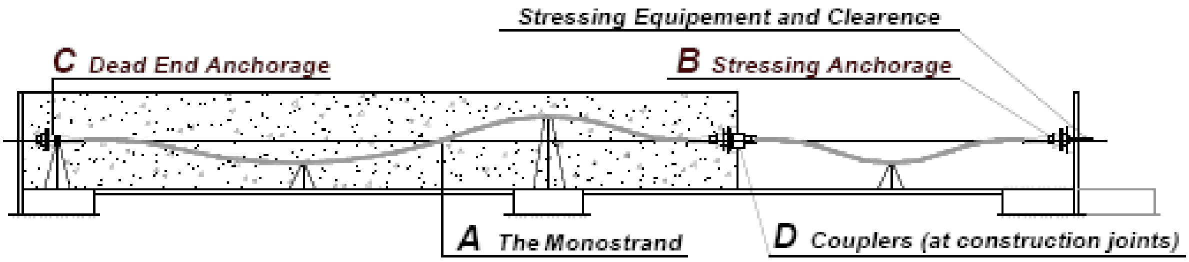
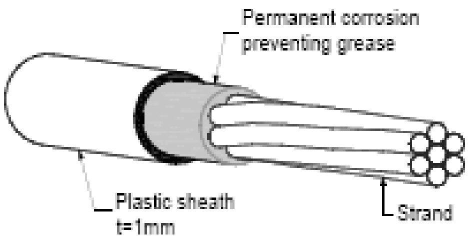
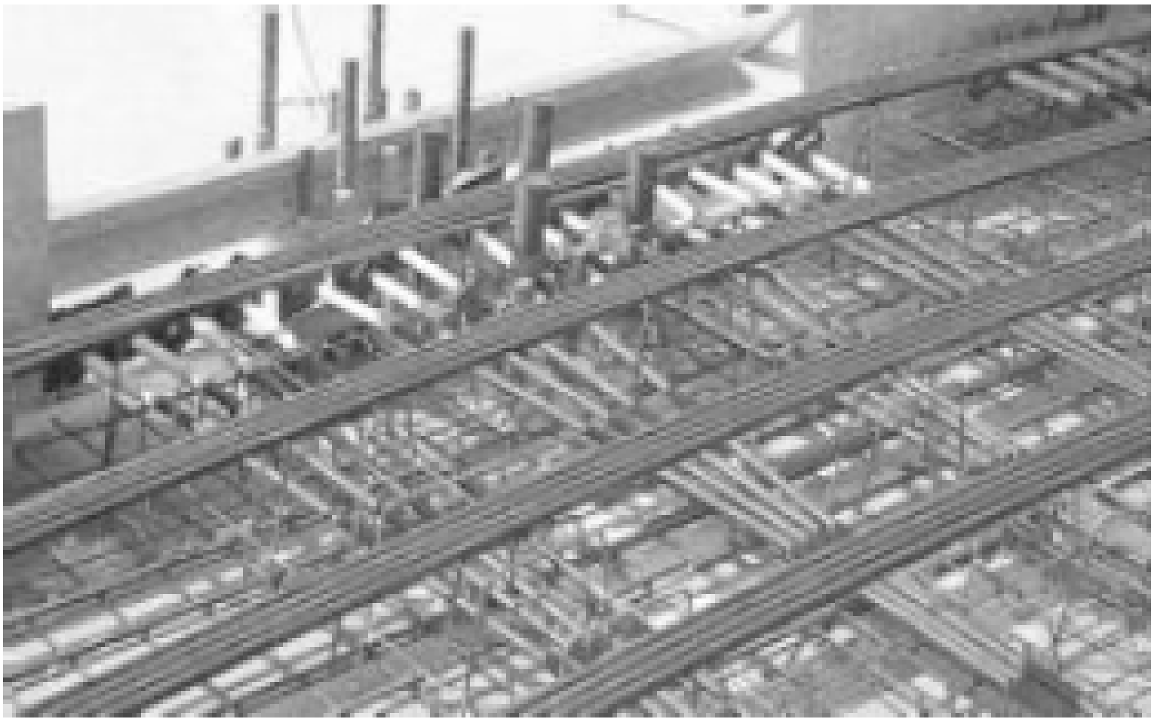


