

## **Using optimization in new design of tribometer specimen clamping system**

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The article deals with the innovation of the clamping part of the tribometer, where the tested specimens are clamped. The new clamping system was designed in the CAD system CATIA V5. The advantages of the new clamping system are compared with the original clamping system of specimens on the tribometer type A30. The new clamping design is evaluated from technical, technological and marginally also from economic point of view. The new clamping design ensures easy handling and exchange of specimens. Easy handling is ensured by the conical collet, which is released by the fixation nut, and subsequently the specimen can be pulled out and replaced with a new one without disassembly the device.

The content of the article is also the strength analysis of the conical clamping collet and subsequent optimization. In the strength analysis, the conical collet is pushed into the conical cavity of the tribometer rotor by an outer fixation nut. The result is a numerical simulation of the new designed clamping system which will consist of the rotor, the conical collet, fixation nut and the tested specimen. The stress von Misses, deformations and reaction forces acting on the collet will be determined by the numerical analysis. Subsequent optimization consisting of defining the target function, boundary conditions and type of optimization will be found the minimum necessary fixation force which will be obtained from the fixation nut to ensure the transmission of torque to the clamped specimen without slip.

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