Design of a roll-off container frame for Multilift system

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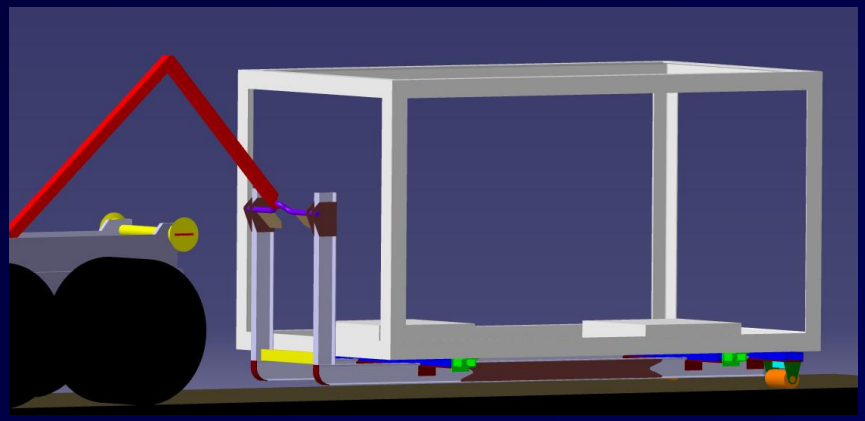
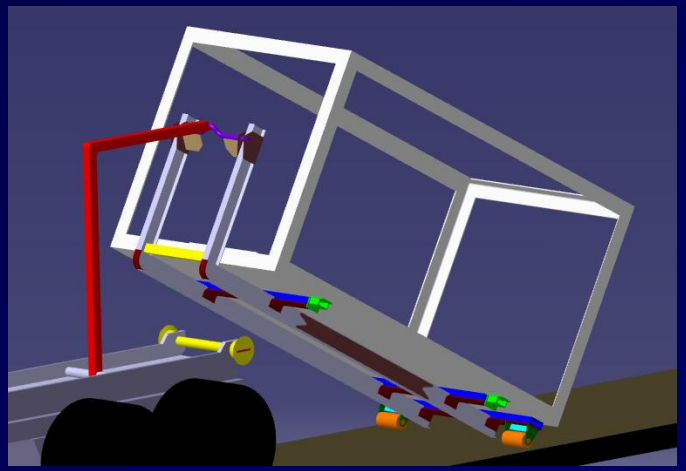
Introduction

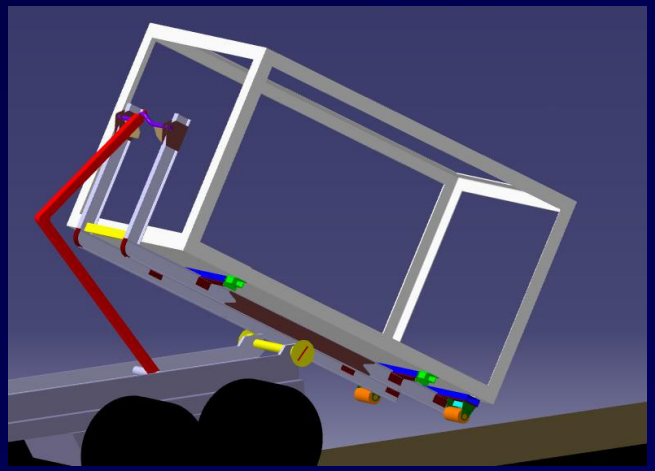
What is a roll-off container frame? What is the MULTILIFT system?

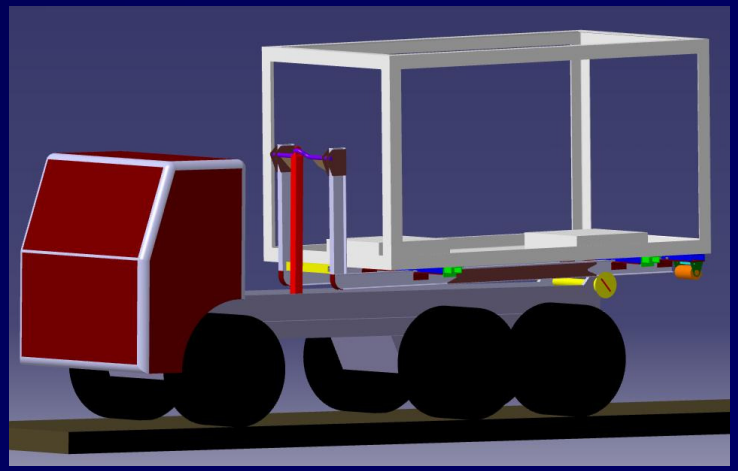
Introduction

How does it work?









