R Range External Monostrand Anchorage

Application Categories

The 1R15 anchorage is an external prestressing monostrand anchorage designed for the strengthening of existing structures, especially for concrete beams or pier headstocks.

The longitudinal prestressing force of the strand is transferred to the structure by the friction between the 1R15 anchorage and the surface of the structure. This friction is created by stressing a clamping bar going through the structure or sealed in a blind hole. An epoxy resin is applied at the interface between the anchorage and the concrete, to enhance the friction.

The length of the 1R15 anchorage allows stressing with a monostrand jack fitted with a curved nose with minimum jacking clearances.

Compared to traditional solutions such as concrete anchor blocks or fabricated steel anchorages, the 1R15 anchorage provides multiple advantages:

- simple and fast installation (no grout or concrete cast on site),
- compact solution allowing stressing with light equipment (monostrand jack),
- reliable and competitive solution due to the industrialisation of a mechanical cast anchorage.

1R15 anchorages stressed

Live ends before stressing

Pier headstock strengthening, Sydney, Australia

Components

Stressing of the 1R15 anchorage with curved nose and monostrand jack

1R15 anchorage in final configuration

Prestressing strand

- 15.7mm strand to prEN10138 (279 kN minimum breaking load),
- maximum tensioning force in the jack 223 kN (80% of the minimum breaking load),
- maximum effective force in the strand 200 kN (after losses due to curved nose and wedge draw-in).

Prestressing bar

- Freyssibar 26.5 mm diameter to AS 4672 (568 kN breaking load),
- clamping force 250 kN after losses.

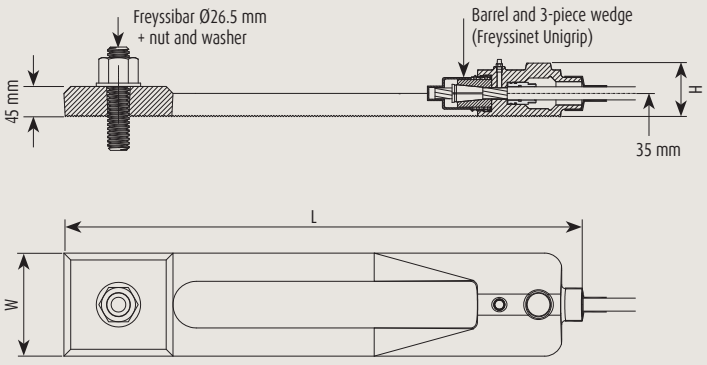
Surface preparation

- epoxy resin Eponal 380 or Sikadur 30,
- concrete 20 MPa minimum strength, adequately scabbled.

Anchorage

The 1R15 anchorage is made of cast iron. The bottom surface at the back end of the anchorage (below the nut) is provided with steel indentations to create shear interlock with concrete through the epoxy resin.

1R15 anchorage - 3D view



Units	L (mm)	W (mm)	H (mm)	Weight (kg)
Active	760	150	78	22
Passive	470	150	78	19

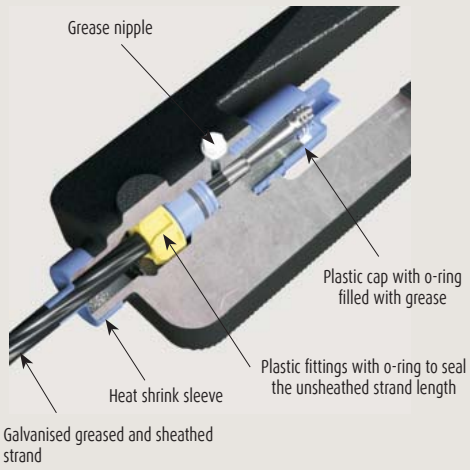
Corrosion Protection

The longitudinal prestressing can be made of:

1. galvanised greased and sheathed strand – most common option,
2. greased and sheathed strand encased in a HDPE duct injected with grout before tensioning.

The prestressing bar is protected by hot metal spray (100Nm thickness 85% Zn - 15% Al cold process). The void around the bar is left ungrouted to allow for bar replacement if required.

The 1R15 anchorage is protected by fusion bonded nylon (performance available upon request). This coating is applied in the factory.



1R15 Anchorage details, galvanised greased and sheathed strand

Geometry

External prestressing tendon using 1R15 anchorages can be straight or draped. If the tendon is draped, it is recommended to provide a physical separation of the greased and sheathed strands along they entire profile. Otherwise in the curved section of the tendon, within the bundle of strands, the transverse pressure arising from stressing the tendon on a curve leads to ripping of the individual HDPE sheath which is too thin to withstand the corresponding strains. In practice, a multitube saddle with flared ends to allow for strand angular misalignment is generally provided.

Multitube deviation saddle

Southern Link Upgrade, Melbourne, more than 2000 No of 1R15 anchorages installed