

# Journey of the JavaHoe

By Dick Morley

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This story happened a long time ago... and it wasn't true then.

My favourite PLC company, Modicon, was owned by a German car company. This company used German PLCs for automation, and not our fabulous American entry. We, the Modicon mavens, felt that we should persuade our new owners to use Modicon. But to no avail. We were not allowed to even make the obligatory PowerPoint presentation. Our product was "not built by orderly German hands." We stealthfully contrived a plan.

Maybe we would make brownie points if my Case 580C backhoe crushed a Lexus from Stuttgart using the Internet. Certainly, cheaper than making all those charges up the sales rampart. A backhoe is a large construction device used to make trenches. Mine weighs one kstone, and can reach out and dig a three-fathom hole.

"Imagine," says the suited factory rep, "opening up a laptop and, across the globe, eliminating the customer's nightmare in a visually exciting demonstration." The engineers were so excited, the pizza got cold. What a project -- it was fun and the sales department liked it!

Off we went. Conversion of the hydraulic system to PLC I/O was difficult. I still had to plow snow in the New Hampshire winter. Parallel operation of PLC and manual was the most difficult aspect of the project. We ended up with pluggable electric valving running in parallel and simultaneously with the manual controls. The Case was not designed to be Web-compatible.

All I/O was 12 volts. We downsized the project so that we only ran the boom system. Four variables were used: boom, dipper, bucket and swing. Each variable control is binary logical control such as "open/close." The PLC generates these signals from input cues, which are transmitted over the Internet anywhere over the globe. A GUI shows the status of the command and, with web video, the actual position of the hoe. Some aspects of the system are written in Java, hence the name. Some project history. Modicon stopped funds when the company was sold. My wife, Shirley, agreed to continue funding the project. We completed the hydraulic conversion and ran demos at our New Hampshire barn. We also drafted the architecture of the Web system, which was slow going. We pulled an old friend out of retirement (Jan Grondstra) to attack the problem full time. My wife suggests that her R&D budget could be better spent to redo the kitchen. Along comes the Advantech cavalry. They supplied the components needed, especially the radio frequency (RF) modems, to complete the job. We converted over to all Advantech products - a good choice. The price was right. Web software was supplied by an Advantech partner, InduSoft. Everyone is available over the Web.

Results: we displayed the system fully deployed for the August ISA Show in New Orleans this past August at the Advantech booth. The hookup from New Orleans ran my Case 580C in New Hampshire each of three days, at 3 p.m. The ISA press finally had something to write about. We had a female "driver", almost hit Jan with the swing, and, on the third day, we burst a hydraulic hose from overuse at the stall limit.

Why did we continue the project? There are three reasons:

1. 'Tis a wonderful marketing scam. Lots of PR and www hits. Visitors to the barn love to run the monster with the local control. London suits wearing Italian leather will stand in the rain to run the unit... and with a smile.

2. Show and tell: we consultants have been PowerPointing the boardroom to death with predictions of Internet control of the enterprise. Actually seeing the huge system working at a cost of peanuts converts even the most sceptic of suits. The suit then goes back home and asks the technical team for www control of an enterprise segment. The team comes back with the obligatory four-million-dollar and four-year quote. Management responds, "I saw a cheap one working." "Make it so," commands top management. "And at one-tenth of your quote." Management is empowered.

3. The science of CAS. Yet to be shown. But my dream is to have 100 people controlling each joint. About 400 total operating a simultaneous forum of control, much like a chat line for the JavaHoe.

Yet to do are:

- Velocity control of attributes
- Extindahoe additional variable
- Sound link
- Unattended operation
- My kitchen
- Multiple controllers for CAS

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*Best known as the father of the programmable logic controller (PLC), Dick Morley holds more than 20 patents, including the parallel inference machine, hand-held terminal and magnetic thin film. With a background in physics from MIT, he is an author, consultant and engineer in the areas of computer design, artificial intelligence, automation and futurism.*