

# Foundation Deformation

## Foundation Deformation Meters.—

a. **General** -- Foundation deformation meters are installed to measure movement of the foundation rock relative to the mass of the dam. These meters are usually installed in drill holes.

b. **Advantages and Limitations.**--Foundation deformation meters have been successfully used on several Bureau structures such as Yellowtail, Pueblo, and Morrow Point Dams. Obviously, care in installation and taking readings is of extreme importance, as is proper placement of the devices to ensure securing the necessary data required. Since the Bureau is no longer building large concrete dams, this device has not been installed in the past two decades.

c. **Description of Devices.**--The foundation deformation meter used the same design as the Carlson joint meter except that the socket end has a length of steel pipe attached. This pipe, which is inserted into a drill hole, is of sufficient length to extend into the foundation stratum where movement relative to the dam is to be measured. All other portions of the device are the same as described for strain meters. A second device for measuring foundation deformation, which uses an Invar tape and a micrometer instead of a joint meter.

d. **Installation Procedures.**--After a drill hole is made and cleaned to the depth desired, the pipe is inserted into the hole and the bottom 5 feet is grouted solidly into place. The portion of the pipe not grouted is greased to prevent bonding during foundation grouting. Just prior to concrete placement, the deformation joint meter is carefully installed and embedded in the first lift of the dam.

e. **Monitoring Procedures.**--Readings on deformation meters are made in the same manner as for joint meters; the readings are recorded on a field data form.

f. **Maintenance.**--Maintenance on the readout device is identical to that described for strain meters.