Aims

- Design of a roll-off container frame that can carry a 15 feet container and an aggregate unit
- The roll-off container frame can be lifted, carried and put down by a truck with Multilift system

Reqiurements

- The frame must have proper strength and stiffness in all cases of loading procedure
- It can be put off to the ground with a fold of 200mm
- 3 or 4 adjustable level jack
- Fixing of the container according to the standard MSZ ISO 668
- Considering the instructions of the standard DIN 30722
- Maximum height with the container: 2670 mm
- Maximum total weight: 7762 kg, maximum weight of the container: 5403 kg, weight of the inductor aggregate: 1748 kg.
- There is no dynamic load during carrying

Design variables

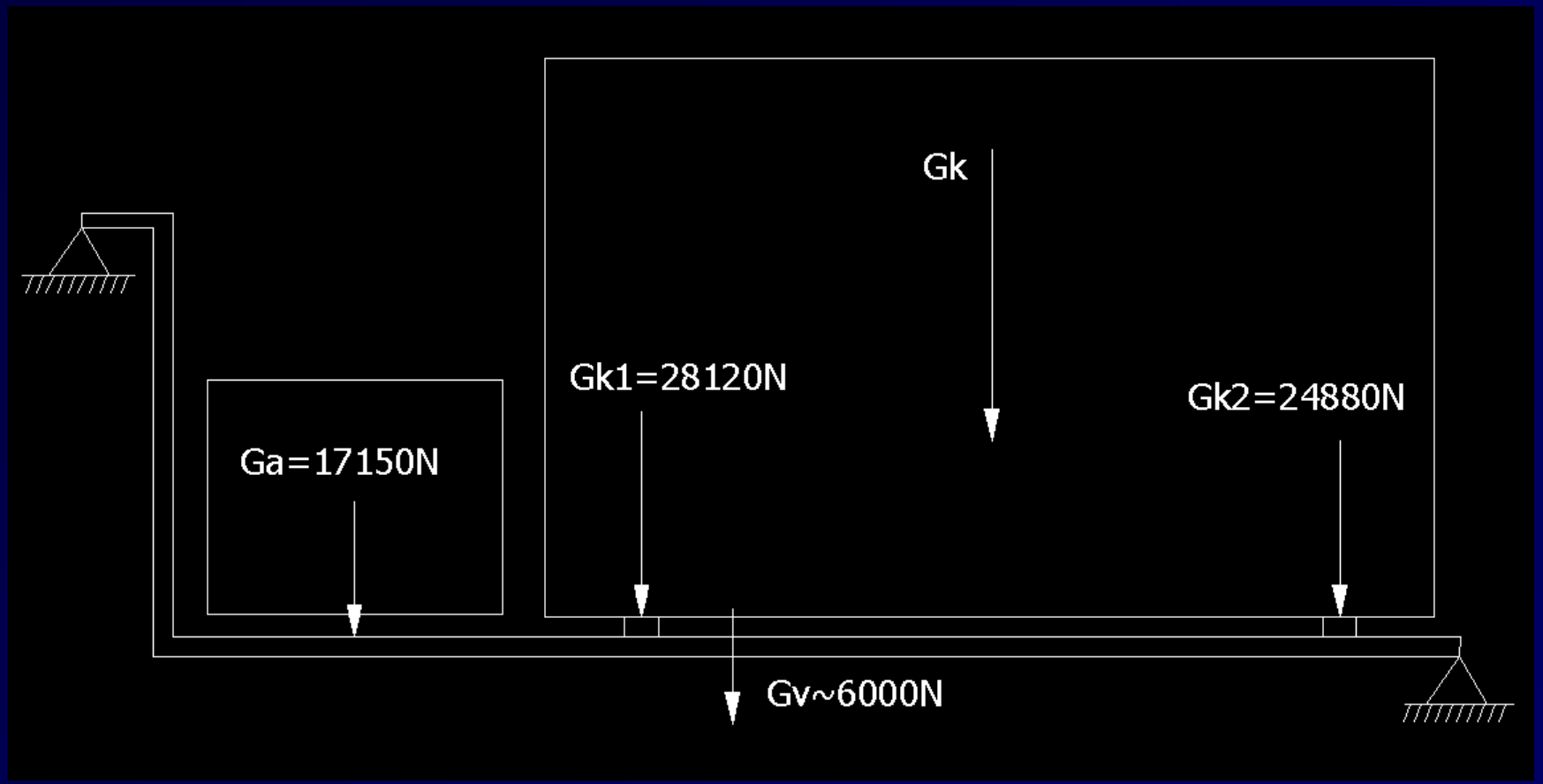
Constraints:

- - DIN30722 and MSZ ISO 668 standards
- - main sizes and connection sizes
- - Max. height: 2670mm

