

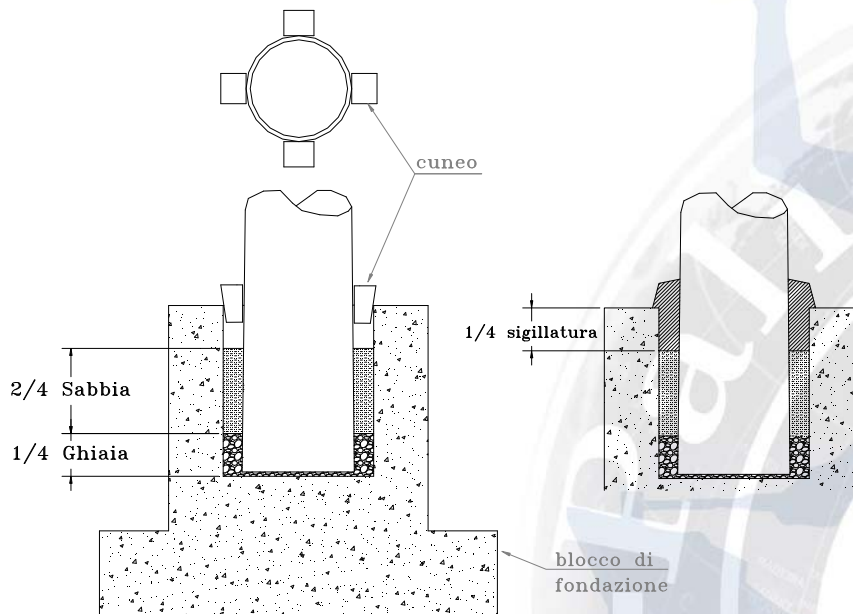
INSTRUCTION FOR ANCHORING THE COLUMN TO THE FOUNDATION BLOCK

GENERAL

Instructions here below mentioned concern the operation to be done to lift the columns (either with circular or polygonal cross section) in case of direct burying into the foundation block and, in case of base plate into foundation block or in case of fixing with base plate and anchor bolts. **IN ADDITION TO THESE INSTRUCTIONS YOU NEED ALWAYS TO REFER TO THE WORKSHOP DRAWING GIVE WITH THE ORDER WHICH MAY CONTAIN INFORMATION REFERRING T THE PARTICULAR CASE**

Before lifting the column You must wait the need time to have the complete aging of the fondation block .

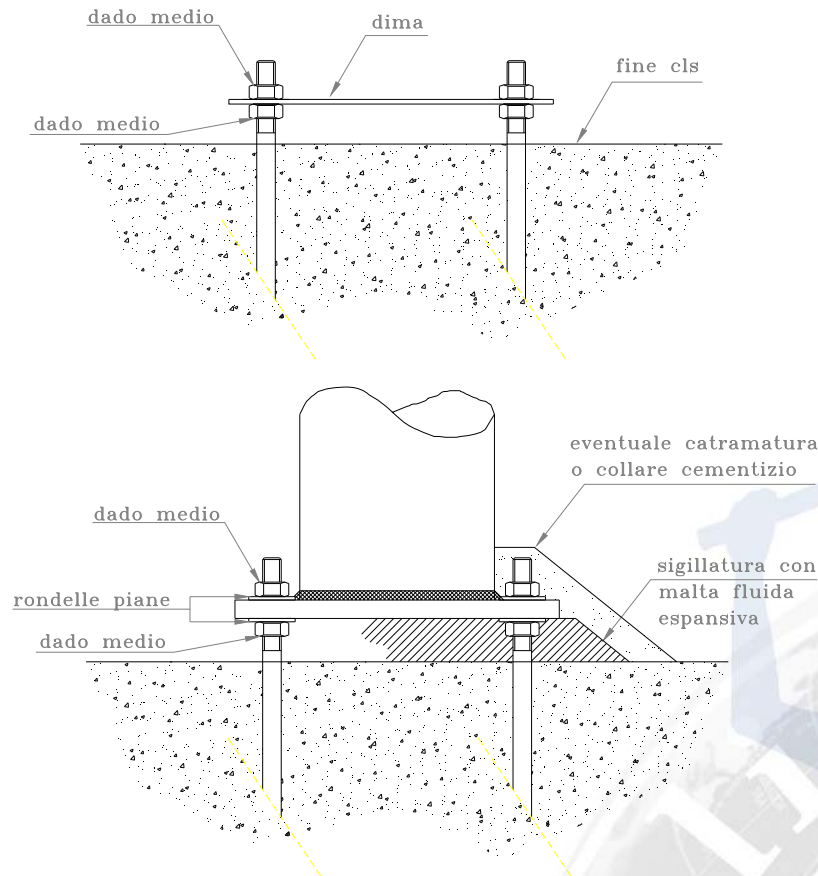
BURYING INTO FOUNDATION BLOCK



To fix the columns into the foundation block you have to carry out the following g operations:

- Insert the base of the column into the socket of the foundation block
- Put pebbles and sand all around the column (press it well) according to the indication mentioned in the figure beside.
- Insert 4 wooden edge around the column located at 90°; act on the wooden edges to plumb the column
- Press the sand (if You need add more in order to respect the ratio mentioned in the drawing)
- Take the edges and seal with concrete, which must be of the same type employed in the construction of the plinth

COLUMN WITH BASE PLATE AND ANCHOR BOLTS



For columns with base plate , before lifting the column You have to cast the anchor bolts into the foundation block. In order to locate properly the anchor bolts You will employ a blank steel template, that is a plate already drilled with correct distance between holes centre.

