

Numerical Analysis and Composite Band Repair of Pipeline Failures

Supervisor: Prof. Dr. János Égert, Department of Applied Mechanics

Co-supervisor: Dr. Balázs Pere, Department of Applied Mechanics

Short description: Oil and gas pipelines often have internal and external failures. The internal failures usually originate from welding on location, and the external failures result from any other violent external effect, for instance due to agricultural equipment working above the pipeline. The first task is to predict the risk caused by these circular failures. In the first step one needs to clarify the deformations, stresses and strains around the damaged part of the pipe. On the basis of such analysis one can find critical cases in which repairs are needed. The second task is to fix or to repair the damaged pipe. To repair the pipeline multilayered textile composite reinforcement can be applied at the location of the failures. The multilayered textile composite reinforcement is made by winding technology. During design of this composite reinforcement the width and the number of layers of the winding should be determined. The failures are considered to be fixed when stresses are below the critical values both in the steel pipe and in the composite reinforcement. The numerical aspects of both tasks should be discussed.