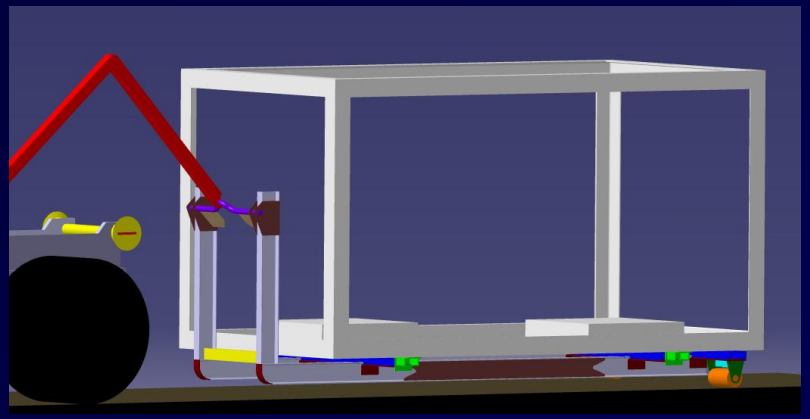
Variables:

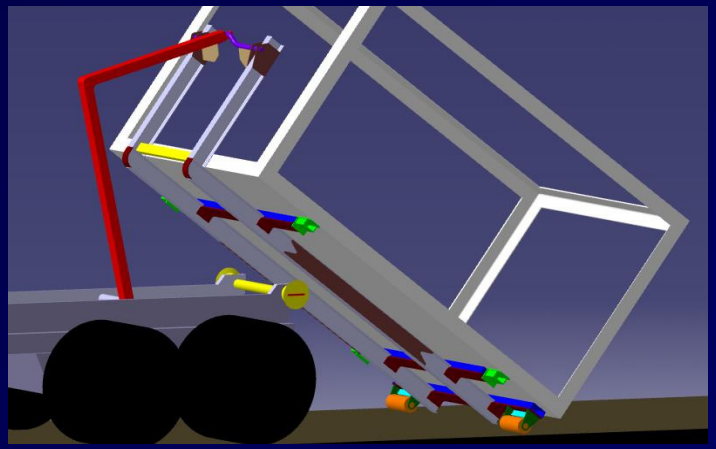
- - Section size of the main- and crossbeams
- - joint between them
- - fixing of the rollers and level jacks

