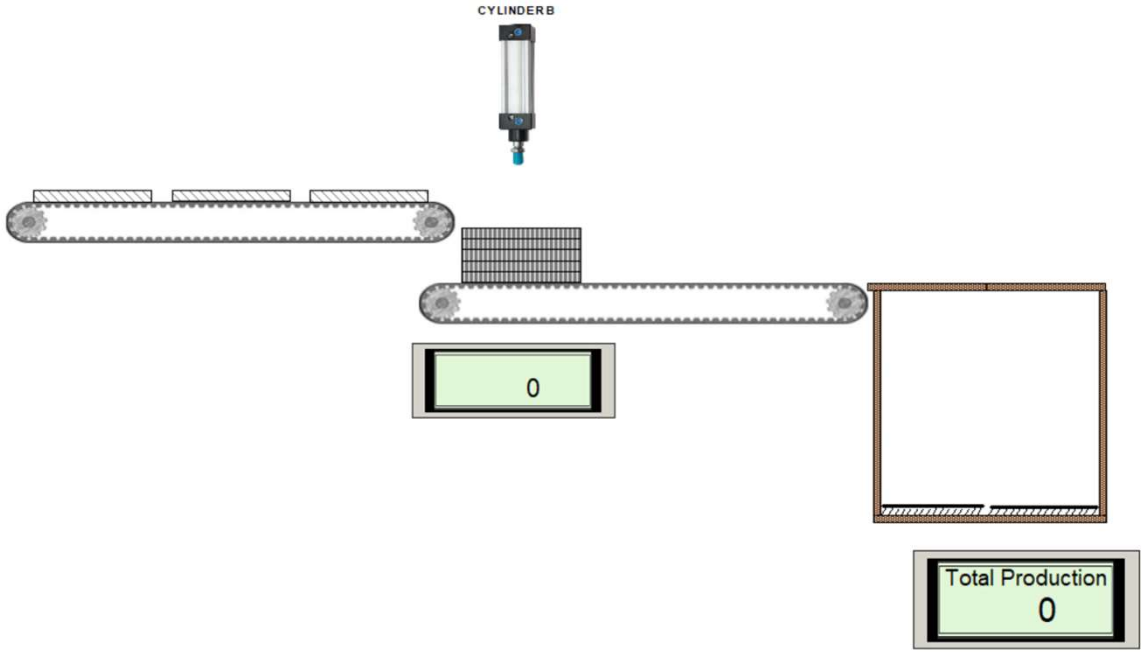
System Overview & Requirements

Develop an automatic conveyor system to process and store steel plates coming from a steel mill.

The top conveyor can transport three steel plates simultaneously, which are dropped onto a second conveyor to form a stack. The operator shall be able to change the number of plates that each stack is made of. As the stack is complete, the top conveyor stops to allow for the extension of a pneumatic cylinder. Such cylinder presses on the stack for 3 seconds before retracting.

The stack is then transported to a wooden crate for shipping, while the top conveyor is reactivated to build the next stack.

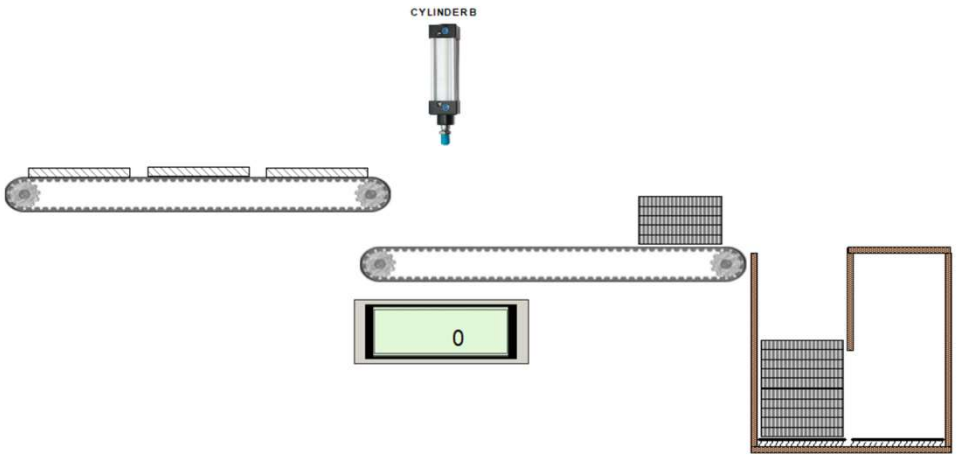
The incoming plates must be loaded on the first conveyor according to a clock signal generated by a Pulse Timer. No more than three plates can be loaded at the same time due to weight limits.

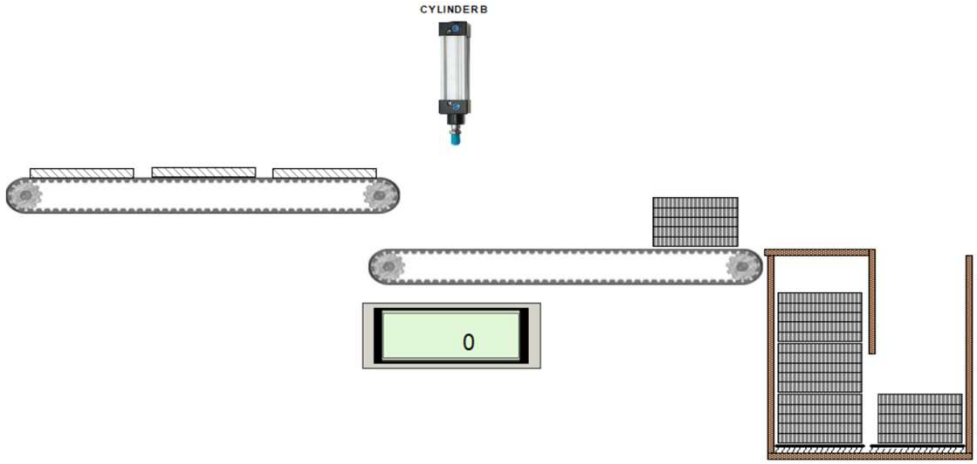


System Overview & Requirements

The wooden crate at the end can store the stacks of plates in two columns, with a maximum of three stacks each. Two openings at the top allow for the stacks to be lowered in the correct column: as soon as the first column is full, the second opening is activated to direct the incoming stacks to the second column, while the first opening is closed off.

When the whole crate is full, it is ready to be shipped so it must be transported to the designated storage area of the plant.





Assignment

Develop the automatic control to implement the task with Codesys (programming) and Fluid Sim (plant), using ladder and ST languages (in proper well organized FB – ladder and ST, and FUN – in ST).

Moreover, develop a clear and understandable HMI interface Codesys with: Start, Stop, Emergency, alarms, conveyors, storage station, cylinders and whole system animation (movements and visibility, including the rotation animation of the pulleys of the conveyers)… and all sensors and pilot lights needed to simulate the real plant.

In particular develop a well organized code that uses POUs in LD (ladder) and structured text (ST) with batch method including:

- Main POU (Start, Stop, general commands);
- FBs with I/O communications signals for: cycle management (LD), actions execution (LD), Emergency (ST), HMI visibility (ST);

FUN in ST for cylinders and objects animation.