
BOND OF PRESTRESSING TENDONS

A seminar by Robert Ullner

MONDAY, MAY 15, 10:00 AM

GALBRAITH BUILDING, 35 ST. GEORGE STREET, ROOM 117

Bond between concrete and reinforcement enables the transfer of forces from the reinforcement to the surrounding concrete. So far, only limited research has been undertaken on the bond behaviour of strands in post-tensioned concrete members. Questions related to the need for temporary corrosion protection, the strength and stiffness evaluation of existing structures and the cutting of tendons during the dismantlement of prestressed concrete structures have arisen and require more reliable knowledge of the bond behaviour. The present project aims at answering these questions.

A series of 11 large-scale tests on post-tensioned concrete tension members with long embedment lengths has been carried out. The influences of the most important parameters on the bond behaviour of grouted post-tensioning tendons were studied, including the tendon size, the duct material (steel or plastic), the presence of a temporary corrosion inhibitor (Rust-Ban 310) and the type of loading (loading or unloading).

The pull-out test with long embedment length is suitable to investigate the bond behaviour of post-tensioning tendons and permits a direct determination of the bond length. The bond behaviour can be determined by measuring the concrete strains on the specimen surfaces and applying appropriate bond models.

No unique bond shear stress-slip relationship appears to be capable of describing the bond behaviour over the entire activated bond length for variable pull-out forces. As a rough approximation, average bond shear stresses over the entire activated bond length can be used for comparisons with tests as well as for practical applications. The bond demand of post-tensioned concrete members will be illustrated using an example, and the load-carrying behaviour of these members will be compared with unbonded prestressed concrete members.

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