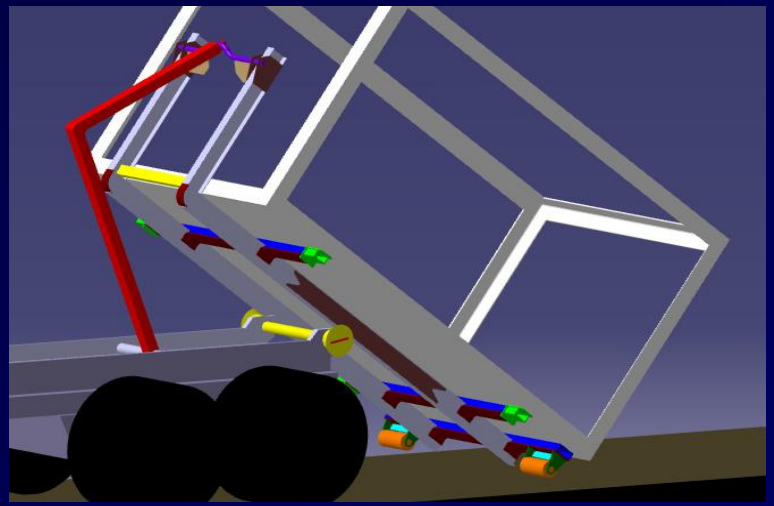
Model of the loads

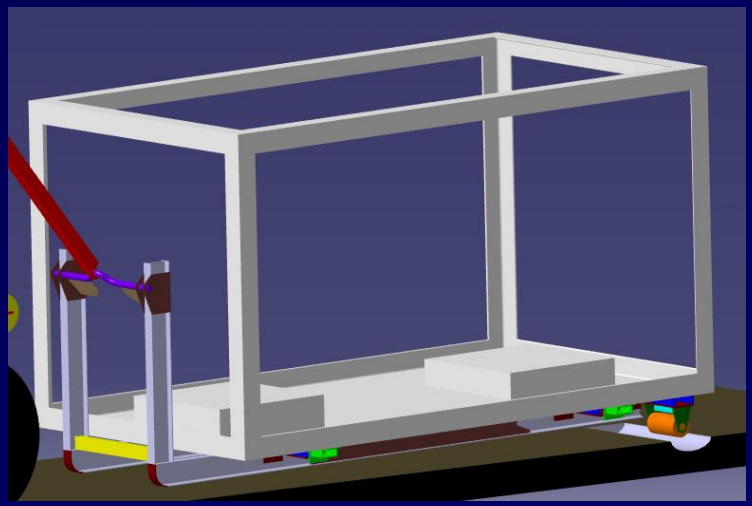


Load cases

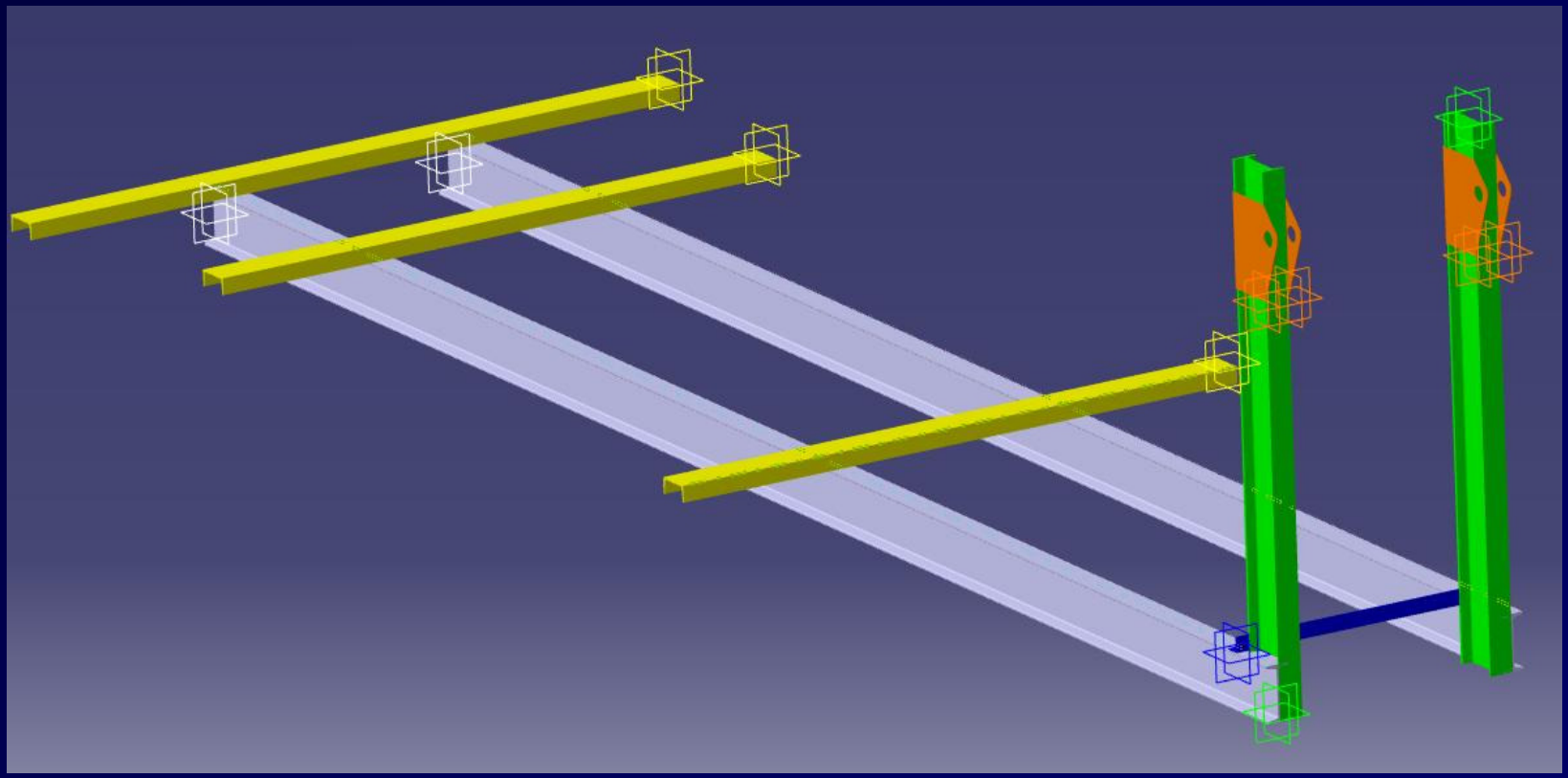






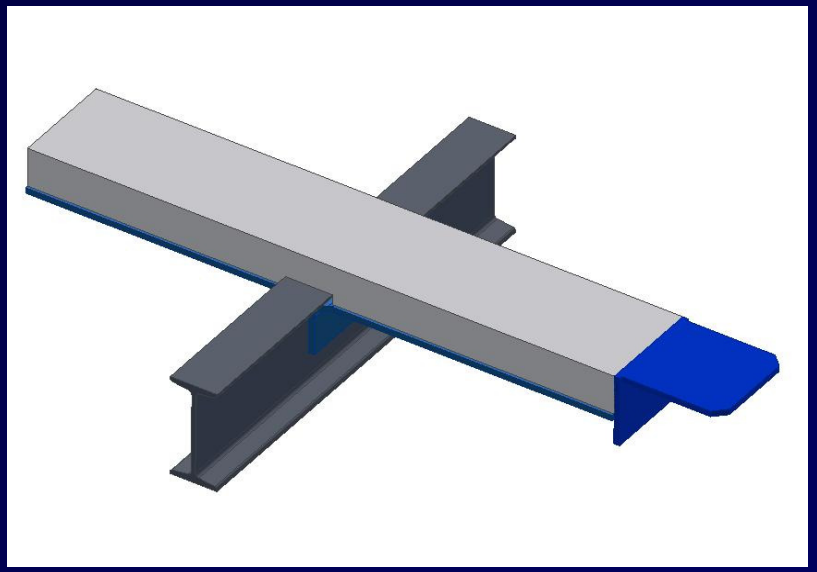


