

## Virtual Stringline: Training High-Tech Equipment Operators

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Construction workers who operate heavy equipment including dozers, excavators, scrapers and cranes are highly sought after. Around the country, facilities offer training and certification to this class of operating staff to aid them in becoming proficient at operating heavy iron. One source for this type of training is the International Union of Operating Engineers (IUOE). Headquartered in Washington, D.C., IUOE has 400,000 members in 170 local unions throughout the United States and Canada and is the twelfth largest union in the AFL-CIO. The organization's website states that training is its No. 1 priority. It offers about 100 apprenticeships and training programs to help develop and certify employees as highly trained and skilled craft workers. These workers become a powerful benefit to their companies.

To learn more about the international union, I contacted Dave Mullins, training director for Local 132 in Ravenswood, West Virginia. According to Mullins, the union represents people who operate, maintain and repair heavy equipment throughout North America. The business model of the association is a joint trust, which results in a cooperative effort between the contractors and the union. The union's product is a skilled workforce, sold to contractors on demand. IUOE's skilled workforce is made possible by its apprenticeship program. This program addresses the need for new contracting staff and provides retraining and upgrading of skills for experienced staff. This model serves to keep the employee base skilled in new technologies. Let's take a look at the basic operation of the union's apprenticeship program and the latest training offered for machine control operators.

### The Apprenticeship Program



*West Virginia program attendees learn to handle the facility's equipment.*

The four-year apprenticeship program offered by the union is multi-faceted and is approved by the Bureau of Apprenticeship and Training, a branch of the U.S. Department of Labor. It is paid for and funded by contributions from participating contractors. In the first year of the program, apprentices must acquire the first of 200 unpaid but required classroom instruction hours. These hours are a combination of onsite field instruction and classroom lessons. There is an additional "for-pay" working relationship that requires 1,000 hours of on-the-job work with a participating contractor. These are annual requirements. If apprentices successfully conclude the first year, they qualify to enter the second year, which requires a minimum of 1,200 hours of instruction and on-the-job experience. Again, after successfully completing the second year, they enter their third and final year of apprenticeship. Each year of successful completion also typically earns apprentices a raise in pay. The courses of the program mirror actual job conditions, teach construction techniques and emphasize safety as a top priority. If the candidate has financial challenges, the program has allowances for free room and board where he or she can obtain three meals a day along with sleeping quarters, at no cost to the trainee.

When attendees complete the apprenticeship program, they attain "journeyman" status and enter the workforce full time, obtaining a skilled journeyman's wages. These jobs also include healthcare and pension benefits.

Many areas throughout the country are experiencing serious labor shortages in the

construction market. This causes issues for contractors who are winning bids and have purchased construction equipment and materials, but do not have the skilled labor to perform the work. Each state and Canadian province has training facilities similar to what I am describing; pay rates vary depending on location.

"The training includes the theoretical portion of construction work as well as hands-on [work]," Local 132's Mullins says. "It also includes a myriad of safety training courses since OSHA [Occupational Safety and Health Administration] and MSHA [Mining Safety and Health Administration] are behind this as well. Classes in trenching and shoring are offered as is hazardous waste removal. Other more common courses include CDL training for the Commercial Driver's License. In fact, attendees can learn almost anything that exists on a construction site, except for very specialized equipment. And even then, if a skill is in demand, albeit unique to the industry, the facility occasionally can rent or borrow that equipment from a contractor."

### Training for 3D/GPS Machine Control



*An aerial shot of the West Virginia training ground for equipment operators.*

What really caught my attention is that the IUOE is currently adding courses and certifications for 3D/GPS machine control. "The contractors have now acquired sufficient numbers of this equipment for their bulldozers, scrapers, etc. to require operators skilled in this very state-of-the-art technology. This is further proof that 3D/GPS machine control is here--and here to stay," Mullins says.

When 3D GPS machine control was introduced a few years ago, it was acquired by some very progressive contractors looking for an edge to get their work completed more rapidly and with higher quality, fewer passes, reduced rework and the ability to work with reduced staff and minimized survey stakeout. Shortly thereafter, equipment manufacturers including Caterpillar, John Deere and Komatsu began installing hookups for the systems at their factories. As a result of this influence, Mullins explains, "Now our training organization is including courses for 3D/GPS machine control as part of our curricula. The 3D/GPS course garners a completion certificate and as such is a part of the program within the apprenticeship program."

Mullins provided some metrics of the new training program. "We just recruited 40 new apprentices, and approximately 150 journeymen come through the program annually with about 85% completing successfully," he says. "Once [trainees] achieve West Virginia certification, it is portable to major employers like contractors for the [U.S. Army] Corps of Engineers and power companies who require certified credentials in their bid packages."

Dave Reitmeyer, owner of Productivity Products and Services Inc. (PPS) of Saxonburg, Pennsylvania, provides and installs the 3D/GPS machine control equipment used in Local 132's program. According to Reitmeyer, the demand for this equipment and operators trained to work with it is rising. The Local 66 unit has recently contacted Reitmeyer due to an increasing need for skilled 3D/GPS machine control operators and asked him to assist in adding this equipment to its inventory for training. "Then Local 132 in West Virginia added the classes," Reitmeyer continues. "Local 132 has a D6 Cat with the 3D/GPS rover from PPS Inc. This [system includes] a Topcon HiPer XT, a wireless base RTK rover system with Pocket 3D and Office 3D software."

Reitmeyer anticipates that "attendees will train on all aspects of 3D/GPS usage on actual machines." He points out that the important reason for training operators on machine control is that the systems traditionally have been in indicate mode, whereas the new robotic systems actually control the machinery. "Indicate mode means that nothing is tied

to the hydraulics, so the operator controls the machinery," Reitmeyer says. "The current technology now controls all blade activity with the operator simply shifting gears and steering. This automation is great, but there better be a highly knowledgeable person behind the wheel!

"The reason that the system knows what to do is that it has been supplied with the proposed terrain model," Reitmeyer continues. "By comparing the DTM to the equipment's GPS-located position, the computer can move the blade where it needs to be. So, the technology requires that a contractor's knowledge must now extend beyond the cab and into computer-based terrain models. There is now a need for a data prep liaison, a new position for contractors and a key person who facilitates the entire process and interfaces between the office and the field."

If the operators are receiving hands-on training on how to physically operate the machinery, where do these facilitators learn their trade? Reitmeyer's company offers customized classes in data prep, data conversion and data migration to the machine control equipment. PPS Inc. has built facilities for both indoor and outdoor training at its location and partners with OutSource Inc., a manufacturer-authorized training company, to supply a complete mobile PC lab set up with the software and contractor data sets. Reitmeyer says the classes are so successful that some of the attendees have now begun their own data prep companies offering services directly to contractors.

The software used in these classes includes a wide range of offerings from Autodesk's Land Desktop and Civil 3D to Carlson Software's SurvCADD, Carlson Civil, Carlson Survey and Carlson Takeoff. Reitmeyer makes particular note of the Takeoff software, since it is customized specifically toward the contracting market and rapidly assists contractors in producing quantity takeoffs, generating 3D models from engineering plans and migrating data into the machine control robots.

As high-tech 3D/GPS machine control increasingly enters the construction field, there are numerous solutions for attaining skilled journeymen, operators and data prep practitioners to perform the work. Equipment operators can obtain training focused on the theories of this technology as well as hands-on experience with the heavy iron. Specialized courses are also available from resellers and training centers to train people for new positions as field-to-office liaisons. Both contractors and potential employees should take advantage of these offerings to improve the skill of their workforce or their career potential.

**For more information, contact:**

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