The assembled group template + anchor bolts must be arrange perfect plumb and fixed (with strips) to the reinforcement of the plinth, in order to avoid movement during the casting phases.

Carry out the following operations:

- Insert the column on the anchor bolts and lean it to the nuts below
- Screw, without tightening, the nut above
- Plumb the column acting on the lower nuts
- Tight the upper nuts
- Seal with fluid mortar

NOTE: When You cast the anchor bolts into the foundation block You must pay attention and leave the whole threaded part out of the plinth. Furthermore it to keep the threads clean it is good to protect them covering them with adhesive strip.

Once the concrete is hardened You can unscrew the nuts and take the template out that can be used to locate others anchor bolts.



WARNING NOTE

TIGHTENING OF BOLTS FOR JOINED PART NOT PRESTRESSED

The prescription of standard D.M. 14.01.2008 “technical standard for constructions”, define a pre stressing force for bolted joined in order to prevent the sliding between the two parts to be joined making thus a friction union. In this case a force equal to 70% of the ultimate resistance to traction of the bolts according to the formula:

$$F_{p,Cd} = 0.7 \cdot \frac{f_{th} \cdot A_{res}}{\gamma_{M7}}$$

To which it is associate a tightening torque equal: $M = k \cdot d \cdot F_{p,Cd}$

where:

f_{th} = resistance to traction of the bolt

A_{res} = resisting area of the bolts (reduced of the threaded part)

γ_{M7} = safety coefficient (equal to 1.1 for high resistance bolts pre stressed)

k = safety coefficient (equal to 1.1 for high resistance bolts pre stressed)

d = nominal diameter of the bolt

The scope of the friction union is that on to bring to contact the two parts to be joined so that they do not slide one on the other, causing as a consequence a traction stat on the shaft of the bolt until to reach values near to the yield point. Infact, considering a bolt class 8.8 [yield point 640 MPa, braking load 800MPa], the pre stressing force is equal to:

$$F_{p,Cd} = 0.7 \cdot \frac{f_{th} \cdot A_{res}}{\gamma_{M7}} = 0.7 \cdot \frac{f_{yh}}{0.8} \cdot \frac{A_{res}}{1.1} \cong 0.8 \cdot f_{yh} \cdot A_{res}$$

where f_{yh} = resistance to the yield point

We reach therefore values near to the 80% of the yield point.

In case of structures with base plate the connection between plate and foundation block isn't a friction bolted union working with pre stress, therefore the verification of the tightening torque by means of a dynamometric key. In fact , the task of the anchor bolts is to transfer the stresses deriving from the upper structure to the foundation block, that is to maintain the structure in its place avoiding the overturning.

Furthermore we underline that to apply a tightening torque to the anchor bolts can be counterproductive because You will pre stress the anchor bolts with a force equal already to the 80% of the yield point (maintaining only 20% as reserve for the external actions).

For the above mentioned reasons, generally THE PRE STRESSING TIGHTENING TORQUE MUST NOT BE APPLIED on nuts of anchor bolts or in general nuts and bolts of our products (if not clearly specified in the workshop drawings in particular cases)

BOLTS AND NUTS MUST BE TIGHTENED WITH STANDARD KEYS AVAILABLE FOR SALE WITHOUT EXTENTIONS OR SOMETHING SIMILAR, EMPLOYING A NORMAL EFFORT WHICH CAN BE DEVELOPPED BY A PERSON

Approximately the applied torque values can be defined according to the following hypothesis:

- Considering that they are bolted joined parts which are not subjected to pre stressing.
- Considering that the tightening of the bolts forced with the normal human force.
- Considering that the maximum effort which can be done by a man in safety, is defined as 25kg (D.L. 81/08 - ISO 11228)
- Considering the length of normal fork keys normally for sale.

You can have an indication about the tightening torque by the following formula: $M = F \cdot L$,

where F = applied force (max 25 kg ~ 245 N) e L = length of the key

Hereby we list as an indication some tables with the length of standard simple fork keys

Chiave a forchetta semplice		
	Misura chiave	L [mm]
	10	120
	13	145
	17	160
	19	175
	21	175
	22	196
	24	196
	26	216
	27	216
	30	240
	32	270
	35	300
	36	300
	38	300
	41	340
	42	340
	45	376
46	376	
50	420	
55	450	