

# **Riveted Inclinator casing Installation Manual - For Horizontal Installation**

User manual

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## **Section 1 : Forward**

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This instruction manual, describes the technique required for the installation of riveted inclinometer casing tube, into base slab construction for storage tanks.

Use of the horizontal inclinometer probe and readout unit, and also data reduction and analysis are discussed in separate manuals.

It is important that the materials and equipment covered by this manual should be installed by competent and suitably qualified personnel. They must READ AND UNDERSTAND the procedures outlined in this manual before attempting installation of the equipment on site.

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The techniques described are intended to serve as a general guide and may vary to suit particular site conditions.

## **Section 2 : Introduction**

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The inclinometer casing tube is installed horizontally, for example under an embankment or attached to the steelwork of the base slab in a storage container. An Inclinometer probe is passed through the casing to take readings. Two sprung pairs of wheels in the inclinometer probe body, in conjunction with internal keyways in the casing tube, ensure constant orientation of the probe, relative to the measuring direction throughout the installation length. The profile of the installed casing, which is assumed to be moving as part of the soil or base slab mass, is obtained by interpretation of the observed slope values from the base/ref datum. Changes in consecutive casing tube profiles will indicate the direction and magnitude of vertical movement.

## **Section 3 : Inclinator Casing**

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The inclinometer casing is made from ABS (Acryl nitride Butadiene Styrene). It has four orthogonal opposed keyways, a maximum outside diameter of 70mm and supplied in 3m lengths. Joints between lengths are made using 380mm long telescoping couplings of the same respective material with a maximum outside diameter of 77mm. The internal diameter of the casing is nominally 60mm.

The couplings are connected to the casing tube using 12mm long alloy rivets. (see fig.1) By leaving a gap between each casing tube within the telescopic coupling, lateral movements can be accommodated if required.

### **3.01 Preparation**

Preparation of materials can reduce both time and effort during installation time and reduce the possibility of errors in calculation of lengths.

An installation schedule sheet should be prepared to enable casing lengths to be marked off during installation and allow an installation record to be recorded during installation.

On receipt of the inclinometer casing tube, it should be stored on a flat surface to prevent distortion.

Check with the engineer the exact location of the casing tubes within the base slab steelwork. Particular care should be taken to ensure correct position where the two casing tubes cross over each other at the centre position.

## **Section 4 : Installation of Inclinator Casing in Base Slab**

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### **4.01 Installation in Soft Ground (trench)**

Select the required number of casing tubes and couplings to suit the installation. It is common practice to install the casing in a sand filled trench, which is then backfilled and lightly compacted to protect the casing prior to the construction of the embankment or the placing of soil over the trench.

Each casing tube is then pre-fitted with a coupling, this will simplify the installation when the casing tubes are joined together.

- a) Mark one end of each casing tube with a mark corresponding to half the length of an inserted coupling.
- b) Run a bead of sealing mastic around the outside of the casing tube, approximately halfway between the end and the mark.
- c) Push the coupling over the casing tube down to the mark. Drill through the casing tube midway in the slot in the coupling and rivet using two large headed rivets. Run a bead of sealing mastic around the shoulder formed by the casing tube and coupling and infill the two slots and rivet heads with mastic. Wrap sealing tape (DENSO TAPE or similar) tightly with half width overlap for approximately 75mm over the coupling end and over the slots and rivets.
- d) Pass each pre-assembled length of casing tube and coupling through the base slab steelwork. These are joined together in the same manner as described above (c), with each casing tube being pushed firmly into the preceding coupling before riveting.
- e) When all the casing tubes have been installed, starting from one end, align the 4 internal keyways (vertical and horizontal) and secure to the steelwork with tie wire every 2m.
- f) Ensure that an end pulley (if being used) is fitted and that a draw string is fed through the casing during installation to aid with subsequent readings.
- g) Finally, protect the casing tubes from debris etc. by fitting end caps.

### **4.02 Installation of Base Slab Steelwork**

Select the required number of casing tubes and couplings to suit the first installation across the base slab. Each casing tube is then pre-fitted with a coupling, this will simplify the installation when the casing tubes are joined together.