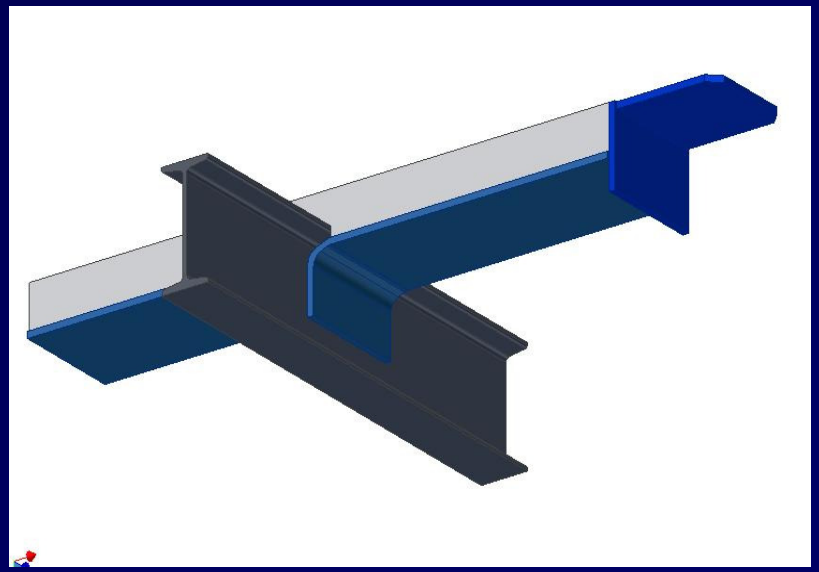
The first design



Design alternatives

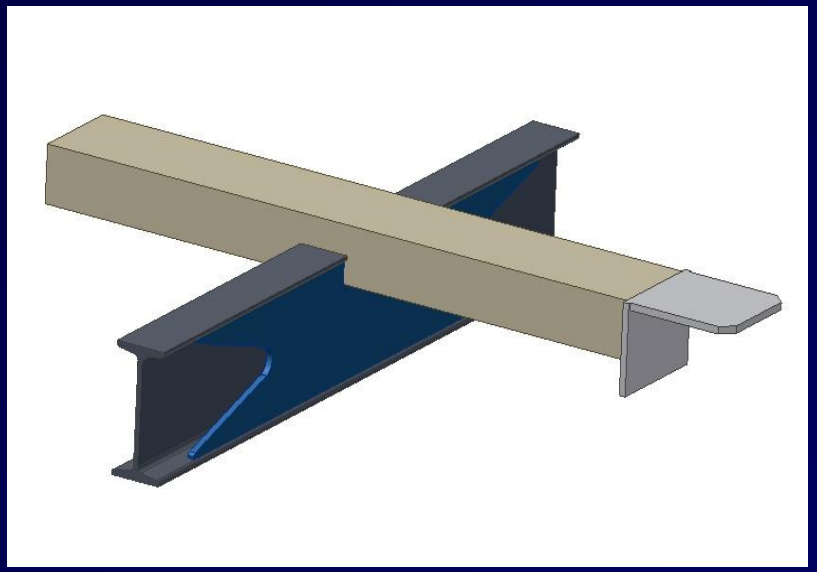
180x70 excised U-profile for the cross beams with 10mm iron sheet at the bottom, bent to the side of the main beam

