

## Designing a machine that removes, tilts and wraps slitted steel coils.

Thibe Vanesch & Arne Theunis

Master of Electromechanical Engineering Technology

### 1. Problem definition and process flowchart

The company Contistel at Lummen is facing safety problems during the take-off of slitted steel coils from an output thorn and have the desire to make this process (semi)automatic. The process diagram is presented schematically in fig. 1. The problem occurs at step 9,10 and 11, this is a very time-consuming process because the roll must then be rotated 90° (vertically) on a pallet and it is initially horizontal around an axis. The operator therefore enters a dangerous condition here, namely when he has to drop the roll (of often + 1 ton) off the thorn to get it turned. Also, packing the roll, placing wooden beams between partial rolls and wrapping with plastic film are done manually, which is very time-consuming. A machine has been designed to automate these steps.

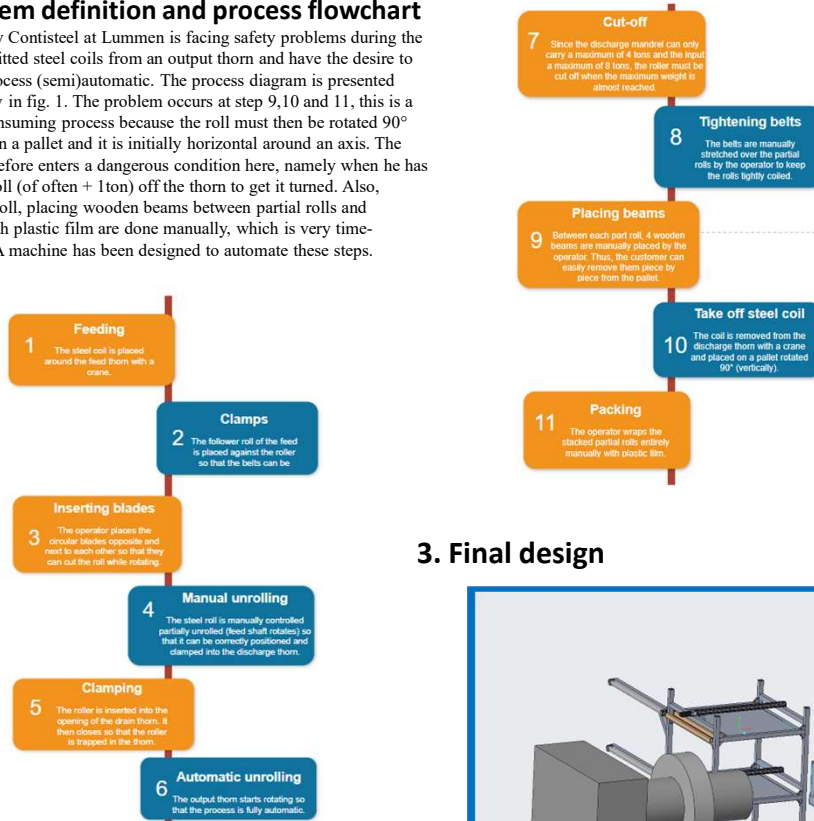


Fig. 1: process diagram cut-and-slit line

### 2. Brainstorming

After properly understanding the problem, there was a lot of brainstorming and sketching in order to compare different mechanisms using a morphological overview (see Fig. 2).

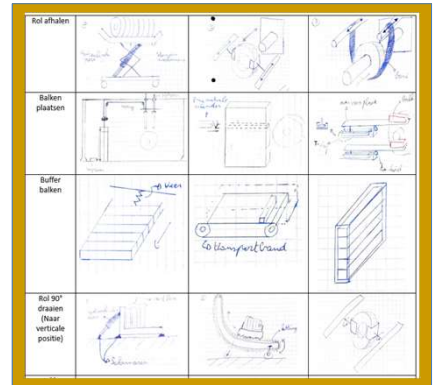
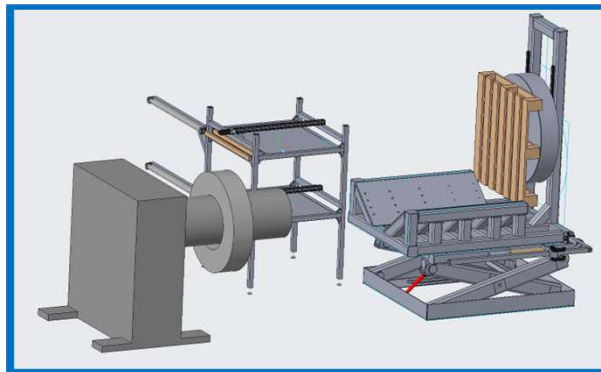


Fig. 2: morphological overview

### 3. Final design



The scissor elevator allows the rollers to be removed from the thorn.

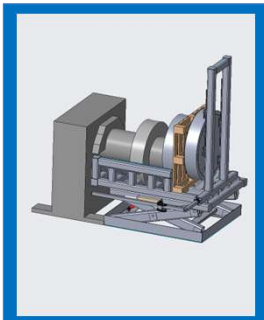


Fig. 3a: step 1: taking the coil off

The pneumatic cylinder pushes the bars between the coils.

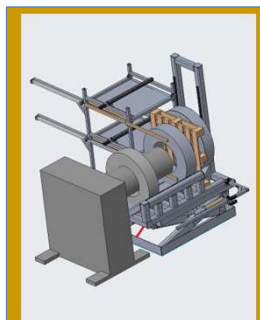


Fig. 3b: step 2: Placing the wooden beams between the rollers

A hydraulic cylinder allows the cart to pivot to stand vertically.

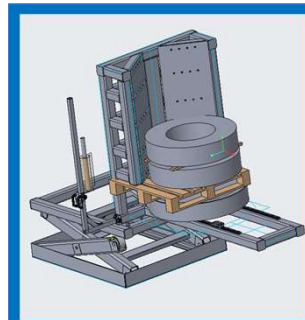


Fig. 3c: step 2: lifting from horizontal to vertical

To wrap the rolls with plastic film, the turntable and pallet are guided on linear guides to avoid collisions.

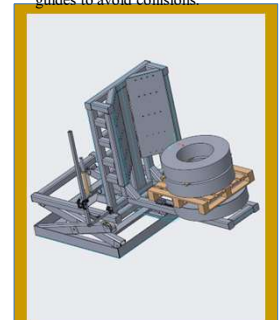


Fig. 3d: step 3: Wrapping with plastic foil

Supervisors / Co-supervisors / Advisors: John Bijmens, Karel Kellens, Michael Daenen, Jeroen Lievens