Macalloy Bars

Dywidbag Bar

Examples of Prestressed Concrete

RC and Prestressed Concrete

Concrete is very strong in compression but weak in tension (its tensile strength varies from 8% to 14% of compressive strength). Such low tensile capacity in RC structures allows to develop (flexural) cracks under early stage of loading. This causes serviceability issues and eventually these cracks may cause larger fractures and collapse of structures

To reduce or to prevent such cracks from developing, a concentric or eccentric force is imposed in longitudinal direction of the structural elements, by means of steel tendons.

Loss in Prestress

Influential factors

- elastic shortening of the concrete (pre-tensioned members, short term)
- the mechanisms used during anchorage (short term)
- friction in the jack and anchorage (short term)
- friction in the duct (short term)
- loss in Prestress (short term, long term)
- shrinkage of the concrete (main, long term)
- creep of the concrete under sustained compressive load (long term)
- relaxation of the steel under sustained tension (long term)

Short term and long term

From the time the prestress is applied, the prestress force gradually reduces over time to an equilibrium level. The sources of these losses depend on the method by which prestressing is applied.

In both methods:

1 The member shortens due to the force and this relieves some of the prestress;

2 The concrete shrinks as it further cures;

3 The steel 'relaxes' that is, the steel stress reduces over time;

4 The concrete creeps, that is continues to strain over time.

5 In post-tensioning, there are also losses due to the anchorage (which can 'draw in' an amount) and to the friction between the tendons and the duct and also initial imperfections in the duct setting out