

# Mechanical Couplers for Splicing Steel Reinforcements in Concrete Structures

H.G.Sreenath

## Abstract

Large diameter steel reinforcing bars used in concrete members in concrete structures, when normally lapped as done for small diameter bars require about 15% more than that when used as a single bar. The lapping cannot be avoided as the bars come in standard lengths of 18-12 m. The practice of lapping large diameter bars has been discontinued, considering the congestion of reinforcing bars and economy, by providing "Mechanical Couplers".

The Indian construction industry has felt the immediate need, and is encouraging the builders to use mechanical couplers for use in many major infrastructure and multi-stored construction projects. At present, the splices for reinforcing bars are by imported know-how, and the American code of practice is taken as reference for acceptance criteria for certification on the performance of couplers.

The paper presents the performance of mechanical splices, such as, screwed couplers, splices with cast iron sleeves and high strength grout, subjected to static tensile test alongwith experimental test results, and the types of failures associated with such types of couplers.

Large diameter steel reinforcing bars used in concrete members in concrete structures, when normally lapped as done for small diameter bars for the continuation of bars, require about 15% more than that when used as a single bar. The lapping is necessary, and cannot be avoided as the bars come in standard lengths of 8-12 m. The lapping is done by providing suitable development length as prescribed in the code of practice (Fig.1).

The practice of lapping large diameter bars has been stopped, considering the congestion of reinforcing bars and economy, by providing "Mechanical Splices /Couplers". The splicing of bars using friction clamps, bonded sleeves, pressed-in sleeves or with mechanical

splices/screwed couplers, is being extensively used in the advanced countries.

The Indian construction industry has felt the immediate need, and is encouraging the builders to use mechanical splices / couplers for use in many major infrastructure and multi-stored

construction projects. The Indian codes are yet introduce specifications for mechanical splices / couplers. At present, the splices for reinforcing bars are by imported know-how. The American code of practice is taken as reference (ACI 318:2005), ACI-349, ASM Sec III Div.:2. The British standard BS 8110-1997 also discusses the splicing of reinforcements, and its acceptance criteria.

Our centre conducts tests on spliced reinforcements with couplers. The paper presents performance of mechanical splices, such as, screwed couplers, splices with cast iron sleeves and high strength grout alongwith experimental test results, and the types of failures observed. The paper also suggests the sampling to be made for evaluation of mechanical couplers.

## Mechanical Devices for replacing Lapped Splices

The earlier code restricted use of lap splicing for reinforcement bars of 36 mm diameter and above. The only alternative available was to weld the bars as per IS: 2751 and IS: 9417 for continuity. The welding of bars for continuity, require special preparation of the ends of the

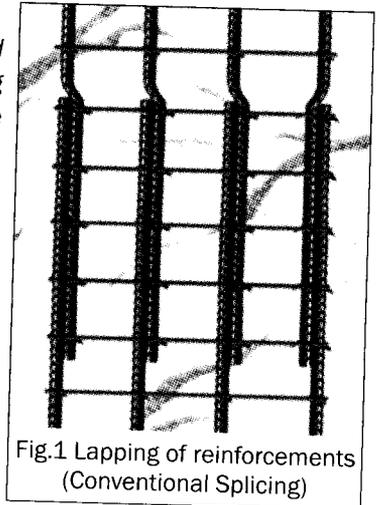


Fig.1 Lapping of reinforcements (Conventional Splicing)