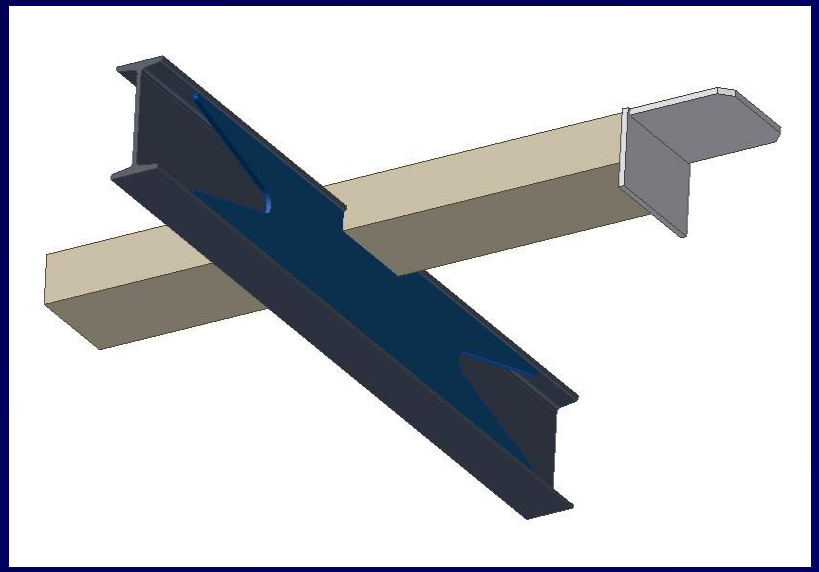




Design alternatives

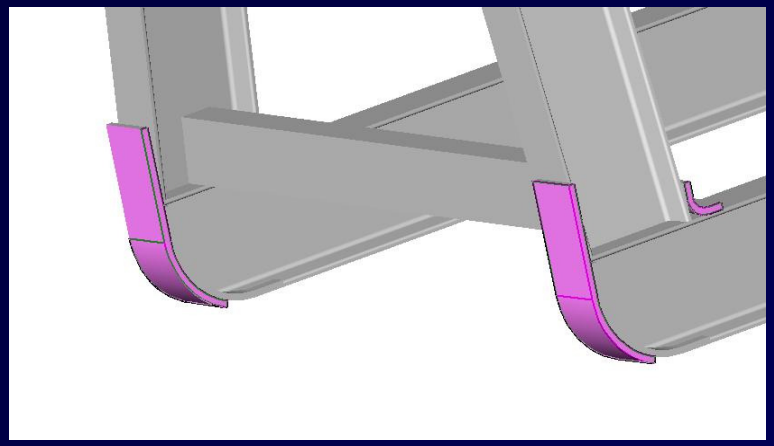
160x80x8 excised closed profile for the cross beams, with 10mm iron sheet reinforcement at the side of the main beam

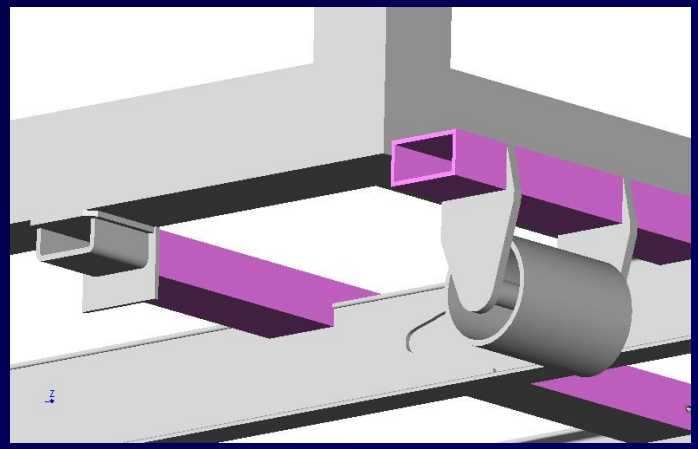




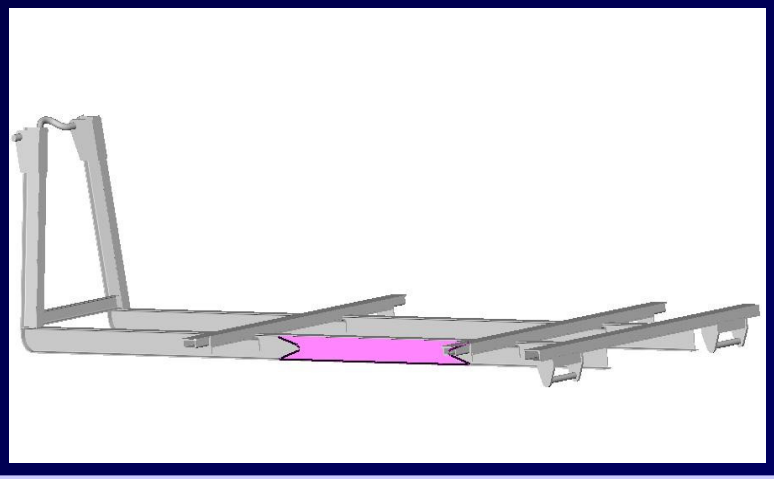
Geometry

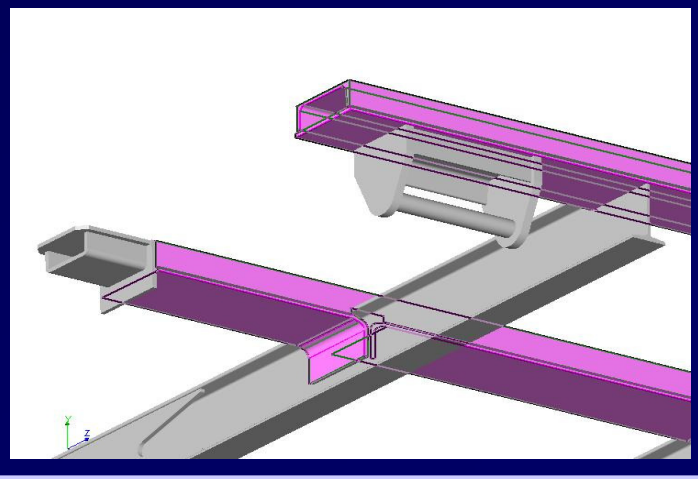
Closed profile cross beam with side reinforcement