- (h) Mark one end of each casing tube with a mark corresponding to half the length of an inserted coupling.
- (i) Run a bead of sealing mastic around the outside of the casing tube, approximately halfway between the end and the mark.
- (j) Push the coupling over the casing tube down to the mark. Drill through the casing tube midway in the slot in the coupling and rivet using two large headed rivets. Run a bead of sealing mastic around the shoulder formed by the casing tube and coupling and infill the two slots and rivet heads with mastic. Wrap sealing tape (DENSO TAPE or similar) tightly with half width overlap for approximately 75mm over the coupling end and over the slots and rivets.
- (k) Pass each pre-assembled length of casing tube and coupling through the base slab steelwork. These are joined together in the same manner as described above (c), with each casing tube being pushed firmly into the preceding coupling before riveting.
- (l) When all the casing tubes have been installed, starting from one end, align the 4 internal keyways (vertical and horizontal) and secure to the steelwork with tie wire every 2m.
- (m) Repeat (a) to (e) above for the second casing tube installation at 90°. Take particular care at the central crossover point where the tubes pass.

- (n) When both casing tubes are tie wired to the steelwork the integrity of the installation should be checked by passing a dummy inclinometer probe through each tube. If necessary, alignment can be adjusted by repositioning the tie wires.
- (o) Finally, protect the casing tubes from debris etc. by fitting end caps.



