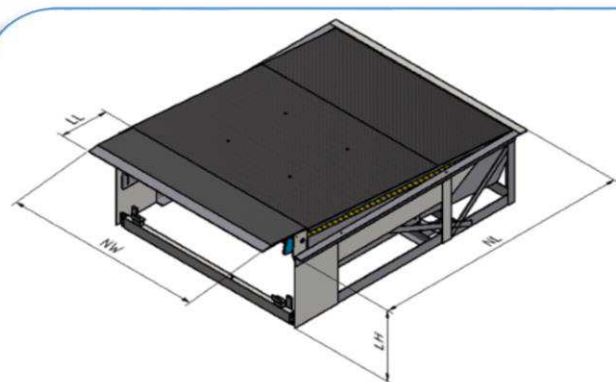


Redesign of Docking Swingdock Levers for Increasing Load Capacity in Resting Position

PhD Thesis

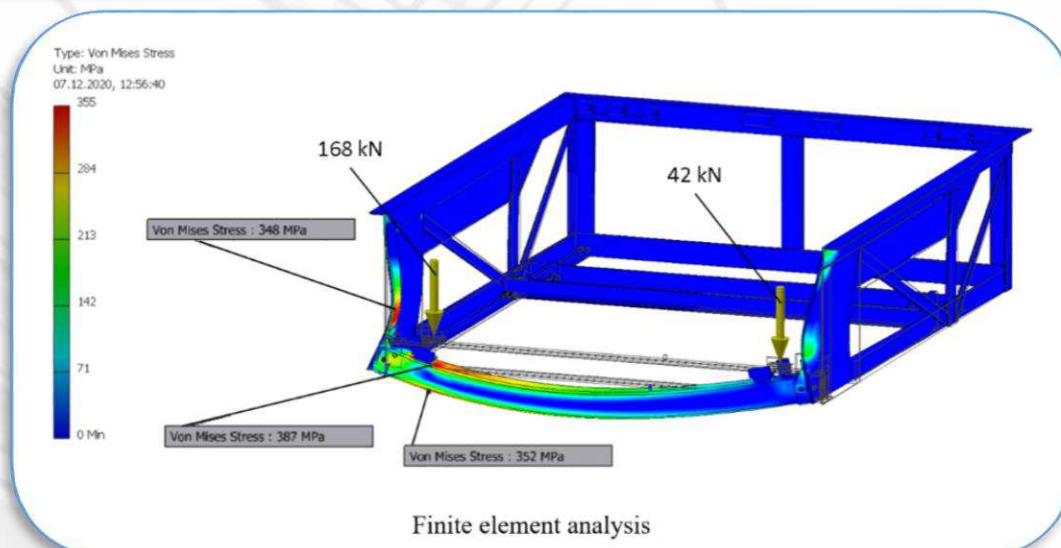
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The study presents a redesigning a Swingdock docking leveller, with a capacity of 100 kN, in order to increase the load capacity in the resting position. The need for this study resulted from a real problem, which occurs during the operation of the product, which consisted in the failure of the support element of the ramp assembly, a phenomenon that led to the destruction of the ramp and was a potential generator of dangerous accidents. In the study, we proposed a prototype for testing, modelled this prototype in 3D, performed an analysis using the finite element method in order to identify areas where stresses exceed allowable values, we redesigned the ensemble in critical areas and validated experimentally the proposed solution. Following the experiments, we concluded that the proposed solution is appropriate, the docking leveller assembly being able to support the mechanical stresses developed in critical areas as a result of imposed loads.



Dimensional parameters of the product

Load capacity: 100 kN
 Nominal length (NL): 2500 mm
 Nominal width (NW): 2000 mm
 Nominal height (LH): 700 mm
 Lip length (LL): 500 mm
 Frame type: W



Advantages:

- The solution resulting from the redesign can be implemented also on the products already installed in the field.
- After testing the prototype, it was found that there is a good correlation between the results obtained from the finite element analysis and the real behaviour of the prototype.
- The designed solution removes the shortcomings of the support profile fixing solution specified in the design theme but develops stresses over the material yield strength at the top of the side wall from the frame assembly.