Figure 2.21: Schematic layout of the mono-strand post-tensioning system

A The monostrand





Special product
Internal Unbonded Tendons

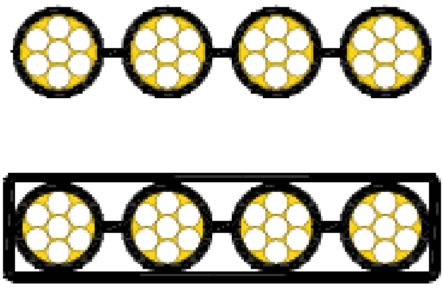


Figure 2.24: Tendons connected by webs to a flat band (VT-CMM-System)

Recommended design values:

- Spacing of tendon supports 0.6 to 1.5 m
- Minimal radius 2.5 m
- Friction coefficient $\propto = 0.06$
- Unintentional angular deviation per unit length $k = \propto * \Delta\alpha = 0.0005\ m^{-1}$

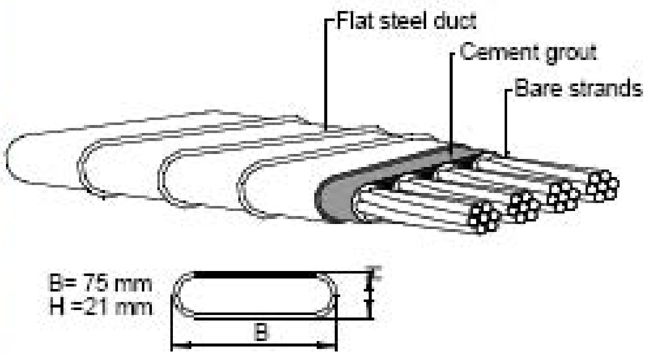


Figure 2.31: Steel flat ducts

Tendons in standard corrugated steel flat ducts
Recommended design values:

Spacing of tendon support 0.8 to 1.0 m
Minimal radius 2.5 m (vertical)
6.0 m (horizontal)
Friction coefficient $\propto = 0.2$
Unintentional angular deviation per unit length $k = \propto * \Delta\alpha = 0.0008$

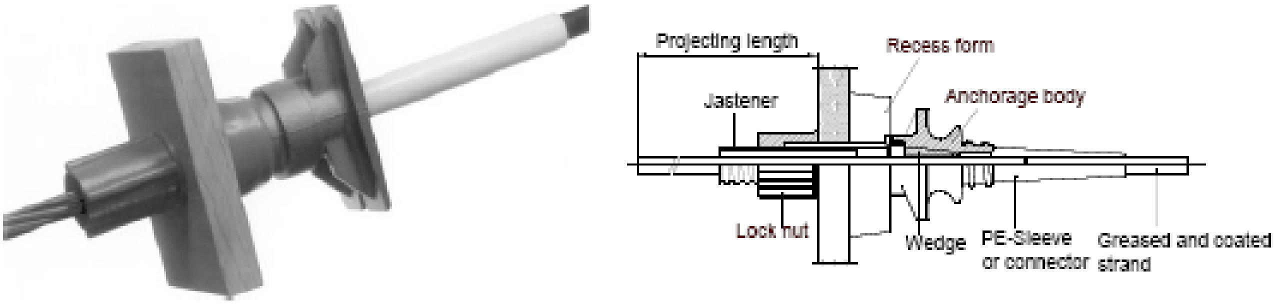
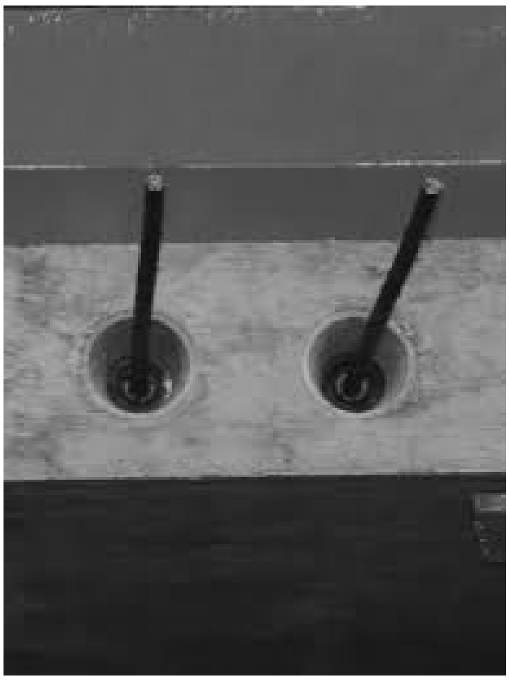


