Research Note

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CABLE AND CLAMP MODIFICATIONS FOR MODEL 104 MOISTURE PROBES

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ABSTRACT

Two Troxler depth moisture gages equipped with Model 104 probes being used in a hydrology study in the summer of 1963 were of little value because of repeated cable failure. Two modifications of the Model 104 probe, described herein, provided satisfactory service. A new clamp had to be developed for use with the cable.

Two Troxler depth moisture gages equipped with Model 104 probes were used by the Intermountain Forest and Range Experiment Station in a hydrology study in the summer of 1963. During the first 240 hours of operation, 200 hours were lost because of cable failure. In addition, continuity of records was so interrupted that collected data were of little or no value. The major source of trouble was broken strands of wire within the cable near the clamp or at the soldered connections within the plug. The breakage was caused by kinks in the wires within the rubber cable sheath that develop when the wires are flexed repeatedly during handling.

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MODIFICATION OF PROBE

The Model 104 probe was modified to remove strain from the connecting plug and to limit flexing of the cable (fig. 1). The modification uses two brass adapters, a $3\frac{1}{2}$-inch brass nipple, and an 8-inch spring.

The strain was removed from the connecting plug by coupling the $3\frac{1}{2}$-inch brass nipple to the probe with one adapter and sealing with a rubber o-ring.

The flexing of the cable was restricted by using the other brass adapter as a compression nut. A rubber compression seal and a leather washer sealed this union. When tightened, this adapter secures the cable to the rubber sheath and limits movement of the cable strands. This adapter also serves as a spring retainer. The 8-inch spring, soldered to the adapter, limits the radius of cable bending for a distance of 1 foot (fig. 2).

After the Model 104 probe was modified, 400 to 600 moisture readings were recorded per day by using both units. By the end of the summer more than 15,000 readings had been recorded without a cable failure.

All parts used are available at any good hardware store, except brass adapter #3 and brass adapter #5 in figure 1. Both adapters can be manufactured at almost any machine shop. Total cost should not exceed $10.00.

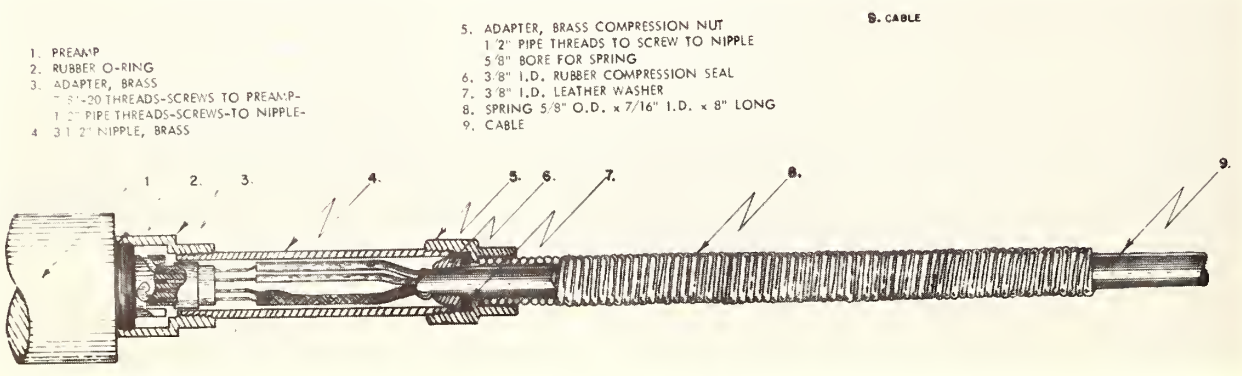


Figure 1.--Details of modification of cable connection for Model 104 depth moisture probes.

