Workability is the property of materials describing the extent to which they can be deformed. This property depends on the type of material, forming temperature as well as the manner of application of strain causing loads. When the workability limit is reached, the material cracks and the workpiece undergoes failure. Therefore, it is vital to determine forming limit values, as this will enable the design of metal forming processes for metals and alloys without disrupting material cohesion. Currently, this is done by compression, tension or torsion tests. Nonetheless, the results obtained with these methods are reliable for forming cases that are characterized by stresses similar to those occurring in the test. For this reason, it is justified to develop new tests enabling accurate determination of forming limit for other cases of load conditions. One of such tests is a rotary compression method characterized by alternate application of compressive and tensile loads, which is typical of cross and skew rolling processes.

The research project will involve a series of theoretical analyses to investigate stresses and strains and specimens under rotary compression. The experiments will enable determination of the moment of workpiece failure during a new test. A comparison will be made between the numerical results and experimental findings to determine a forming limit value (damage function) using well-known ductile fracture criteria.