

ADM Working Grain Model

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Objective:

The objective of our project is to create a working model of a grain elevator that has as much see through components as possible in order for people to see the how grain flows through a grain handling facility. The grain bins are made out of lexan, a clear plastic material. They were donated by the GSI. See through lexan panels were placed on the grain leg and belt conveyor. The screw auger metal tubing was replaced a plastic lexan tubing which will greatly enhance the visual understanding of how the grain flows.

Our model includes several monitoring devices that can be found in use at actual ADM facilities. We installed a bin temperature monitoring system that will monitor the temperature of the grain inside the bin. Also, we installed bearing temperature sensors, speed monitoring sensors, touch switch sensors, and a binicator system that monitors the amount of available space in a bin.

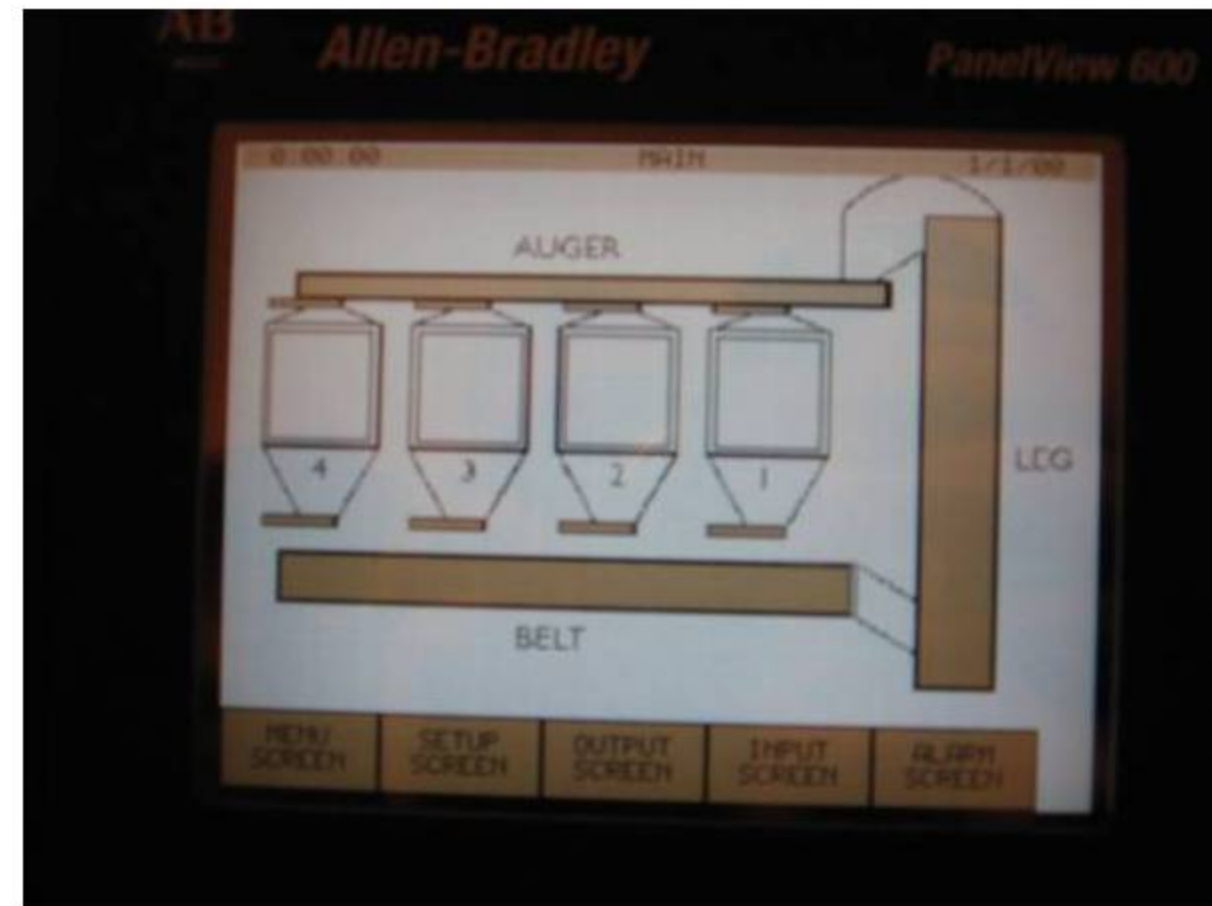
Our main goal was to build a model of a grain elevator that will demonstrate how grain flows through a grain elevator and that incorporates the most modern advancements in the grain industry. One way that we are going to do this is by making the entire elevator operate off of a touch screen computer. Having the model operate off of a touch screen will help new people easily understand how an elevator operates.



The elevator will be controlled through a programmable logic controller (PLC). This allows the use of a touch screen to be the interface between the user and the PLC. This means the operator will be able to view what bin is being emptied, where the grain is going, what equipment is operating, and monitor for hazards while this is being done.

The touch screen gives the user the ability to set the elevator to automatic or manual mode. In automatic mode the user simply enters the bins desired to empty and fill. The controller will then start the equipment in sequence and move the grain until the bin is full or the operator stops the flow of grain.

In manual mode, bins and equipment can be turned on and off as the user desired. This permits the operator to test run certain machines or set up hazards for educational purposes.



Hazards monitoring systems, provided by 4B Technologies, has been installed throughout the model. Hazards such as; speed monitoring, bearing temperature, grain temperature, belt alignment and bin level are all monitored. This information is transferred to the Watch Dog and T-500 systems. If a hazard is detected, such as a hot bearing, the monitor will send an alarm to the screen and then shut down that specific equipment.



Lexan windows have been installed in numerous locations throughout the model. This allows the audience to actually see the grain flowing throughout the system. The clear material is placed on the bottom of the elevator, the top of the belt conveyor, the auger tube and the entire structure of the grain bins.





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Popcorn has been placed in the grain handling system. This material was chosen because of its durability and to reduce grain dust than can be created when handling grain. This will also increase the amount of time before the grain deteriorates.



The model contains three different types of conveying systems. The leg is approximately 9 ft tall and was purchased through Universal Conveying Systems. It is rated at 75 Bushels per hour. The belt conveyor was built by Grainway. It is 13 ft long and rated at 100 bushels per hour. The auger was purchased through West Lafayette Agri-Sales in Otterbein, IN. It is rated at 100 bushels per hour.