



FIGURE #1



FIGURE #2

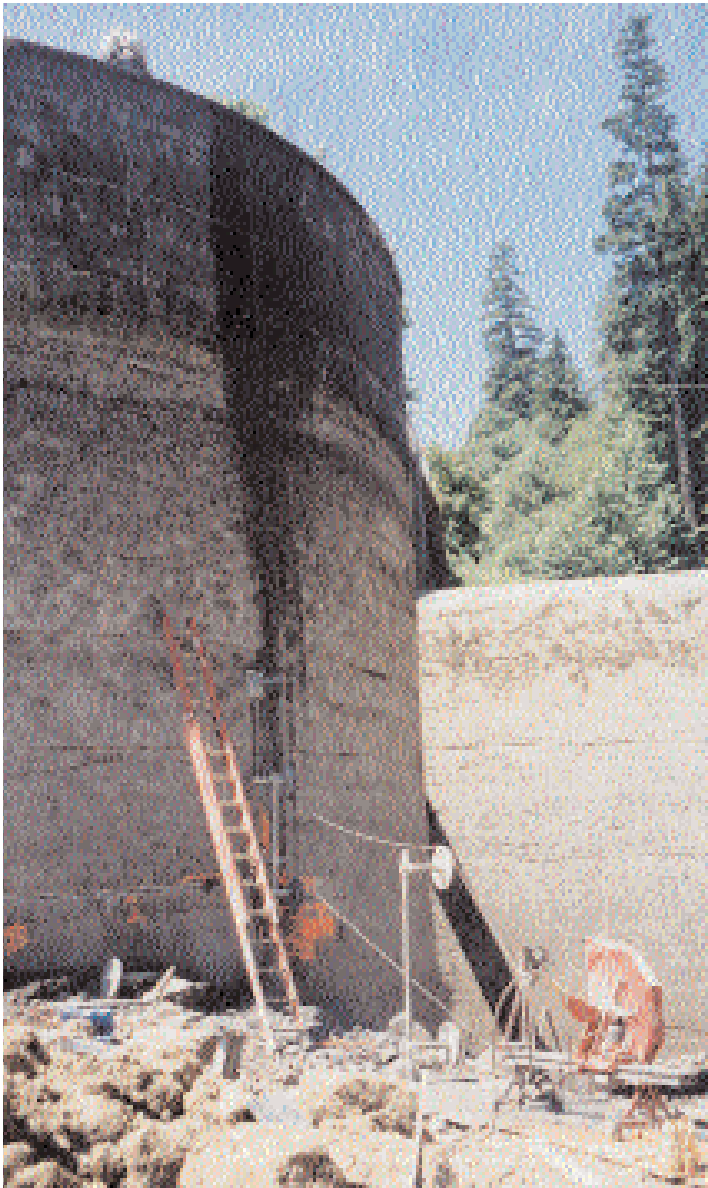


FIGURE #3



FIGURE #4

The Solution to a Dam Problem

Team Work Helps Upgrade Portland Water Reservoir

After serving the citizens of Portland since the early 1930s, one of the dams that comprise the city's water reservoir system was slated for upgrading and renovation. The scope of work required a section of the existing dam to be removed to accommodate a new spillway. Impact removal methods were excluded from this phase of the project. The reasons for this were to preserve the structural integrity of the dam and to create a clean cut that would facilitate the construction of the new spillway within the existing dam structure. Also, the job had to be done in a timely manner to prevent a decrease in the city's water supply. After consultation between Construction Solutions, a Division of Diamant Boart Inc. and a consulting and engineering support company, American Concrete Cutting of Springfield, Oregon and officials from the Water Department of Portland, diamond wire sawing was specified for this phase of the project. Wire sawing was specified because of the size of the area being cut.

To remove the required section of the dam three wire cuts were needed. The first cut was a horizontal cut along the base of the dam. The cut area was 14 feet (4.26 meters) by 39 feet (11.88 meters) by 17 feet (5.18 meters) by 29 feet (8.84 meters) (see figure #1). Using Diamant Boart P80 spring wire and a SLA800 Wire Saw, this cut required six hours. It has been Construction Solution's experience that for wire saw jobs the set-up time requires about twice as much time as the cut time. This was evident on this job. For the first cut, the set-up time was 11 hours, most of which was required because of the large wrap area, or length of the wire that was in contact with the object being cut, and the methodology required to get the cut started with such a large wrap.

The second cut was a vertical cut flush against temporary shoring, holding back dirt fill. This cut was triangular in shape (see figure #2) with overall dimensions of 3 feet (0.914 meters) by 29 feet (8.83 meters) by 14 feet (4.27 meters). This cut required two and a half hours to complete with a set-up time requirement of five hours.

The final vertical cut was angled towards the gate control house at the bottom of the cut area (see figure #3). Further complications were present with this cut due to limited space, which would require fabrication of special guide pulley fixtures and mounts. After consulting with the General Contractor and the Portland Water

Department, it was decided that the job would be expedited if wire sawing were allowed on the reservoir side of the dam. Special precautions were taken to protect the bottom of the reservoir from being contaminated. All of the required equipment was craned over the dam and setup. The last vertical cut had dimensions of 3 feet (0.914 meters) by 29 feet (8.83 meters) by 17 feet (5.18 meters). This cut required almost three hours to complete. Set up time for this cut, including relocation of all equipment to the reservoir side of the dam, required seven hours.

Some of the special precautions that American Concrete Cutting and Construction Solutions took to preserve the water reservoir were, lying a double layer plastic tarp under the power pack to prevent any oil from dripping off of the machine and into the reservoir. They also built a diversion for the slurry and pumped all of the slurry out of a plastic lined depression. The wire saw was mounted on a piece of plywood to catch any overspray from the sawing work and in general operators had to be careful about the simplest things, like where they set their tools down (see figure #4). Their precautions paid off though and the reservoir remained protected.

The 2 million pounds of concrete that comprised the spillway section of the dam was able to be removed in one large piece and then broken up into manageable pieces using heavy concrete breaking equipment. Cutting rates as seen on this job were faster than is common, due to the composition of the concrete structure. This dam was built without reinforcing steel, utilizing local granite and basalt aggregate ranging in size from 3 inches (76 millimeters) to 3/4 inch (19 millimeters). Typical performance of P80 wire operated with 30 hp (23Kw) or greater is between 15 to 18 square feet per hour (approximately 1 to 2 square meters per hour).

General Contractor and Portland Water Department personnel were impressed with the efficiency of wire sawing the spillway access. This challenging job only took five days utilizing concrete cutting techniques. After onsite consultation it was decided to replace the use of impact removal of the gate control house to using wire sawing and bulk removal.

American Concrete Cutting of Springfield, Oregon was founded in 1982. They are a full service concrete cutting company with 15 employees. They primarily focus on specialty demolition, like dams and bridges. They have been a member of CSDA since 1999. ●