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Department of Electrical Power Engineering and Mechatronics

PAPER APPLYING MACHINE FOR SHEET METAL PACKAGING.

PABERIT KASUTAV MASIN LEHTMETALLIST PAKENDAMISEKS.

MASTER THESIS

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Summary

The thesis is about a cover applying station in an aluminum packaging line, in a simple and objective way to describe the main solution processes.
The packaging line receives a stack of plates to be packaged, the packaging line include four main stations
De-stacking station, which takes the supplied stack and supply it as a chain of single plates that is processed by Ink marking, laminating and/or oiling machine
The second station is the re-stacking station, which takes the plates and form a new stack (can have a pallet and can be directly stacked on the conveyor)
The third station is the cover-applying station, which is the main station for the thesis.
This station has two carriages with grippers and three paper magazines.
The function of the station is to put bottom paper on the pallet, put an interleaf paper between the plates and put a top cover on top of the whole stack.
One carriage is responsible for taking the paper from the magazine and guiding it until the paper magazine provides the required length and cut the paper, the carriage takes the end of the paper and gives it to the second carriage.
Both the carriages position the paper on the pallet/plate/stack according to the paper type then move back to prepare for the next paper (cycle)
The second and third stations work together in turns to provide the stack at the end.
The fourth station is the folding station, which handles the top cover and make the required folding of the package.
There are two more stations after the folding but are not mentioned due to their insignificance in the thesis topic.
The cover applying station has achieved its goal to be able to place the three types of paper on the stack with a capacity of 60 plates/hour as well as an error less than 1 cm.
The PLC program was very complicated cause of many difficulties that arose from the mechanical design, but this project is new for the company and throughout the making of the project, the whole team learned a lot.
Many problems are solved, next project would be much easier to design and implement
There are many changes to be considered as how the paper is fed from the paper magazines. These designs caused huge complicities in the programming side as show in the thesis. The question now is either to use the same design with the present complicated programming or change the design itself and redesign a new simple program, it depends on the criteria and the

efficiency required by the next customer but the results of the project is satisfying for the company as well as the customer.