

Introduction

The Laboratory of Friction and Wear Technology (LTAD) deals with subjects related to friction and wear in mining, oil and gas industries. The LTAD has been active for more than ten years in the formation of human resources, in the development of research projects and technical services for the areas of exploitation, production and transportation of oil.

These activities are focused on the development of friction repair technologies, *in situ* measurement of mechanical properties, identification of wear mechanisms in very diverse operating conditions, development of test rigs and wear testing methodologies, always trying to reproduce field conditions.

The LTAD also collaborates with companies in the Triângulo Mineiro region, offering them technical support in the development of mechanical components, especially when selecting metallic materials and failure analysis.

The LTAD belongs to the Faculty of Mechanical Engineering at the Federal University of Uberlândia. It participates actively in the graduation program for mechanical and mechatronic engineering and in the post-graduation for mechanical engineering.

Research Areas

The main research areas are as follows:

1. Development of technology and equipment for friction repair of offshore structures and refineries;
2. Development of technology and equipment for the *in situ* evaluation of mechanical properties;
3. Evaluation of the tribological performance of materials applied in the oil and gas industry, helping in the selection of materials and in estimating their durability;
4. Simulation of processes in which hard particles interact with technical surfaces;
5. Erosion, corrosion and corrosion/erosion in the oil and gas sector;
6. Characterization and selection of metallic materials;
7. Failure analysis.

Personnel

The LTAD is composed of highly qualified professors, engineers and technicians in the following areas: instrumentation and process control, friction and wear, microstructure characterization and failure analyses. Also involved are graduation and pos-graduation students.

Partners

The LTAD has as principal partners companies of the mining and energy sectors, such as Petrobras and its suppliers. Financial support is also received from the main Brazilian funding agencies, such as: CNPq, Fapemig, Finep,

Cooperation Example



In situ measurement of mechanical properties on an oil pipeline

Testing Facilities

The infrastructure available at LTAD was the result of cooperation with industries through the development of research projects. Some of the available facilities are listed below:

1. Infrastructure for metallographic preparation;
2. High resolution scanning electron microscope equipped with EDS detector;
3. Microhardness testing systems;
4. Corrosion/erosion test flow loops, impingement jets, etc.;
5. Scales for weighting mass loss caused by different wear configurations;
6. Interferometer for surface characterization;
7. Equipment for testing scratch resistance behavior;
8. Support workshop and electronic development facilities;
9. Tribometers which are able to reproduce different field cases.

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Quality Control and Certification

The LTAD is certified by the Brazilian National Petroleum Agency – ANP to conduct R&D projects. Additionally, the LTAD has a quality control program which ensures its testing quality.



**FEDERAL UNIVERSITY OF UBERLÂNDIA
FACULTY OF MECHANICAL ENGINEERING**

**Laboratory of Friction and
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