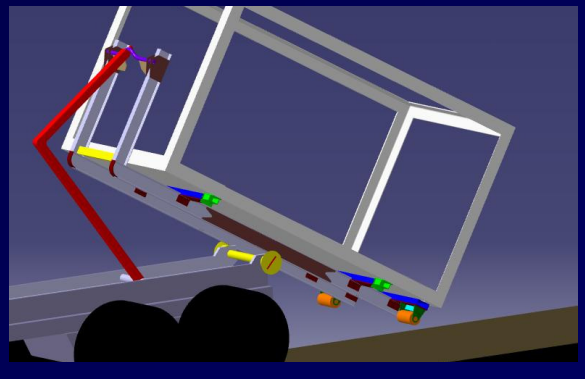
U-profile cross beam with iron sheet at the bottom

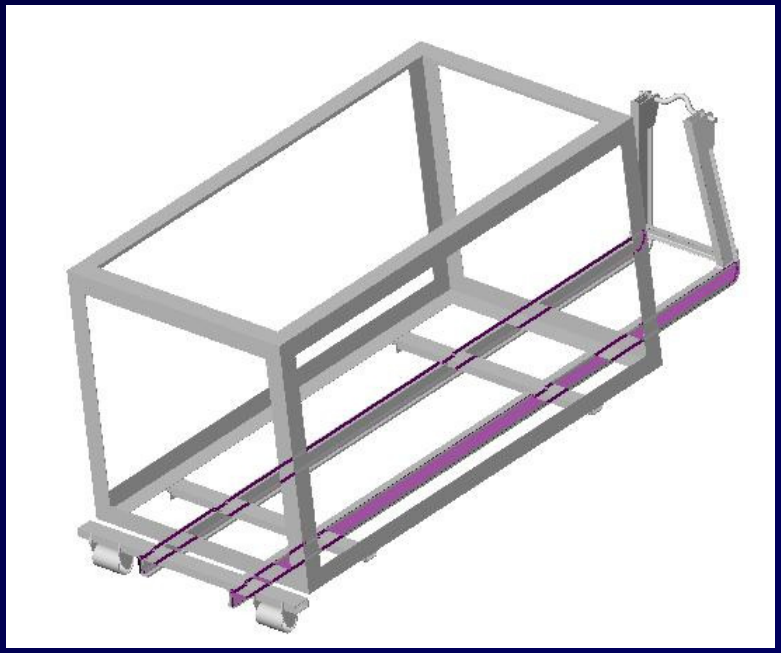


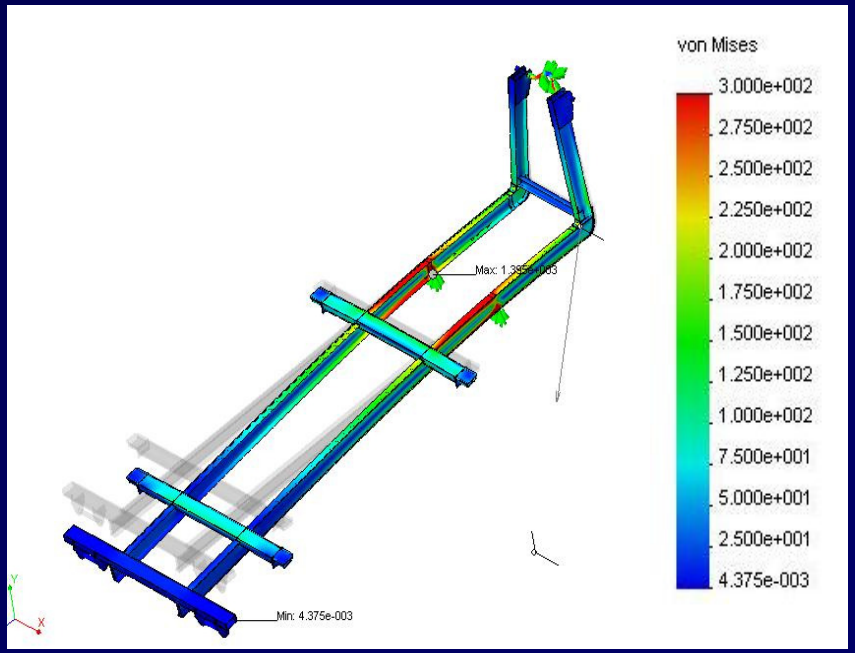


Modified design

- Side reinforcement all along the main beam (I-180)

