

Description for the general public

This project extends the range of methods used for experimental investigations of thin-walled cold-formed beams to optical measuring techniques (optical deformation analysis). This is a continuation of previous researches conducted in the Division of Strength of Materials and Structures at Poznan University of Technology.

The aim of the project is a global look at mechanics of thin-walled cold-formed beams using experimental methods. Measurements will not restrict to some points where strain gauges are glued or recording single parameters, e.g. load. The deformation and strains of the whole external surface of a beam will be recorded like in numerical methods that are based on Finite Element Method. In this way local and distorsional buckling that are characteristic of open, thin-walled beams can be exactly monitored and analysed.

New cross-sections that were not analysed before will be considered in this project.

Obtained experimental results will be compared with the results of finite element analyses (FEM, FSM) and some analytical formulas. Optical deformation analysis allows to make not only a quantitative comparison, i.e. comparing parameters (stresses or strains) in some points, but also qualitative one, i.e. the deformation and buckling mode of whole beams can be compared.

According to the authors' knowledge this is the first use of optical deformation analysis for analysing thin-walled cold-formed beams. Therefore this project popularize these modern measuring methods, validating and checking their usefulness to analysing such structural members.