Preparation of Museum-Quality Soil Monoliths

Jim Ford, Charley Cail, and Bob Bourlier

Port silt loam (fine-silty, mixed, thermic Cumulic Haplustoll), a fertile alluvial soil common in central and western Oklahoma and cropped largely to wheat (*Triticum aestivum* L.) and alfalfa (*Medicago sativa* L.), was designated the state soil of Oklahoma in 1987. We found preparation of the museum-quality monoliths of this soil a worthwhile effort that provided a focus for fellowship, learning, fun, and hard work at the annual meeting of the Professional Soil Scientists Association of Oklahoma.

Sampling was on the El Reno USDA-ARS research station where a backhoe was used to dig a trench 6-feet deep, 15-feet long, and 3-feet wide. This made a pit large enough for four vertical sections to be selected and collected and also allowed room for several persons to work and maneuver in the pit. The soil was near field capacity when collected.

The central concept of the soil was located on the vertical face and a detailed description made. The next step was to smooth vertical faces where sections were to be taken. An angle iron frame was then hammered into the face to outline the area to be collected, and the surrounding soil excavated. Excavation was with butcher knives and pick hammers to cut back sides to a depth of 8 to 10 inches. When the face and edges were smoothed, a wooden holding tray (2¼-inch deep × 11¾-inch wide × 48-inch long) made of ½-inch exterior plywood was placed over the face of the soil section.

Excavation was then begun from the top to separate about a 5-inch thick soil section from the pit wall. This was accomplished with the use of knives, sharpshooters, and flexible saws. Care and patience were required as we worked toward the bottom to keep the section from collapsing under its own weight. Once the section was separated, it was lifted from the pit and smoothed to level with the edge of the holding tray (2¼-inch thick). Next, the trays were transferred to a storage area to air dry for 60 days.

To prepare the soil for display, the formica-covered back of the permanent display cases was placed over the soil in the holding tray, then the soil section was turned to face upward and the holding tray lifted off. The soil was then carefully trimmed to final dimensions (2-inch thick × 11½-inch wide × 48-inch long). Our first attempt to work down the face was to use knives, but this loosened ped structure and caused unwanted cracking and disturbances. We found that a crosscut bow saw worked the best for trimming the soil to the right thickness. (Fig. 1). Once the soil was trimmed to the approximate final dimensions, the front and sides of the display tray were test fitted over the monolith to mark final trim areas so the fit was a snug as possible.

After final trimming, the face of the monolith was prepared. We found that a smooth-finished surface (rather than a surface roughened to show structure) worked better because it allows a smoother, tighter fit into the encased display. This tight fit also keeps the soil from crumbling and moving as opposed to a roughened ped structure surface with voids.

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1 Soil scientists, USDA-SCS; Alva, Woodward, and Oklahoma City, OK, respectively.