Simulating the Job

Cyber training for heavy equipment operators

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Andre Babin, Instructor with Mechanical Operations at the Miramichi Community College is convinced that a new excavator training simulator they have tested will be an excellent operator training tool for their program. Babin said that when the Community College purchases the commercial training version of the simulator [Simlog note: the license was purchased soon after the article was published], the College will be able to accelerate training to serve a construction industry that is hungry for trained excavator operators.

The Mechanical Operations Department has been testing the new excavator simulator created by Simlog, a Montreal based training simulator developer. The College has been working with Simlog's harvester and forwarder simulators over the past two years with good success and they were anxious to try the excavator simulator in (fully operational) Commercial mode. Simlog launched the PC-based simulator with virtual digging graphics for training hydraulic excavator operators in October of 2005.

Babin said that the Miramichi College has been using the simulator in "Evaluation Mode", which allows them to use and review all of the simulator functionality through a short series of time limited simulation exercises. In "Evaluation Mode", the simulator provides a sample database with pre-defined users, classes, and simulation results, to demonstrate the functionality of the Simulation Manager. However, in Evaluation Mode, all the generated information is lost when the user's log off.

In Commercial Mode the entire functionality of the simulator becomes available, including hundreds of pre-defined simulation exercises and the ability to save simulation results.

The Commercial Modes provides twelve simulation modules of increasing difficulty, starting with the basic operation of the boom and carrier, and ending with trenching and truck loading that features Simlog's unique "dynamic terrain modeling" technology. The simulator also allows trainees to switch between the "SAE" and "Backhoe-Loader" joystick patterns. In each simulation module, key performance indicators are measured to evaluate the simulated work (execution time, bucket fill, stick angle, trenching precision, etc.).

Trainer supervision is not required with Simlog's simulator-based training, because simulation results are automatically saved on the PC's hard disk for later review, either as files or as entries in a special database. The Simulation Manager allows supervisors to create individual "accounts" for each simulator user, with distinct login names and passwords, and create "classes" of simulator users too. The data can be easily accessed by trainers and individual trainees' simulator activity can be analyzed to evaluate progress and pinpoint areas of difficulty.

The simulator consists of set of joysticks and mounting hardware to attach them to either a table or an office chair, and requires an up to date desk top or laptop computer. Simlog's Personal

Simulators are real-time 3D applications, so the computer will need to provide hefty computing and graphics horsepower.

Simlog recommends "Windows XP Professional Edition" and suggests that users look to processors such as Intel's Pentium 4 with at least 256MB of RAM. Simlog also recommends special graphics-accelerated chipsets such as nVidia GeForce FX or ATI Radeon X300, or better, with at least 128MB of internal video RAM. The computer also needs at least two USB ports for connecting the joysticks.

According to Babin the harvester and forwarder simulators cost in the range of $3,500 and he expected the excavator simulator to cost about the same. He said that the Simlog products had operated almost flawlessly. He added that updates and product support are done by email.

"We have been testing the simulator in Evaluation Mode and we are very, very impressed. The simulator has joysticks programmed exactly the same as an excavator. The programming is very lifelike. If a trainee orients the bucket incorrectly or applies too much pressure the program will cause the simulator to stall out, similar to an excavator under the same conditions" explained Babin.

"After one hour on the simulator, trainee operators gain a lot of operating confidence. When they move on to a real machine, they at least have knowledge and confidence to operate and control the joy sticks competently".

Babin said that from a trainer's perspective, the simulator is an excellent training tool for groups of trainees. "We can have trainees come sign on and work for a couple hours without supervision. I don't want to have to sit and watch, which generally makes a trainee quite uncomfortable. They have their own time and space, to develop their initial skills. Later on, I can access the database and see exactly what each trainee has done and see exactly where they are having difficulties. Then I can sit down with each trainee individually, and address the problem areas and work on solutions to move them forward," said Babin.

"Trainees will start out studying joystick operation on paper and then they will move to simulator. When we put the trainee in the seat of a machine in the field, it makes a huge difference in their abilities and confidence. The simulator experience makes a big difference in their learning curve on an excavator. Our training philosophy is that once in the seat of a machine, the quality of their work is more important than the quantity of dirt moved or wood cut. We want to develop good operator skills first. Once those skills are nailed down, only then will we look for them to increase their production" said Babin.

The Miramichi College currently sees a very high demand for their graduate operators in both construction and forestry. Babin points to highway construction projects in New Brunswick and the migration of trained operators to western theatres offering higher wages, that is driving the demand for operators.

"I get calls frequently from contractors looking for operators, and some are not very congenial because the contractor cannot find enough operators to keep the equipment running for their desired schedule. I tell them, if they want trained operators, send us some candidates and we will train them, then they can put them to work. We find that our graduates are scooped up fast, once they complete the training course."