Figure 2.25: Anchorage elements

Figure 2.26: System with enhanced corrosion protective properties



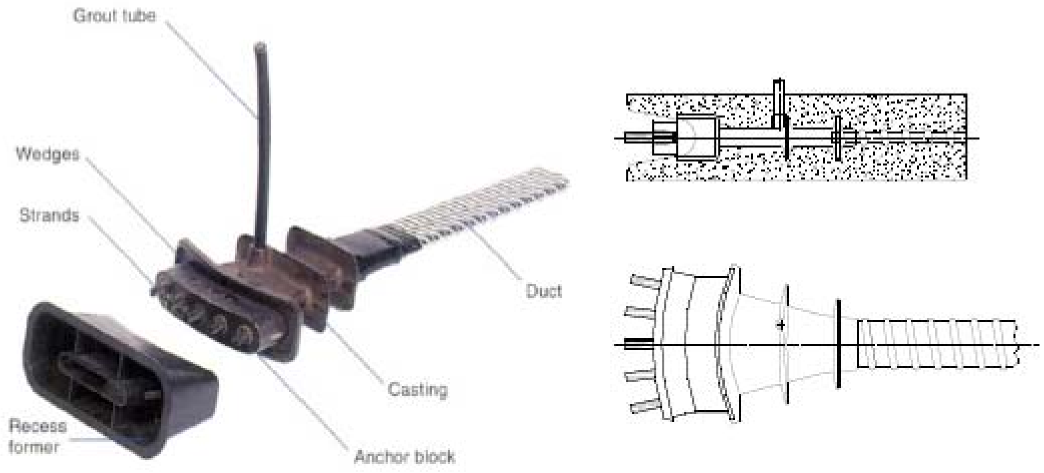


Figure 2.36: Components of a stressing anchorage of group 3

C Dead-end anchorage

Where high level of corrosion protection are required and a need for the pre-stressing force to be transferred as near as possible to the end of a structural component, the stressing anchorage can be used as dead end anchorage.

Where the pre-stressing force must only be transferred as near as possible to the end, an anchorage with retainer plates and compression fitting can be used.

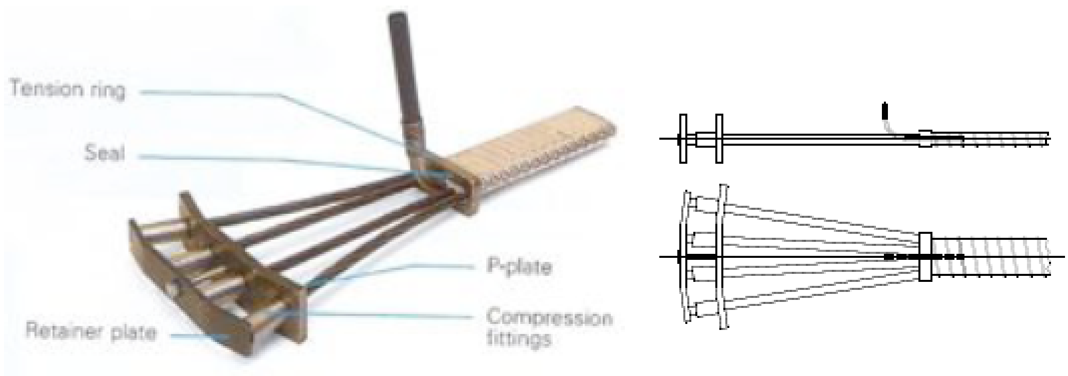


Figure 2.38: Elements for dead end anchorage with bearing plate

In other cases, the pre-stressing force can be transferred by the bonding of the bare strand and partly by direct bearing of the bulb at the end of the strands.