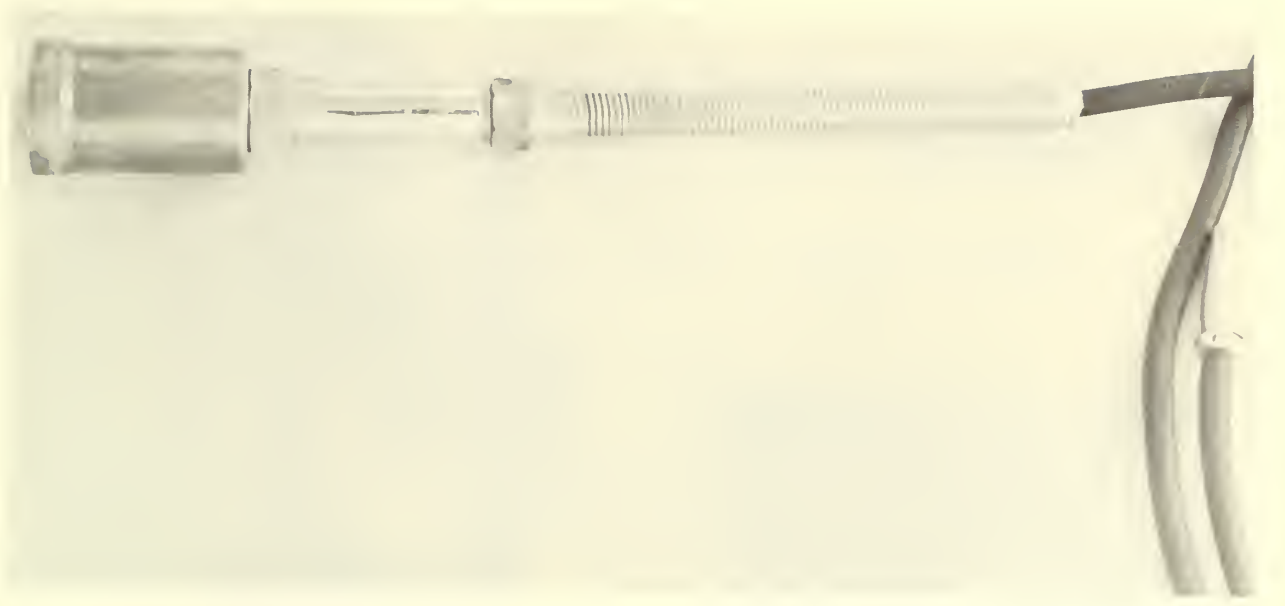


Figure 2.--Cable connection modification for Model 104 probes.

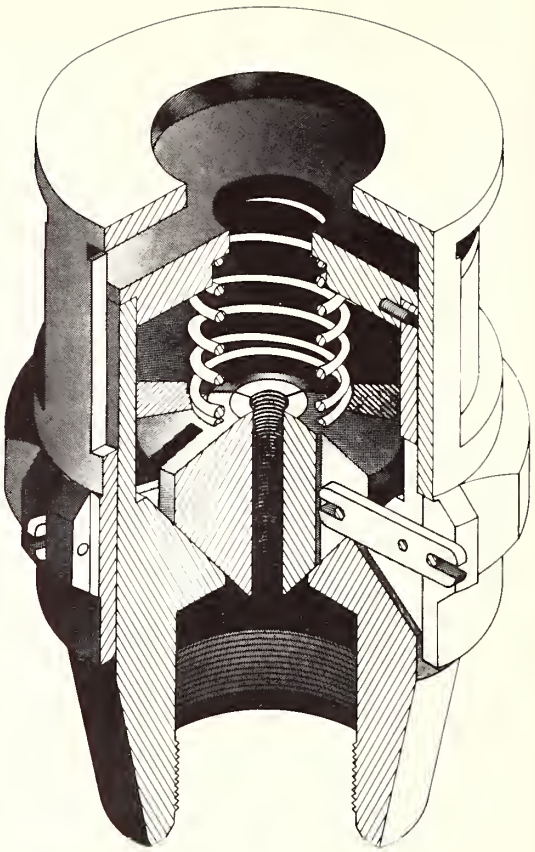
NEW CABLE CLAMP

Because this modification prevents the use of Troxler's existing clamps, a new cable clamp had to be developed (fig. 3).

The new clamp is spring-loaded to remain in the closed position. It can be opened to an intermediate position to permit passage of the cable and can be locked in a wide-open position to allow the previously described cable modification to pass through. To operate, a slight pressure applied to the ring on top of the clamp opens the clamp to the intermediate position and releases the probe cable. When pressure is removed, the clamp again locks the cable. To bring the probe into the standard, greater pressure is applied. This locks the clamp wide open and allows the modified portion of the cable to pass. Figure 4 shows the probe in a raised position.

The quick-release clamp can be made at a good machine shop and, although cost could vary greatly, it should not exceed $100.00. In quantity, it could be made at a much lower cost.

Figure 3.--Details of quick-release cable clamp showing internal mechanism.



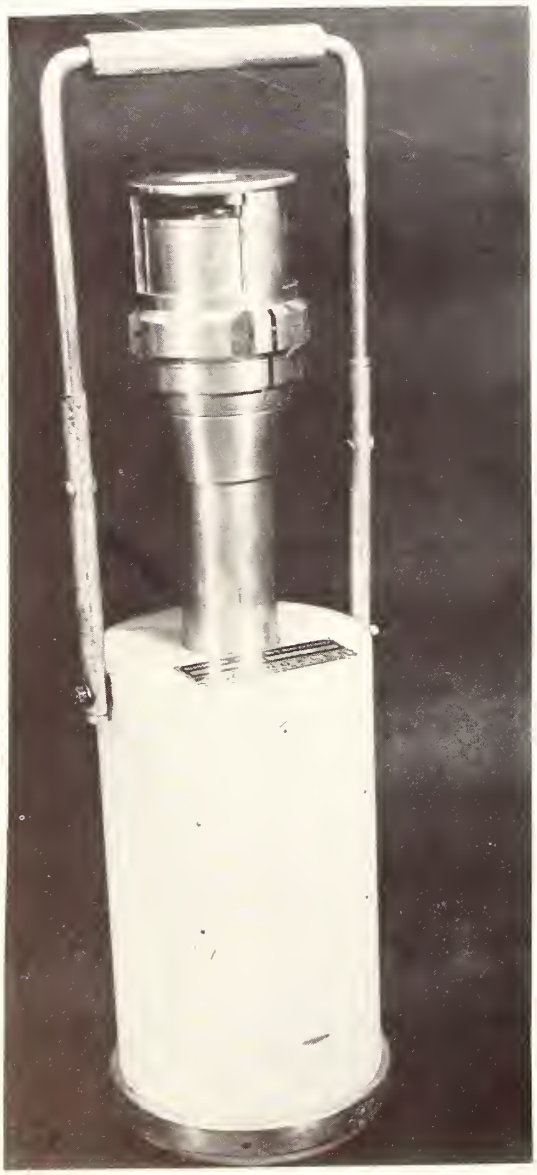


Figure 4.--Quick-release cable clamp installed on the shield and standard.