

Safe Stressing – Mono-strand Post-tensioning

PTIA Guidance Note
GN03/v.1
May 2012

Stressing should only be carried out by experienced personnel who have been assessed as competent to operate stressing equipment and have acquired knowledge of all safety requirements necessary during the stressing operation.

During stressing operations always remain vigilant and ensure nobody stands behind the jack or on top of the anchor and away from the exposed far end of any live end tendon.

Before final stressing commences

- ✓ Check the structural post-tensioning drawings to ensure they are current for the project.
- ✓ Check the Stressing Notes on the post-tensioning drawing. These notes will detail a stressing sequence and stage stressing if required, the transfer strength required before stressing, and the designated loads for which strands are to be stressed.
- ✓ Check the concrete has attained the specified compressive strength according to the stressing notes located on post-tensioning drawings. Never commence stressing if the concrete has not reached the required compressive strength without specific written approval from the design engineer.
- ✓ Check to see that the hydraulic jack and gauge have identification markings and that those markings correspond to the calibration sheet. A copy of the calibration sheet should be kept with the jack and gauge at all times. The calibration sheet should carry the following information;
 - Final stressing pressure
 - Jack number
 - Gauge number
 - Date calibration expires
- ✓ Place caution signs, place exclusion zones, stressing barricades (See PTIA Guidance note for the Construction of Stressing Barricades) and take safety precautions in accordance with the statutory safety and specification requirements, and as per Safe Work Method Statement.



- ✓ Assemble and check the stressing equipment: Connect the two hydraulic hoses from the pump to the jack, making sure that the fittings are secure. Each of the hoses should be connected to the corresponding “pressure” outlets and “return” outlets on the pump and hydraulic jack. Attach the stressing gauge. Check the position settings on the hydraulic pump and place it in the neutral position.
- ✓ Ensure that the hydraulic jack jaws are cleaned, lubricated and not worn.
- ✓ Ensure all hydraulic connections and hoses are clean before assembly and inspect all lines and connections for defects. Never use faulty or leaking hydraulic equipment.



- ✓ Check the hydraulic pump is in the off position.
- ✓ Connect the power leads and check power supply.
- ✓ Check the stroke length of the hydraulic jack by placing it into the stressing position and switching the power on/off switch several times until the stressing jack has reached its full stroke without any pressure build up in the system. Never attempt to take the stressing jack past this point as serious damage will occur to the equipment.
- ✓ Place the control valve on the hydraulic pump into the return position and switching the power on/off switch several times the stressing jack will return to its start position. Again, never attempt to return the stressing jack past this point as serious damage will occur to the hydraulic system.
- ✓ When not in use place the control valve into neutral and disconnect the power to the hydraulic pump.

Stressing

- ✓ Slide the hydraulic jack over the strand* to be stressed and place it firmly against the face of the barrel, and check there are no obstructions that may hinder the jack's movement during the stressing operation.
- ✓ Ensure that the hydraulic pump and hydraulic jack operators are standing in the correct position. The operators should not stand behind the jack or on top of the anchor during stressing. The tendons/strands* should be stressed in a sequence that allows the operators to work away from the tendons/strands* having been stressed. The jack operator should have hydraulic hoses running behind himself when placing jack on strand and during stressing.
- ✓ Place the 3 way valve/handle into the stressing position and ensure that the inline pressure release tap is tightened clockwise. Stress all strands* to the full stress load (check construction drawings to confirm load and then refer to the calibration certificate for the jacking pressure).
- ✓ Once the load has been reached, release the load on the jack by turning the inline pressure release tap, on the pump, slowly anticlockwise. When the gauge reading is zero, place the 3 way valve/handle into the return position and return the ram on the jack.
- ✓ Place control valve on the hydraulic pump into the neutral position and remove the hydraulic jack from the strand*.
- ✓ Repeat these steps for each strand* in the stressing sequence until all are stressed.
- ✓ Upon completion of the stressing operation, stressing results (strand extensions) must be recorded and sent to the design engineer for approval. This is now considered a "Hold Point" for any post-tensioning inspection & test plan. Written confirmation must be received from the design engineer prior to cutting and sealing of the tendon pockets.

**Strand may also be referred to as "cable".*





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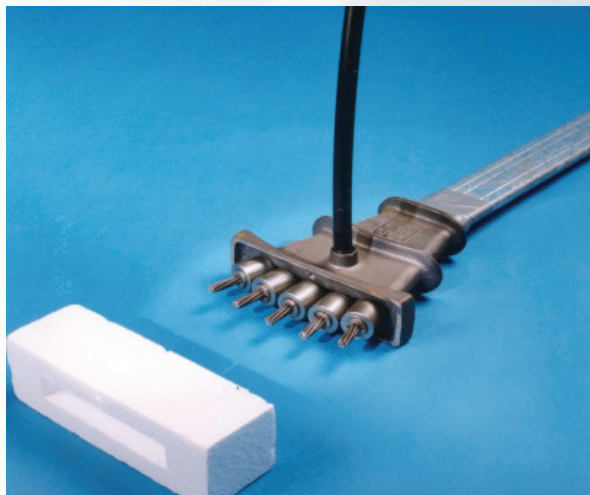
Strand

refers to a length of cable within a tendon.



Stressing jack

a hydraulic ram that is fitted to and stresses strands



Tendon

A single or group of prestressing elements (E.G. strands) and their anchorage assemblies which include duct, attachments and grout.



Strand Extension

a measurement of the strand after stressing. Measuring the elongation.