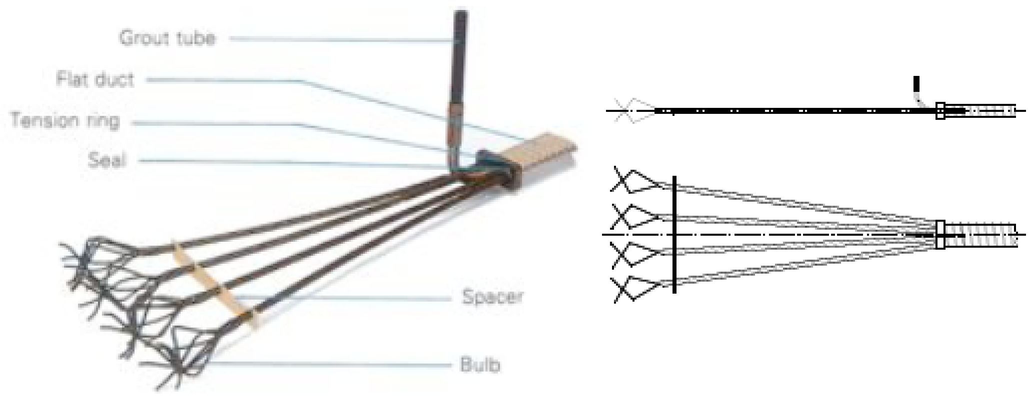


Figure 2.39: Elements for dead end anchorage by bond

For a slab with h = 280 mm the average eccentricity for the two directions will be for the cases illustrated in Figure 2.6:

a) $e = h/2 - t = 140 - 20 - 17 = 103$ mm
b) $e = h/2 - t = 140 - 30 - 21 - 3 = 86$ mm
c) $e = h/2 - t = 140 - 50 - 50 - 10 = 30$ mm

The disadvantage of bonded tendons with circular ducts is striking. With flat ducts bonded tendons can be an alternative also in slabs, although they will still be less effective than unbonded tendons, due to their larger edge distance.

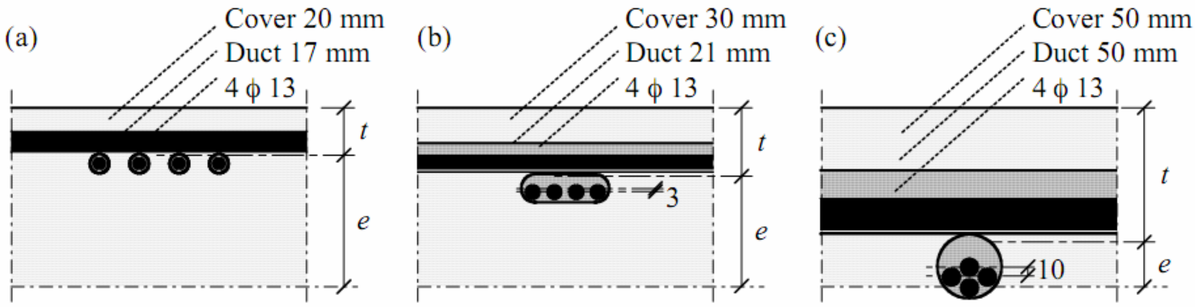


Figure 2.6: Example of (a) unbonded tendons compared to bonded tendons with (b) flat and (c) circular ducts respectively