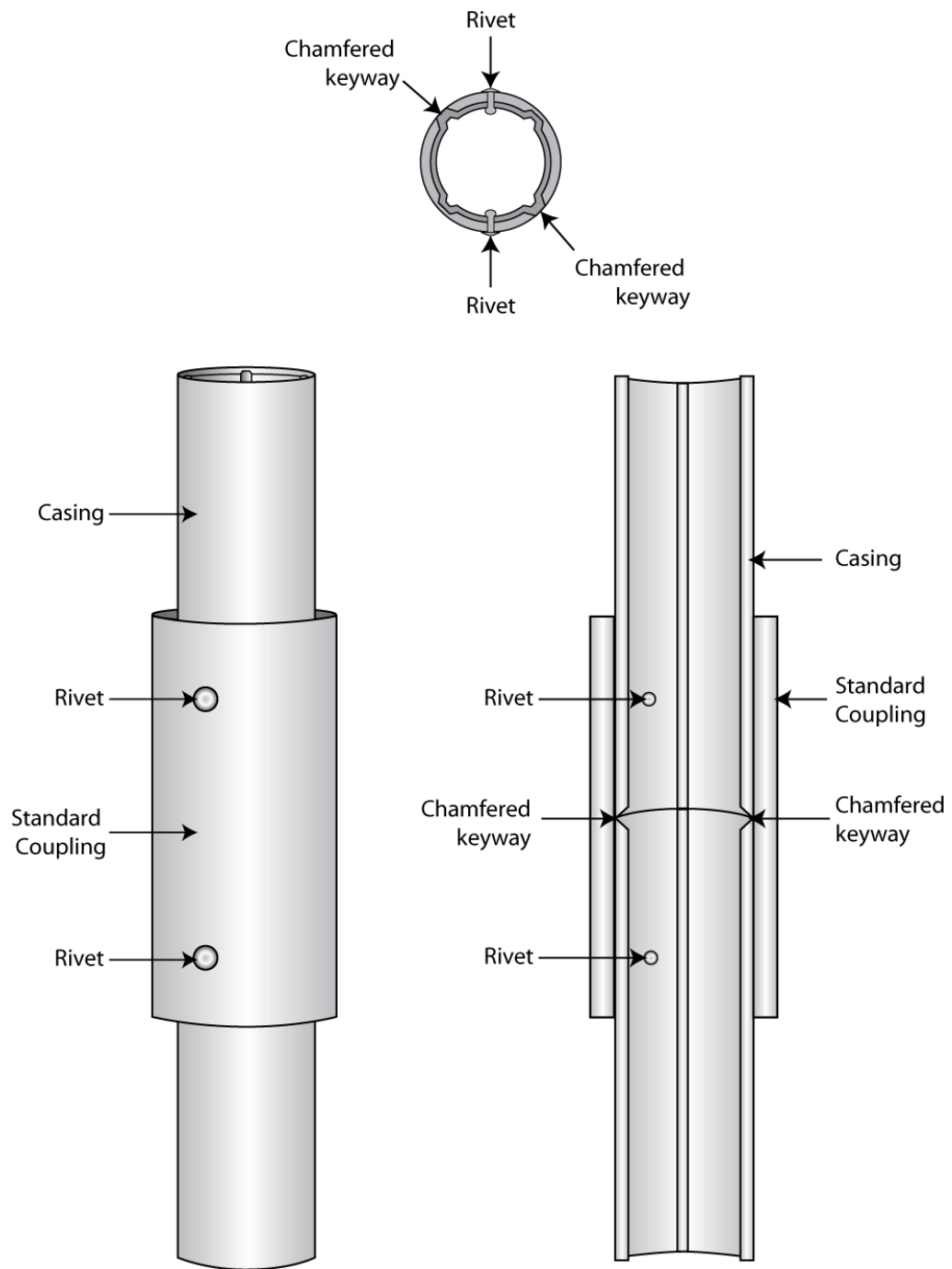
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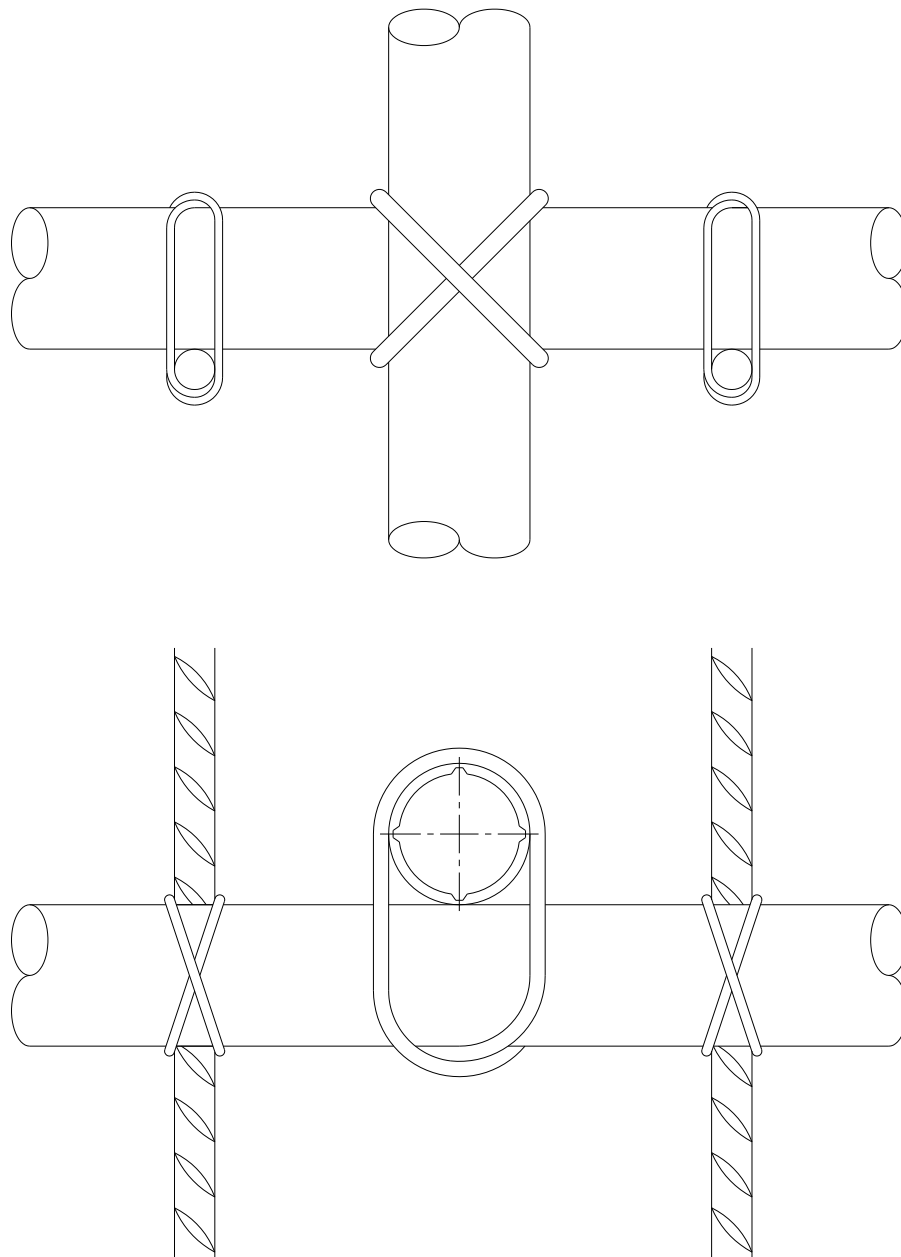
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**Figure 1: Inclinator Casing Coupling**





**Figure 2: Inclinator Casing Tie-wired to Steelwork**



**Figure 3: Installation of Horizontal Inclinator Casing Tube in Base Slab Steelwork**

