Existing composite fatigue tests relate essentially to uniaxial stress, and in particular to tension-compression. These are most often loads where the mean value is higher than zero, therefore the final analysis should take into account the influence of the mean value with the use of appropriate transformation methods.

As part of the project, we would like to carry out fatigue bending tests for composite materials. The most important aspects that will be undertaken are:

• Perform a double-sided bend that is placed under a certain mean tensile load.

• Analysis of a complex stress state in a composite material, i.e., by considering both normal and shear stresses.

The main scientific contributions of the project are: 1) Designing the bending fatigue test of rubber composites, which would enable testing of various types of composites, 2) A non-destructive optical method for detecting crack initiation in the matrix intermediate layers was developed and validated, 3) Selecting the correct damage parameter and the correct topology of the finite element model for forecasting the fatigue life of rubber composites, 4) Approval of the methodology of forecasting the fatigue life curves of rubber composites based on material data for the matrix and ropes.

The main computational research will be carried out at two universities in Slovenia. On the other hand, experimental research in Poland. As a result of the analyzes, an adapter for two-sided bending fatigue tests with the introduction of additional tensile force will be designed and manufactured. So far, such research has not been carried out because there is no such research stand.

As a result of experimental research carried out in Opole and numerical analyzes carried out in Ljubljana and Maribor, it will be possible to design durable belts used, for example, for conveyors. An additional effect of research, analyzes and cooperation will be the establishment of closer cooperation between two universities from different countries: the University of Ljubljana and the Opole University of Technology.