

## WEAR RESISTANCE AND SURFACE ENGINEERING

This competency focuses on evaluating and improving the wear resistance of coated and treated surfaces through advanced testing and material characterisation. It investigates how microstructure, surface treatments, and coatings influence durability and performance under friction and wear conditions. The activity supports industry partners in extending the lifetime of tools, components, and surfaces in high-friction environments such as transport, manufacturing, and machining, strengthening applied RDI and materials innovation.



### ACHIEVEMENTS

- Published multiple peer-reviewed studies on DLC (diamond-like carbon) coatings and surface-hardening processes, including friction behaviour, adhesion performance, and hardness characterization
- DLC coating superlow friction mechanisms analysis (Széll, Fülöp, Horváth, Maros, IEEE 2025)
- Daimler-Benz adhesion testing on case-hardened and DLC-coated parts (Pócsik, Oláh, Réger, Horváth, 2025)
- Hardness characterization of aged and surface-treated 3D-printed maraging steel (Olesnyovicsné, Széll, Horváth, Maros, Réger, Materials 2025)



### INFRASTRUCTURE

- Ball-cratering tribometer (Calo-test)
- Micro-Hardness tester
- Macro-Hardness tester
- Scanning Electron Microscope (SEM)
- Optical microscopes
- Surface roughness tester
- Differential Scanning Calorimetry (DSC)



### REFERENCES

- Dual-training and RDI collaboration with Ferzol Lemezmezmunkáló Kft. on sheet-metal components where surface durability and coating performance are critical
- Industrial-practice collaboration with TE Connectivity Hungary (Tyco Electronics) and DewertOkin Kft. on precision components and mechanical actuators, addressing wear, friction, and surface quality for reliability