

SUMMARY

The aim of the work given was to design a new PVC roll slitting machine for Prolexplast OÜ that could replace their current one. It had to assure the same overall quality to the rolls that are being slit while reducing the time the operator is occupied with the machine. The new machine was designed to be automated in order for the operator to be able to leave the machine slitting and do the other tasks.

There were two primary options on how to do that. The option where the PVC rolls are being slit like a wooden log with miter saw was chosen. That made the machine automation easier and more compact. The most important factor about that method was to choose the right saw. For that multiple different options were tested, with practical experiments, and the best option was the band-saw with a toothless blade. That gave the required quality.

The overall design was built around the band-saw. The working process had the PVC roll rotating, and the saw was moved parallel to the PVC roll, and it slit the roll from the predetermined locations that were inserted by the operator through the touchscreen interface.

The side to side movement of the saw was achieved with a linear actuator. For moving the saw up and down an electrical cylinder was used. Both of them had to have feedback in order to know exactly where they are and to be controlled with the PLC. The PVC roll was made to rotate with two rollers. One of which had the motor inside of it and was responsible for rotating the PVC roll and the second roller.

The Prolexplast OÜ is using many different types of PVC, which all have slightly different properties. That dictates that with this design, all of those materials need to be tested in the future. The most commonly used material by them was used in all the experiments, and it can be said that this design is capable of slitting that material.

Like stated in the requirements it had to be cheaper than its competitors, and the approximate price of such a machine is 15046,72 + tax €. The cheapest competitor's price was 42 500 euros.