATLAB software in order to extend their application in our system of blade and disk to trace what happens in the contact area. In fact, in further steps, development a reliable contact model will be investigated using both experimental and numerical analysis that can be useful in real design of joints in structures.

- Training activities carried out during the year (courses, seminars, etc.); for each activity specify the nature, duration, and location

➤ Shell 3D models for composite structures	8 hours, hard skill, Polito
➤ Intercultural & interpersonal management	8 hours, soft skill, Polito
➤ Navigating the hiring process: CV, tests, interview	2 hours, soft skill, Polito
➤ Project management	5 hours, soft skill, Polito
➤ Public speaking	5 hours, soft skill, Polito

- Possible participation in further research activities during the year (research projects and agreements)

- Possible participation in internal activities to support teaching during the year (specify on which courses, named as "subject expert")

- Stays at other research institutions during the year

- Collaborations with companies during the year

- List of accepted papers

Date,

Signature of Tutor

Signature of the Phd student

The Coordinator
