

A. LANDRY FABRICATION

Combining the speed and power of SolidWorks and Zuken E3.WireWorks software



Lumberjacking is hard work done by hard men.

Brains, however, are more important than brawn in today's timber industry. That's why A. Landry Fabrication of New Brunswick, Canada, has designed the world's most intelligent and profitable track harvester—a machine that quickly fells, de-limbs, and sections timber.

The purpose-built Landrich harvester uniquely combines European-style efficiency, fuel economy, and a light environmental footprint with the track propulsion many North Americans favor over wheels. It also has an on-board computer running Microsoft Windows and several microcontrollers. This digital nervous system enables the harvester to do the work of three machines—a feller buncher, de-limber, and slasher that cuts to varying prescribed lengths—and to respond to real-time timber market intelligence.

Here's how it works. The operator uses a joystick to clamp the harvester's fast and efficient Ponsse H7 head onto a tree trunk. A saw on the head cuts through the trunk, and the head, still tethered to the harvester, falls to the ground with the tree. A head attachment uses sharp knives to shear the limbs from the trunk. A set of rolling wheels measures the length of the trunk while sensors on the clamp gauge the diameter. The harvester's on-board computer checks its timber-optimizing database—data is streamed from the mills or pre-programmed—and tells the machine how to cut. The database prioritizes certain combinations of diameter and length to maximize the value of the wood processed for the machine owner. On a particular Tuesday, for example, the mills may be paying top dollar for eight-foot lengths. On a Thursday, it might be 12-foot lengths. In either case, the harvester cuts the log in the most profitable way, and moves onto the next tree.

- Timber harvesting is a competitive business, and brains are increasingly more important than brawn.
- Conceived industry's most intelligent track harvester.
- Quickly completed successful design.
- Cut design cycle by more than 50 percent.

"It's the most advanced system in the world," says Yves-Michel Thibeault, A. Landry Fabrication's director of engineering. "We're trying to get as much out of the wood as possible and make the smallest possible footprint on the forest. It's better for the forest and forester, too. Everybody wins."

Challenge: Completing the design to quickly satisfy customer demand

A. Landry Fabrication began developing the machine in 2005 with a systematic R&D methodology encompassing market research, focus groups, financial and technical assessments, and a year of prototyping in the field. When users began falling in love with their prototypes and placing orders, it was time to start production manufacturing of the harvester. Seventy-five percent of the machine's design was already complete, done in SolidWorks® CAD software. The remaining 25 percent was the electrical design. All of the electromechanical components in the prototype had been connected by "Frankenstein" cabling ripped from another machine and spliced together.

"We had from April 2009 to June 2009 to complete the electrical design," says Thibeault. "We needed to design something quick, and that's where Zuken's E³.WireWorks came in." E³.WireWorks is part of Zuken's E³.series electrical computer-aided design (ECAD) software and has been specifically tuned for the needs of SolidWorks software users.

Zuken, a SolidWorks software Solution Partner, enabled A. Landry Fabrication to design the wiring harnesses and general cabling topology in SolidWorks CAD software's powerful routing module, then complete the schematics, formboard, and bills of electrical materials (BOMs) in Zuken's E³.series software. The two programs easily share data, essentially operating as one.

Strategy: Combining SolidWorks software and Zuken intelligence

The first step was using E³.series to create a database linking A. Landry Fabrication's design symbols to electrical parts, pins, connectors, and components. Each component possesses its own properties and logic—this pin, for example, always mates with that connector. "We programmed a lot of intelligence into the database. Now we just drag the symbol into a design, and it sorts itself out," says Thibeault. "The schematic and BOM will show all parts, pins, and connectors, and every component is linked to a PDF spec sheet."

Thibeault's team then took the topology they had created in SolidWorks software, a 3D representation of wire harnesses and paths, and flattened the design using a new feature in 2010 SolidWorks software. This created the formboard, a 1:1-scale representation (4-foot-by-16-foot) of every wire, route, connection, and destination used in the manufacture and assembly of the harvester's electronics.