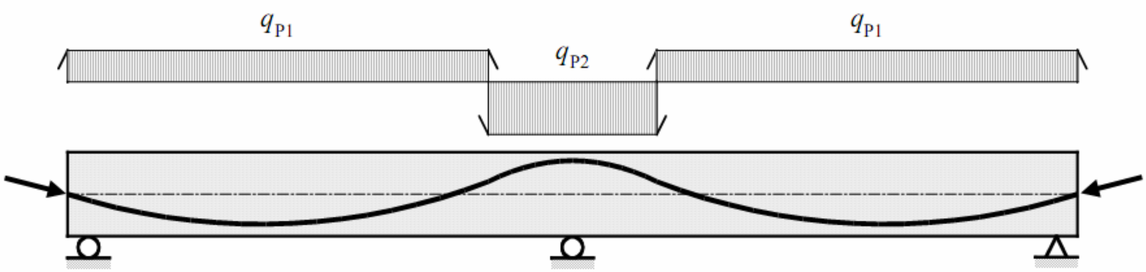


Figure 2.8: Example of tendon layout in a continuous member

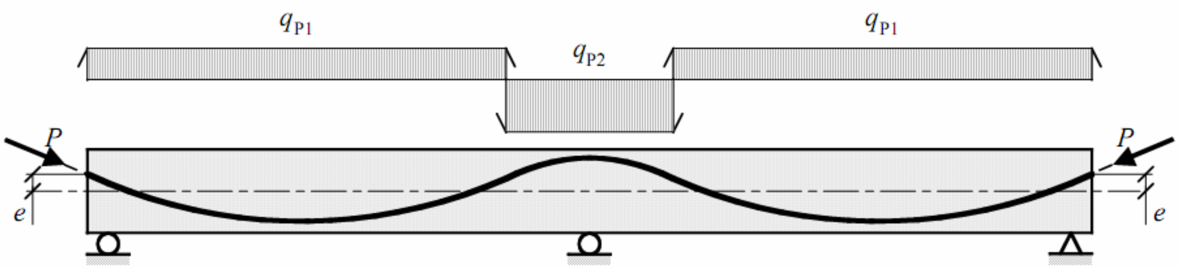


Figure 2.9: Effect of end eccentricities

End eccentricities can be used to enhance a certain effect of prestress. Thus, an upward end eccentricity as shown in figure 2.9 is favourable with regard to shear, whereas a downward end eccentricity will reduce deflections.

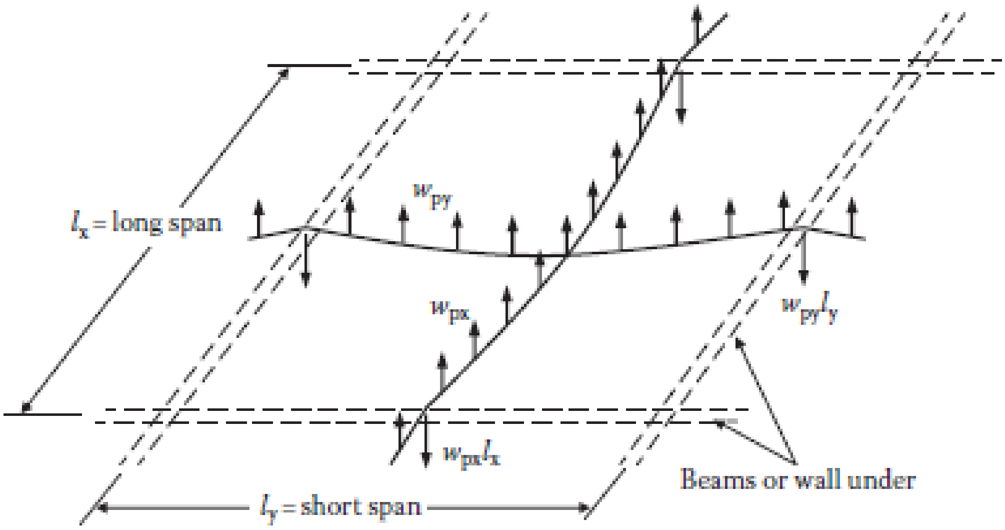


Figure 12.10 Interior edge-supported slab panel.

