



LEA\_IT\_SGG3001001



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# USBR Settlement System

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Instruments and Systems for Geotechnical and Structural Monitoring

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## USBR Settlement System



### Description

The USBR settlement system is used for the measurement of settlement, deformation and ground subsidence in embankments, including of considerable size.

The settlement column is purely mechanical with manual data collection.

Made of robust galvanized iron pipes, it guarantees great resistance even in difficult working environments such as earthfill and rockfill dams, road embankments, etc.

Measurement is performed using a special probe and its stainless steel tape graduated in centimeters, with

precision vernier; measurement is facilitated by a suitable device with a winch.

The USBR settlement system is the most robust and reliable system for monitoring settlement during the construction phases of embankments: where progress of the work makes the use of other instruments on the market critical. In fact for optimum performance, the USBR system should be installed, employed and used for monitoring through all phases of construction.

### Applications

- Earth dams
- Rockfill dams
- Concrete dams (for monitoring of foundations)
- Road and rail embankments
- Piers
- Embankments in general

## Features and benefits

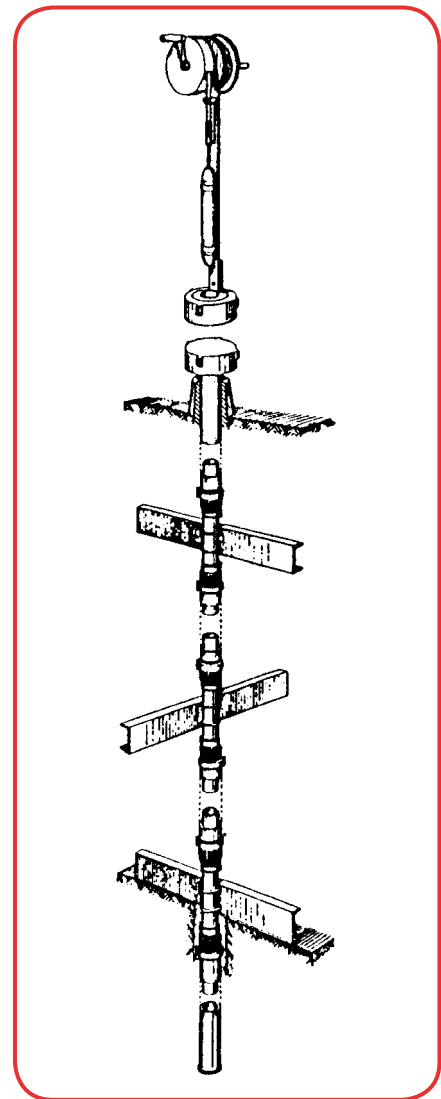
The main features of this system are:

- **Ruggedness**
- **Easy installation**
- **Possibility of taking measurements also during construction of the embankment**
- **Easy to use**
- **No maintenance, except cleaning the probe after use with a simple jet of water**

## Measuring principle

The system is very simple; It is constituted by a column of tubes of two different diameters, partially inserted one into the other and able to slide like a telescope. (It is constituted by an access pipe with telescopic sections) On the smaller diameter tube, steel profiles are anchored and fixed to the ground, these form the measuring point for each layer.

The small diameter inner tubes with ground anchor made by means of a C-profile 1 m long with O.D. 48 mm. The large diameter tubes have I.D. 50 mm and O.D. 55 mm. The tube joints are protected with tubular couplings of neoprene, with scroll springs and clamps. The USBR probe is attached to the graduated tape with a special flex protection device; the probe and the tape are supported by a winch, to be fixed to the head of the settlement column. The winch is endowed with a reference and measurement vernier, a tape reel and a fixing device on the top of the upper element of the column. Measurements are made using the "USBR probe", which is characterized by two retractable flaps that protrude from the main body. The probe is lowered into the column, supported by the centimeter tape; when the probe oversteps the first smaller diameter tube; if recalled, the probe will block against the lower part of the smaller tube. The distance between the flaps and the column head determines the position of the first tube positioned in the embankment.



In this way, it is possible to determine the position (depth) of all small diameter tubes with respect to the column head.

As the small diameter tubes are strongly secured to the ground (with no possibility of slipping or sliding), by measuring changes in distance between these elements, variation in thickness of soil layers or any other interposed material is obtained.

Measurements repeated over time provide not only the settlement of materials in each layer and hence of the entire embankment, but also the extent of settlement in the foundation; it is sufficient to link measurements made by the probe, with periodic measurement of the position of the column head detected by topographic methods.

During measuring, once the probe reaches the bottom of the column and touches the specific device, it retracts its flaps to allow recovery using the graduated tape.



## Technical specifications probe

Bottom Element	Tubular element in galvanized steel, blind, with bottom device for the recovery of the probe (standard Length = 1,5m)
One head Elemen	Tubular element in stainless steel, complete with special head for the application of different measuring devices (standard Length = 1m)
Intermediate Element	Two tubular elements in galvanized steel to form a column element with a length of 1,5 ÷ 1,7 m; other dimensions available on request
USBR Probe	In stainless steel
Dimensions	Diameter = 35mm Length = 225mm
Tape holder support	In steel and varnished and galvanized brass, complete with locking bush to the settlement column
Measuring Tape	Stainless steel, L=50m or L=100m

## Technical specifications probe

Fixed Adapter with collimation target	Device for the application of the collimation target on the head of the USBR settlement column; rigid tube L=70 cm
Sliding Adapter with collimation target	Device for the application of the collimation target on the head of the USBR settlement column; sliding tube with the possibility to increase the length of the tube up to a max. length of 70 cm with step of 5cm each
Lid for the output element	Simple or with benchmark
Stainless steel tape L = 50 m	With plates for the attachment to the probe
Stainless steel tape L = 100 m	With plates for the attachment to the probe

## Technical assistance

If you have any requests or questions about our instruments or if you have special needs that require different solutions from the standard, please contact us. Our team will provide all the necessary information and will be very happy to work with you to study, develop and customize instruments and solutions suitable for your specific needs.

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The product information may be subject to variations at any time.  
Please carefully check the release and contact Pizzi Instruments for further details.

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