





Left, two banks of FieldPoint I/O modules in a protected casing. Right, the crane operates day and night mixing the compost.



from the PC, from the main control panel, and via the "joystick" controls next to the crane itself.

Second, we implemented completely automated procedures such that the crane can perform the mixing operation overnight without operator supervision (removal of the compost heaps and rebuilding them adjacently).

The third part of the software is the automatic error recovery functions. In our case, this is particularly important because the composting hall is a difficult environment where abnormal conditions can occur. For example, the crane can get stuck; the wheels can slip on the rails; the fork

cannot close because it is too full; the crane cannot lift up because the load is too heavy, and so on. The system software must be designed to take such conditions into account and also have the ability to resolve them automatically (e.g. jiggle the crane forward and backward to make it move again; open the fork a bit, and shake off excess load etc.)

The fourth part are the visualization functions, which form an integrated part of the application.

While the first part (the basic control) could be implemented with a PLC, it would be very difficult to

implement the other parts with a PLC system. Many of today's automation problems are not limited to simple control tasks, but rather complex processes that must run fully automatically. Modern systems of this type are also expected to imitate the behavior of a human operator in abnormal conditions and react "intelligently" in order to keep the necessary human intervention to an absolute minimum.

### Conclusion

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In LabVIEW, all aspects of an automation solution of any complexity can be seamlessly integrated and programmed directly. These parts include the control functions, process automation, error recovery functions, visualization, database integration, statistics, and so on. Software engineers can write the entire application with one tool as opposed to using several. ▶

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