The Zuken/SolidWorks software combination infuses the SolidWorks software-designed formboard with all the wire and component intelligence provided by the E³.series software. The Landrich formboard depicts 850 different cables and wires. E³.series also creates a wire list to give subcontractors a roadmap by which to build, cut, and print connection codes on the wires."

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Yves-Michel Thibeault
A. Landry Fabrication



Representatives of ALPA Equipment, A. Landry Fabrication and Litaliens Operations, with the first Landrich harvester at the Atlantic Heavy Equipment Show in Moncton, New Brunswick, Canada.

Results: A successful, error-free design in half the time

"It's difficult to calculate lengths, paths, and configurations for new products without tools like SolidWorks and E³.series software," Thibeault says. "The electrical design alone would have taken twice the time without them. Yet with SolidWorks and E³.series software, the harvester and its electrical systems were quickly and easily developed in a virtual model that is entirely accurate. This process brought new state-of-the-art track harvesters that will help customers achieve new levels of productivity and profitability into production."

Prior to adopting E³.series, Thibeault and his team had considered one other ECAD software option. The other product worked exclusively in a 2D environment with AutoCAD software. A. Landry Fabrication, however, had used SolidWorks CAD software since the inception of the project.

The company originally switched to SolidWorks software in 2005 because of its superior integrated motion and finite element simulation. With SolidWorks software, A. Landry Fabrication was able to optimize cab visibility and efficiency by using smaller tubing while preserving rollover safety. The team also used SolidWorks Simulation to analyze the action of its ultra-flexible boom, optimize fuel economy, and dial in hydraulic cylinder velocities. SolidWorks software helped the team lower the harvester's center of gravity, making it stable on inclines.

"Because of our preference for SolidWorks software, E³.series was a great fit for the electrical design," Thibeault says. "Since it is 3D-oriented, it's a dramatic improvement over the 2D 'pencil and paper' environment. And by automatically calculating component properties, mates, and routes and changes, it eliminated most of the chances for error. SolidWorks and E³.series software create layers of verification and counter-verification."

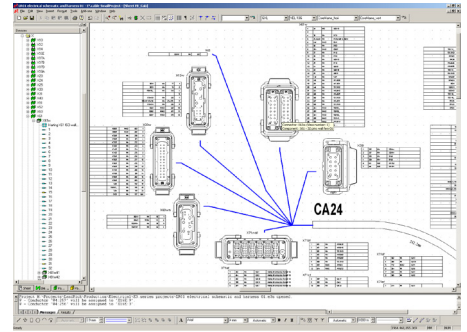
There's also traceability: every wire is measured, marked, and labeled with connector pin and function. When a change needs to be made, related components change accordingly, automatically. With other CAD software, the engineer would have to spend hours redrafting and revising designs. Thibeault is quick to credit CAETEK, its Zuken software reseller, for guidance in developing its integrated CAD/electrical CAD system.

"We're a very young company using the latest technologies, processes, and management techniques," says Thibeault. "We're not afraid of new ideas, because we know innovation will keep us successful. And that's what we get from SolidWorks and E³.series software. I don't see any other way we could have developed such a complex harvester in such a short time, created virtual models, and delivered the product to the customer. I've been involved in harness design for a couple of years and have always dreamed of a process like this, and it's paying off big time. With all the groundwork we've laid and designs we've created, the next machine will be even quicker to produce."

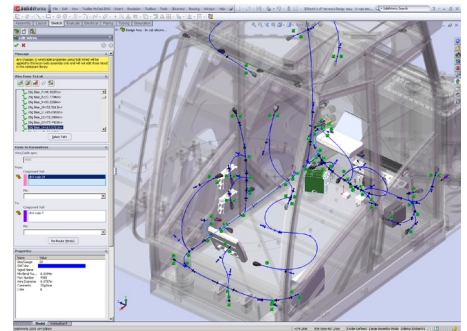
For more information, visit:

www.solidworks.com

www.zuken.com



Formboard created in E³.series software, infused with flattened 3D layout from SolidWorks software.



The Landrich harvester cab in SolidWorks/E³.WireWorks software.



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