

SURVEYOR'S SPADS

by Michael Ebers
Clinton, Tennessee

In answer to the Fall 1992 issue of the MAC, I will try attempt to provide a description of how surveying spads or pins were used during mine surveying.

A hook type of spad was used at the Austinville Zinc Mine in Austinville, Virginia, in the 1970's where I worked for five years. These spads were driven into wooden plugs in holes drilled in the roof of drifts and raises. These control points were called *grade and control plugs*. The wooden plugs were always in pairs, 10 to 20 feet apart and spaced about 150 feet apart along the drift or raise.

The grade and control pins were installed as a drift or raise was being driven to insure that the grade/inclination and bearing were being maintained. If the drift or raise had been advanced 150 to 200 feet beyond the existing grade pins, or if a change in direction or inclination was called for, a new set of pins were installed. The surveying crew would drill a six inch deep hole in the roof of the drift or raise near the face with one of the development crew's jackleg drills. Then a pine plug and spad were inserted into the hole. This was now the new rear control pin. The surveying crew would then set up the transit directly below the new rear control pin. They would hang a surveyor's light on one of the previously installed control pins 150 feet back down the drift and turn the proper angle. Then, by sighting through the transit, the surveyors would be able to align the drill to drill the new front control pin hole in the roof of the drift about twenty feet closer to the face. A pine plug and spad were also inserted into this hole.

Back at the office, the surveyors would calculate the exact location and elevation of the two new control pins. It was important that the drift maintained the proper bearing and grade. The grade in a drift was normally $+1/2$ degree, so that water would drain back towards the entrance. The surveyors would then cut two pieces of steel chain about four feet long and stamp on the washer either "Front" or "Back." The length of each chain had been calculated so

that the proper grade would be maintained. The development crew would, prior to drilling each new round of holes at the face of the drift, hang the two chains from the two control pins. They would then, using the two washers as a sight, mark the aligned point on the face of the drift. This point should be in the center of the face of the drift, four feet from the floor. If the sighting was off, the drillers would know to "pull" the drift to the right or left, or bring the drift up or down during the next round. This same procedure was used for driving inclined raises also.



Shown above are two spad markers. The marker on the left, which is aluminum, is from the Anaconda Copper Mining Company and is the most recent type used. The marker on the right (stamped 311) is brass and was found in the Waterloo Mine at Calico, California, and dates to the early 1890s.



The top spad is brass and is unmarked from the Howells Mining Drill Company. These spads have a hole drilled in them for hanging the plumb bob. The two marked steel spads on the bottom are from the Keuffel & Esser Company. Note the hook at the end of the spad for hanging the plumb bob.