

Simlog Customer Success Story: State of California's Department of Water Resources

Utility Craftworker Apprenticeship Program



In 1971, the State of California's Department of Water Resources (DWR) developed an Apprenticeship Program for Hydroelectric Operators.

A few years later, the Department introduced a three year "Utility Craftworker" Apprenticeship Program.

Currently, DWR works in collaboration with San Joaquin Delta College as a Local Education Agency to provide On the Job and Classroom instruction of Apprentices to *"learn progressively skilled work in the repair, operation, modification, inspection, replacement and maintenance of major civil structures and related utility equipment"*.

To that end, training includes the operation of the following nine kinds of heavy equipment (listed here in alphabetical order): Backhoe Loader, Boom Truck, Bulldozer, Forklift, Mobile Crane, Motor Grader, Skid Steer Loader, Tele-Handler, and Wheel Loader.

Overall, the duration of the program includes 5,460 hours of training over three years, with about 2,500 hours devoted to heavy equipment.

Practically, the three years are divided into six periods of six months and for each period, there are three parts to the training:

1. Home study, primarily with textbooks, supplements, and other printed materials
2. Instruction at the Operations and Maintenance Training Center located near Bakersfield at Tejon Pass, that includes classroom teaching, simulator-based training, and time at the controls of (real) heavy equipment

3. On-the-job training at the local Field Division or Flood Maintenance Yard of each apprentice

Each six-month period ends with an evaluation.

The number of apprentices hired each year changes based on estimated needs three years into the future (because the training program is three years long) in the 5 Field Divisions and 2 Flood Maintenance Yards throughout the State.

Hundreds of people each year complete the application forms on the "Cal Careers" Web site and apply for a chance to become an Apprentice. Applicants must be at least 18 years old, and have a valid State of California car driver's license. There is also a written exam to evaluate reading comprehension, mathematical aptitude, and basic tooling knowledge. After that, candidates are interviewed by a panel of experienced DWR staff, and the applicants with the best scores are chosen.

On average, new apprentices are 21-40 years old, with about 10-15% female participation.

Upon graduation, the Apprentices are guaranteed a journey level position as a Utility Craftworker, with career advancement possibilities leading to Supervisor, Assistant Superintendent, and Superintendent.

At the time of this writing, DWR currently has 11 Utility Craftworker Apprentices and 170 journey level Utility Craftworkers.

Why Simulation

At DWR, simulation is put to work in two different ways.

For apprentices, simulation helps them begin their equipment operator training. And because there is never enough (real) heavy equipment to provide seat-time to all the apprentices at the same time, simulation also plays a role as a "virtual" seat.

For journey level employees who already have real equipment operating experience, simulation helps

them “refresh” their operating skills, because the same person does not operate all the different types of equipment all the time. In this way, when work in a particular region requires, say, a mobile crane, the journeyman in that region can “refresh” crane operating skills at the simulator, before starting that work.

In both cases, it’s easy to see that the purchasing, operating, and maintenance costs for simulation is much lower than the equivalent costs for real heavy equipment, and this cost-effectiveness is why DWR added (Simlog) simulation to the training program.



The Simlog Personal Simulators

DWR’s simulator-based training began in 2017 with the purchase of Simlog’s Hydraulic Excavator and Mobile Crane Personal Simulators along with *Simulation Manager*, the database “back end” for storing simulation results.

The original setup, shown here, featured a Simlog Operator Chair and a single “smart board” front display. (In the photograph, an apprentice is reviewing mobile crane simulation results.)

Two years later, in 2019, DWR added Simlog’s Backhoe Loader, Bulldozer, Forklift, and Wheel Loader Personal Simulators.

The current setup now features the Simlog Operator Chair equipped with an industrial steering wheel mounted on a telescoping and pivoting steering column, industrial pedals, and an additional wall-mounted rear display.

In 2020, DWR added Simlog’s new Skid Steer Loader Personal Simulator, to create a single “multi-purpose” simulator station that provides operator training help for a total of 7 different types of equipment listed here alphabetically: Backhoe Loader, Bulldozer, Fork-

lift, Hydraulic Excavator, Mobile Crane, Skid Steer Loader, and Wheel Loader .

Simulator-based Training

The equipment operations part of the Utility Craftworker program typically begins with Skid Steer Loader. (Because of its small size and simple operator controls, skid steer loader is considered “entry level” heavy equipment, so that’s where operator training typically begins.)

At Tejon Pass, apprentices train in pairs, one at the controls of a (real) skid steer loader and the other observing, taking turns under the supervision of the Director or a journeyman “on loan” from a region.

At the same time, two other apprentices train at the simulator, one at the controls and the other observing, again taking turns under the supervision of the Director or a journeyman.

Note that because the simulator-based training is supervised (just like the real seat-time), apprentices quickly progress through the various Simulation Modules for each equipment type, based on the real-time evaluation of their simulated work by the supervising Director or journeyman. (For this reason, DWR has no “formal” benchmarks, i.e. target values that the simulator-based training must achieve.)

Overall, with software to simulate 7 different types of equipment, each apprentice typically receives 6 hours of simulator-based training per equipment type, for a total of about 40 hours.

Concluding Remarks

To date, a total of 21 apprentices have been trained with the help of DWR’s simulators and according to the Training Center Instructor, “It is a very useful tool for us, and we are treating it just as a real piece of equipment”.

Unfortunately, as of this writing, the COVID-19 pandemic continues to oblige DWR to make changes to the Utility Craftworker program. For example, apprentices now train in smaller groups (in part to promote social distancing) and to that end, DWR must now offers multiple instances of the same training elements. And when people are sick, there are even “make-up” classes, that further complicate program delivery.

Of course, the simulator is carefully cleaned and disinfected after each use.

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To learn more,
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State of California's Department of Water Resources
www.water.ca.gov/apprenticetraining