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Reviewer Invitation for STRUCTURES-D-23-01273R1

1 message

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To: Omar Qarani Aziz <omerqarani@gmail.com>

Mon, Jun 26, 2023 at 8:58 PM

Ms. Ref. No.: STRUCTURES-D-23-01273R1

Title: Response of RC shear walls with single and double layers of reinforcements subjected to in-plane cyclic loading

Authors: Seyed Meghdad Ghaseminia; Tatheer Zahra; David P. Thambiratnam; Julian Thamboo

Structures

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Yours sincerely,

Pedro F Silva

Associate Editor
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ABSTRACT:

Reinforced concrete (RC) shear walls are primarily designed to resist lateral actions in buildings, in addition to carrying the vertical loads from above. Recent changes in the Australian concrete standard (AS 3600) enforces RC walls to have double layers of reinforcement in the horizontal and vertical directions to be considered as ductile walls, whereas RC walls with centrally placed single layered reinforcement are regarded as non-ductile walls. The in-plane behaviour of these RC shear walls under both in-plane lateral and vertical loads is complex as many parameters influence their lateral strength and deformity. To extend the knowledge on the performance of RC walls with single and double layered reinforcement, experimental testing followed by an in-depth data analysis was carried out in this study. The experimental study involved testing of two RC walls with the same percentage of reinforcement arranged either in single or in double layers under in-plane cyclic shear

loading. The aim of the experimental testing was to investigate the reinforcement detailing effect between a single-layer and a double-layer configuration, while keeping other key structural parameters such as reinforcement ratio, concrete compressive strength, level of axial load, aspect ratio, and slenderness ratio constant. Experimental results revealed that the double layered RC wall possessed higher in-plane strength (by ~30%) and displacement ductility (by ~9.7%) than the single layered RC wall. To validate these findings, a database of the single- and double-layered RC walls using results from previous experimental studies was developed to compare the in-plane load capacities of single and double layered RC walls. Existing design provisions from the standards (AS 3600 and ACI 318-19) were employed to predict the in-plane load capacities of the single and double layered RC walls and compared with the experimental results of the database.

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