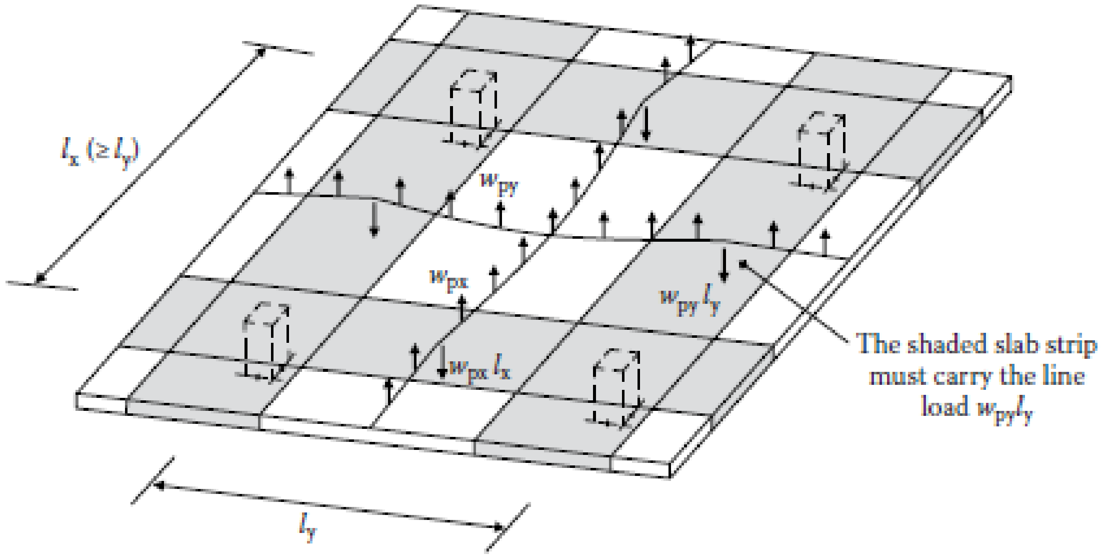


Figure 12.13 Interior flat plate panel.

