3. 2. 2. DETERMINATION OF A FIXING

The tensile loads, compression and shearing forces applied on the fixing angles for the various working heights are given in another file:.

FIXING ANGLE – LOADS AND REACTIONS

This information allows carrying out the calculation of the fitting of the fixing angles adapted to your case of use, knowing that the shearing force is always taken up by two fixing angles.

In general, it can be indicated that, in case of fixing by screw connections or by high–strength tie rod, a correct assembling will be obtained by observing the following data, that is to say:

- F (unit: daN) – maximum static load under tensile strength on 1 fixing angle.
- Fe (unit: daN) – the capacity corresponding to the elastic limit of the tie rod: Fe = S x Re with:
    - S (unit: mm^2) = cross–section of the tie rod
    - Re (unit: daN/mm^2) = elastic limit of the tie rod (class 10.9 Re = 90 kg/mm^2; class 8.8 Re = 64 kg/mm^2; class 6.6 Re = 36 kg/mm^2).
- Definition of the number of rods (N) to be used per fixing angle.

$$\frac{F}{0{,}3\ Fe} = \text{N to be rounded}$$

The number of the rods is always even: 4 or 6, and symmetrical with respect to the upright.

Considering a permissible load per rod, equal to 0,3 of the elastic limit, taking up the moment given by the shearing force and the various dynamic coefficients are integrated.

- Prestress Fp to be applied on the high–strength rod (Fp = 0,5 Fe)

Besides this information concerning the number and the quality of the rods, choosing and fitting workmanlike the fixings are entirely on the user's responsibility.

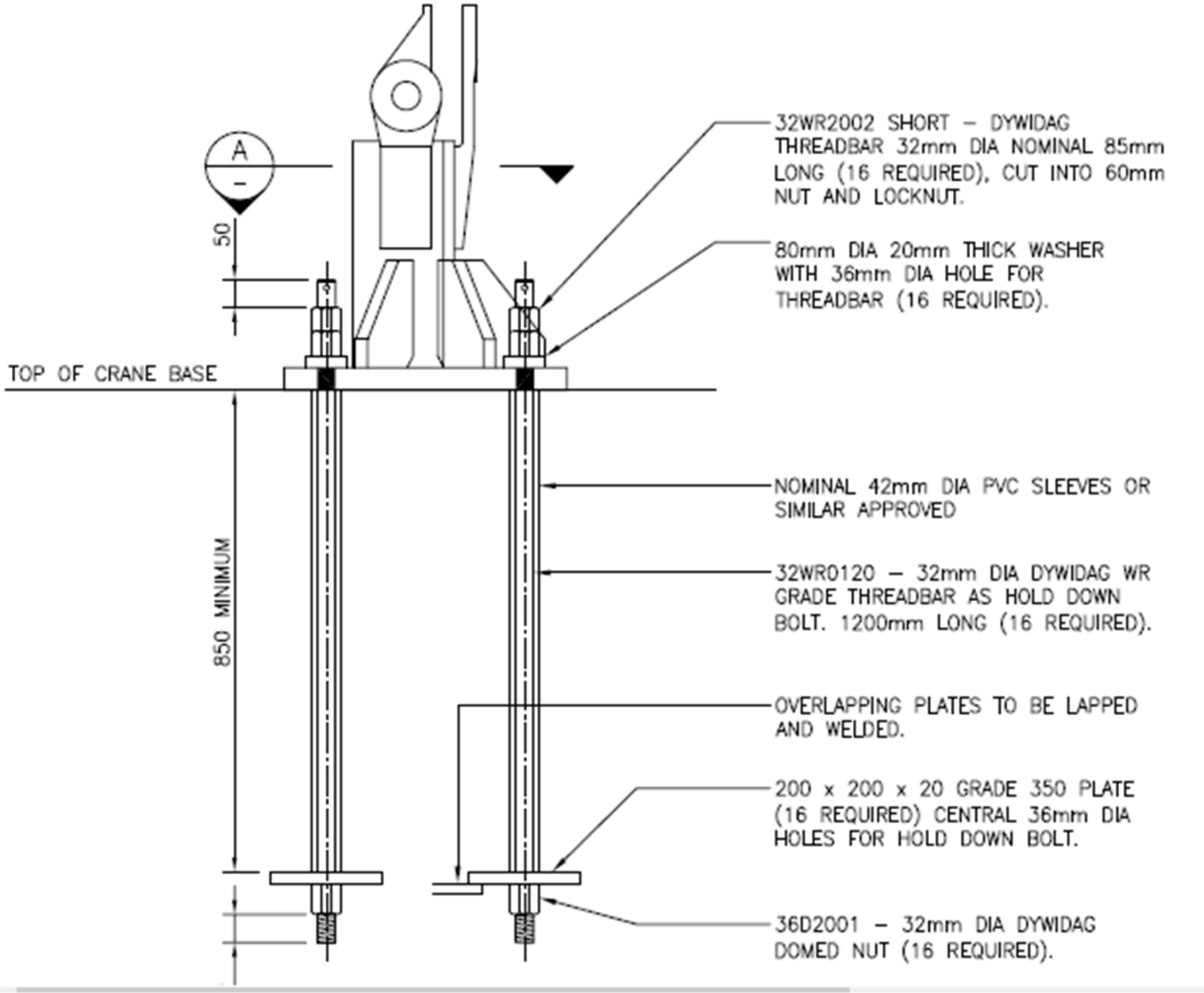
Example: Calculation of the number of tie rods (40 mm diameter, class 8.8) which are necessary for fixing a crane with a max. tensile load of 650 kN at the fixing angle:

- F = 650 kN = 65 000 daN
- Fe = S x Re = 1 256 x 64 = 80 384 daN with:
    - S = π x 40^2 / 4 = 1 256 mm^2 (rod diameter 40 mm)
    - Re = 640 MPa = 64 daN/mm^2 (class of the rod 8.8)
- Therefore N = F / (0,3 x Fe) = 65 000 / (0,3 x 80 384) = 2,70.
  By rounding up to the nearest even number, **4 fixing rods** are necessary per fixing angle.
- Prestress Fp to be applied on the high–strength rod: Fp = 0,5 x Fe = 0,5 x 80 384 = 40 192 daN

- Unfactored tensile load in crane foot = -716.13kN.
- 4no anchors per foot therefore -179.03kN per anchor.

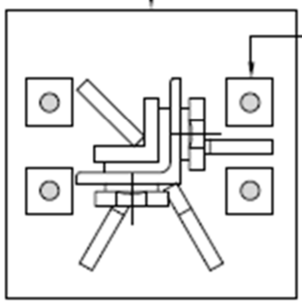
- Yield load of 32mm anchor = 764kN
- Pre load = 50% of elastic limit of anchor road = 382kN
- SWL of anchor = 1/3 of yield = 229.2kN

Difference between specified pre-load and working load = 152kN or +67% of working load



CRANE BASE FIXING DETAIL

CO



STANDARD POTAIN A2 REUSABLE FIXING ANGLE FOR MC85B P12C

BOLTS INSTALLED IN HOLES AS SHOWN

STRESSING PROCEDURE:

1. TESTING OF EACH OF THE CRANE BOLTS AS FOLLOWS
   - STRESS EACH BOLT (ONE AT A TIME) TO 382kN AND SNUG TIGHTEN LOCKING NUT.
2. CONFIRMATION OF TESTING BOLTS TO BE PROVIDED TO [redacted] PRIOR TO CRANE COMMISSIONING.
3. DO NOT WELD HOLD DOWN BOLTS OR NUTS.
4. DO NOT CUT BARS BY OXY ACETYLENE, FRICTION CUT ONLY.

DETAIL A –