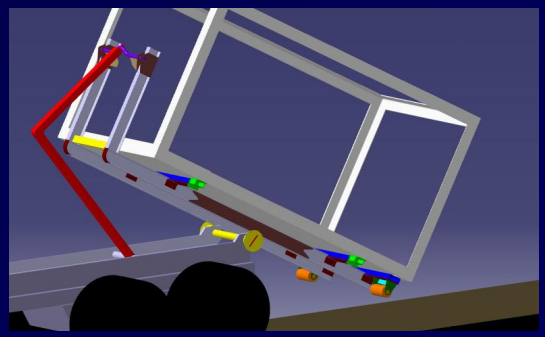


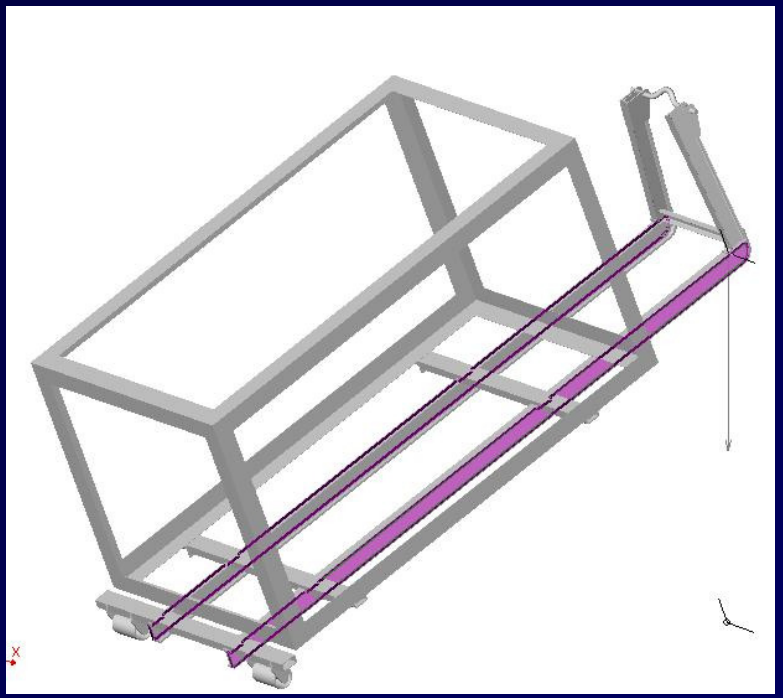


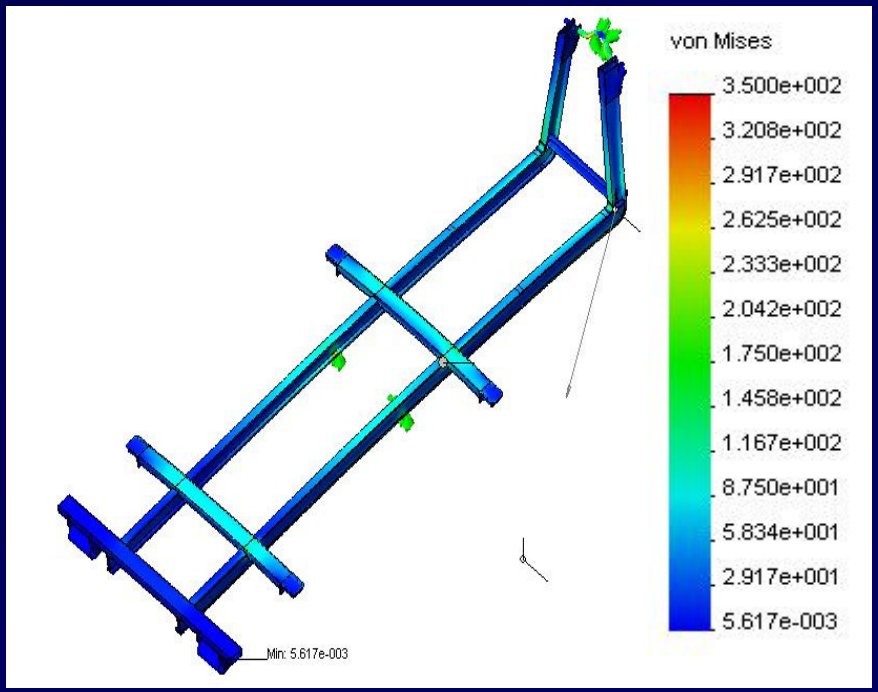


Another modified design

- Welded I-profile for the main beam







Summary

- We designed a roll-off container frame for general purpose
- Different design alternatives were studied
- The final solution fulfills the requirements of weight reduction and stress minimization

Special thanks for the consultants!