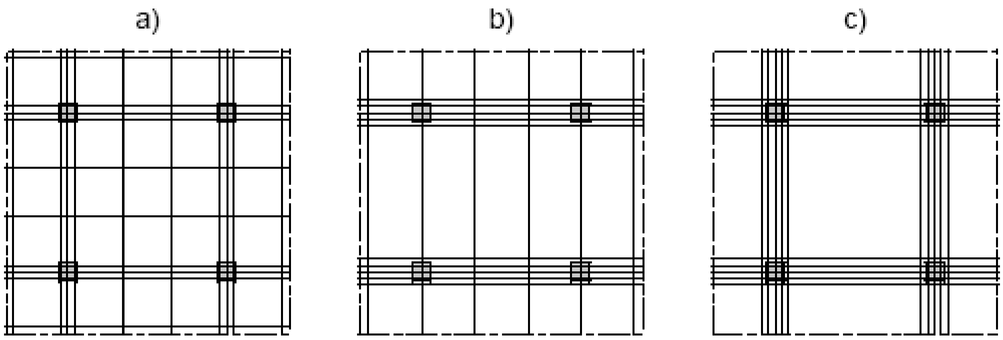


Figure 3.1: Typical tendon layouts in regular flat slab

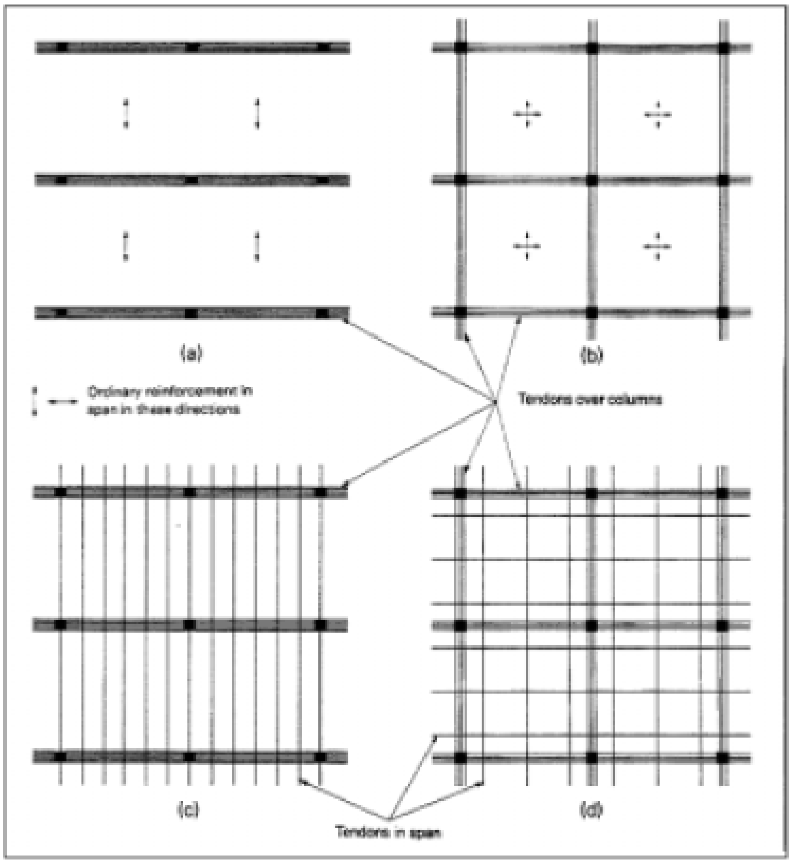


Figure 41: Possible tendon arrangements

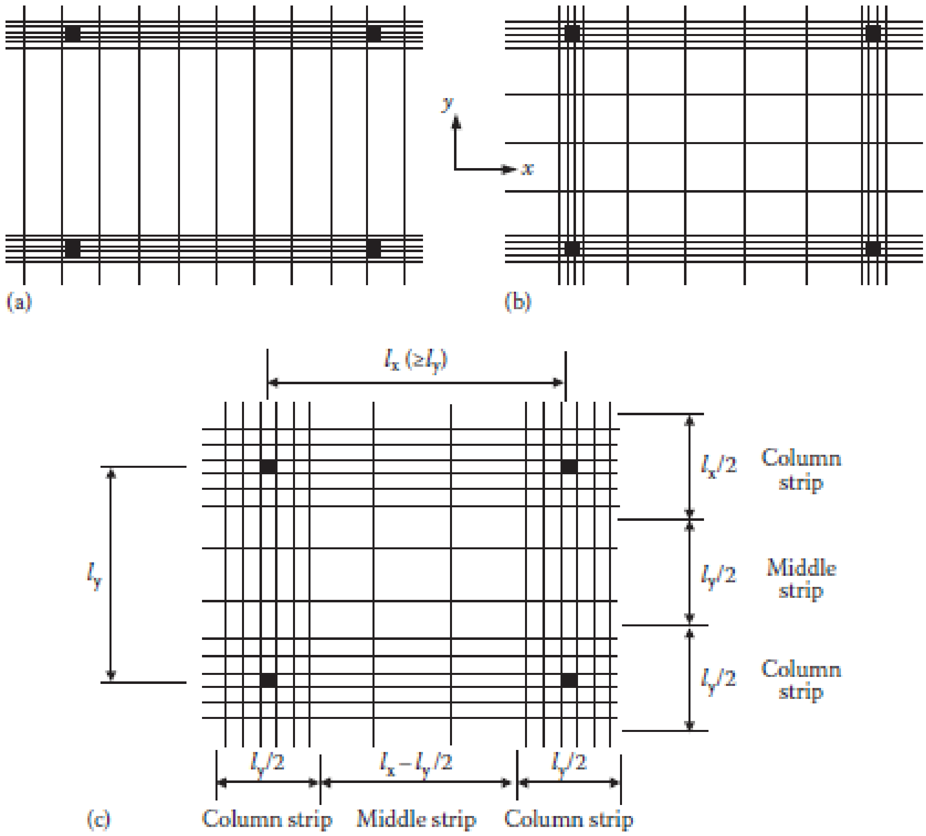


Figure 12.14 Alternative tendon layouts. (a) One-way slab arrangement. (b) Two-way slab arrangement with column line tendons in narrow band. (c) Two-way slab arrangement with column line tendons distributed over column strip.

Primer razlike u nosivosti kablova sa spojem (*bonded*) i bez spoja (*unbonded*)

Example

The ultimate bending capacities are compared for a cross section with (1) bonded and (2) unbonded tendons and the following data: A_s = 1256 mm^2 (4ϕ20); A_p = 2100 mm^2 (2 tendons, each with 7 strands at 150 mm^2); σ_p = 1050 MPa; f_{pd} = 1680/1,15 = 1460 MPa; f_{yd} = 500/1,15 = 435 MPa, z = 1,25m.

(1) $M_{Rd} = 10^{-3}\cdot[1256\cdot435 + 2100\cdot1460]\cdot1{,}25 = (546 + 3066)\cdot1{,}25 = 4515$ kNm

(2) $M_{Rd} = 10^{-3}\cdot[1256\cdot435 + (1050+100)\cdot2100]\cdot1{,}25 = (546 + 2415)\cdot1{,}25 = 3700$ kNm

Primer brze izgradnje prethodno napregnute tavanice