



Distribution Training Lab



Colorado’s most advanced hands-on water distribution training lab is located at the Environmental Training Center, home to the Water Quality Management Technology (WQM) program at Red Rocks Community College.

Funded in part by the National Science Foundation and TAA-Department of Labor

The Distribution Training Lab is designed to teach students about the intricacies of distributing safe drinking water. Poorly managed distribution systems pose the greatest risk to regulatory violations, resulting in contamination and public health issues. The Lab combines classroom instruction, a tabletop model, and an outdoor hands-on living laboratory that replicates actual work scenarios. The outdoor laboratory is equipped with night lighting to accommodate evening classes.

Scaled Community Model

A tabletop model of a community supports classroom materials by replicating a small urban center with fire hydrants and a water tower, and also depicts suburban and rural environments. The tabletop model allows instructors to teach watershed management, point source and non-point source water contamination, and teaches students how the general public sees their community.



The model is lifted to show the often-unseen underground pipe grid system that feeds fire hydrants, homes and businesses. Instructors use the underside of the tabletop model to teach distribution systems and how they function, including consecutive systems, cross connections, traffic

control with mainline work, dead ends and hydraulic dead ends, water storage, and correct sample locations and protocols.

Outdoor Hands-on Laboratory

“Safety first” is not only an important motto, but also one of the key teaching objectives of the outdoor laboratory. Comprised of multiple teaching stations, the Lab has an aboveground vault that gives students the real experience of working in a confined space typical to water distribution systems. Instructors use observation windows to monitor students’ safety while they are in the vault. Inside, students find four typical configurations: 1) double check fire line 2) compound meter assembly 3) by-pass system and 4) air vacuum relief system. During this exercise, students learn how to wear personal protection equipment (PPE) while they learn the required procedures for entering an underground confined space.



Students learn about fall protection and the associated PPE necessary to prevent injury at a second safety station with an elevated platform. This station is used to demonstrate multiple risk factors when entering under-ground vaults and other distribution hazards that are below street level.

Students learn about hazardous materials handling at the last safety station, practicing leak detection and control for 150 lb. chlorine cylinders and 1-ton chlorine containers. Students also become familiar with A and B chlorine tank repair kits, while learning state and federal environmental health requirements.

Live Water Mains

The Lab has a fully pressurized aboveground piping array featuring a series of different pipe sizes, materials, and connections. At this learning station, students learn about pipe assembly, maintenance and repair clamps, tapping, and inspection. The above-ground array has MJ, PVC, DI, Valves and Plugs for 2, 4, 6 and 8-inch diameter pipes.

Leak Detection Field

Students use sonar technology to find water leaks in the intentionally damaged, below ground piping network. This final teaching station addresses a growing issue for distribution systems where significant quantities of treated drinking water are lost to leaks due to aging infrastructure. Students see first-hand that repairing small systemic leaks can have positive impacts on water conservation efforts.

The Water Distribution Lab was funded by an Environmental Protection Agency education grant administered by the Colorado Department of Public Health and Environment-Water Quality Control Division, Denver Water, and Olsson and Associates Engineering.



Many WQM activities are supported by one or both of the following grants:

The National Science Foundation's Advanced Technological Education (ATE) program under Award No. 0903055. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

Trade Adjustment Assistance Community College and Career Training – U.S. Department of Labor (TAA). "This product was funded by a grant awarded under the President's Trade Adjustment Assistance Community College and Career Training Grants as implemented by the U.S. Department of Labor's Employment & Training Administration. The information contained in this product was created by a grantee organization and does not necessarily reflect the official position of the U.S. Department of Labor. All references to non-governmental companies or organizations, their services, products, or

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