





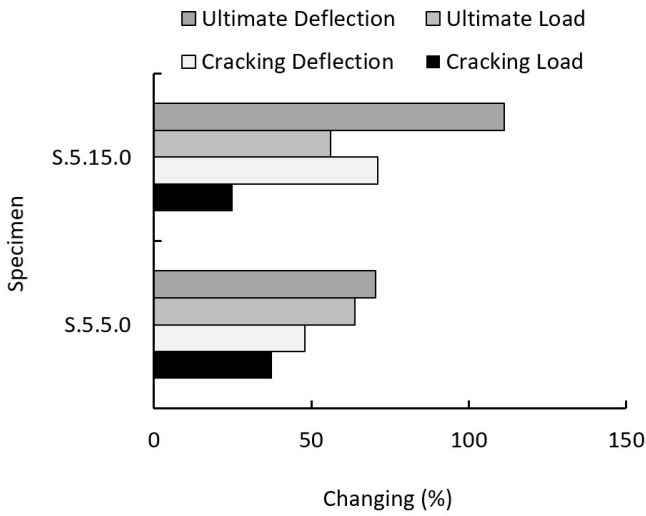




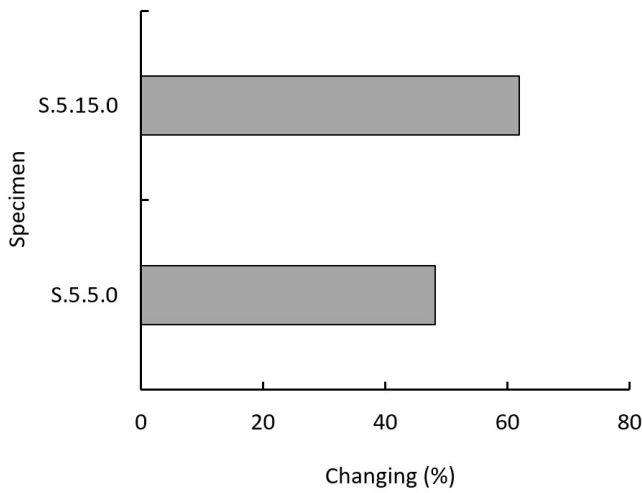




the width of the duct to be larger in the 50 and 150 mm range contributed to reducing the ultimate load.



(a) Load vs deflection



(b) Toughness

Figure 10. Comparative influence with respect to S.C specimen; (a) on load and deflection, (b) on toughness.

The ultimate load in the tested slab specimens lowered by about 19.6% and 37.9%, corresponding to specimens measuring a width of 50 and 150, in that order, relative to the reference solid specimen (S.C). Figure 11 clarifies the load-to-mid vertical displacement curves for slab specimens of the current group. Between the two specimens in the current group, only specimen S.5.5.5 reached the service load of the S.C specimen with a service deflection of 5.6 mm, with an increase against the S.C specimen of around 9.8%. In contrast, the other specimen S.5.15.5 did not get that. The specimen with a larger duct width of 150 mm in the S.5.15.5 specimen experienced a diminishing toughness of 24.3% relative to the control specimen SC; however, it does not represent the lower value. The increase in the toughness of S5.15.5 may be considered a misleading indication because the specimen demonstrated lower stiffness due to the presence of a large duct. Consequently, even in the early loading stage, a greater deflection occurs, making the toughness appear larger. Figure 12 displays the relative effect of the duct width relative to the solid slab reference specimen (S.C) at three distinct values. The effect of duct width was similarly examined by comparing it to the value of the slab specimen having a narrower duct (S.5.5.5) to obtain a more in-depth understanding of shear performance when duct width increases. Extending the duct width to 150 mm caused a reduction in load capacity of 22.7%. The experimental results suggest that increasing the duct width through the slab section negatively impacts its shear performance compared to the solid reference slab, with wider ducts leading to more significant reductions. This behavior is linked to the reduced effective

cross-sectional area and the disruption of internal load paths caused by the voids created by the ducts. Variations in duct width also influenced the slabs' deflection behavior.

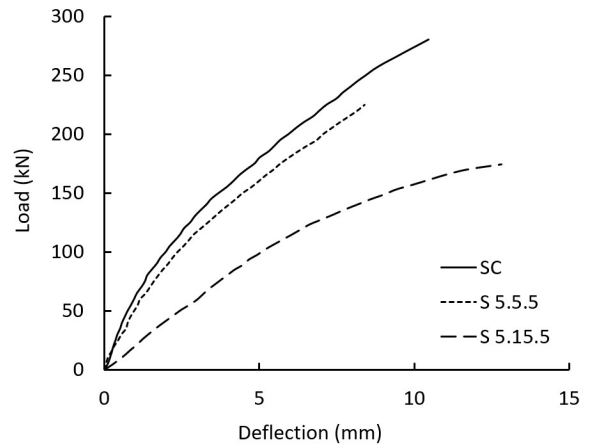
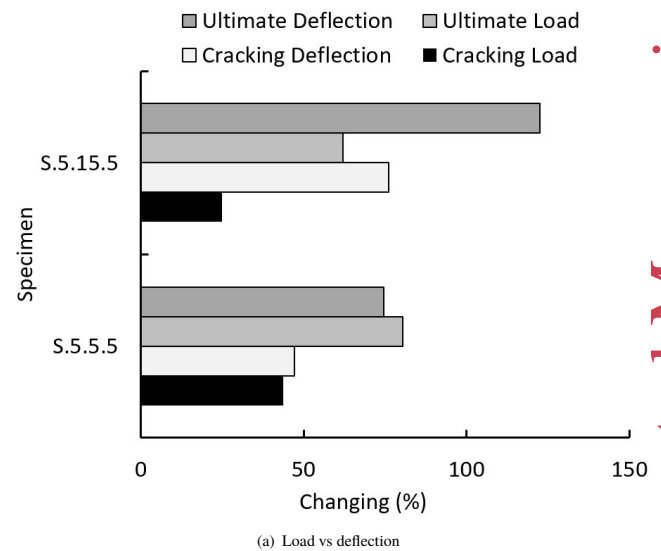
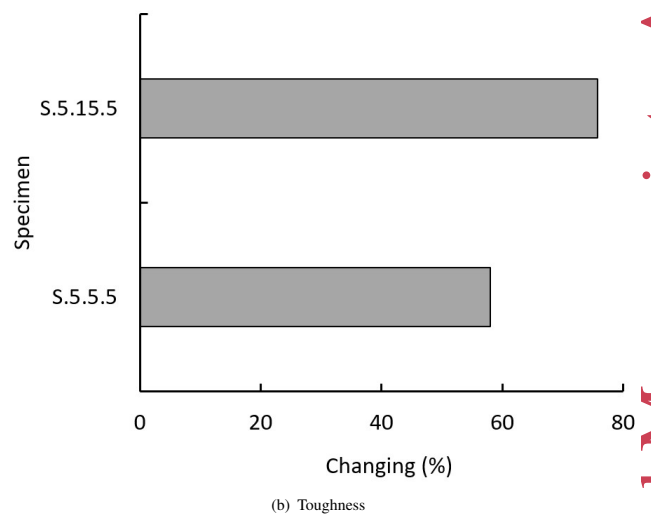


Figure 11. Load-mid span vertical displacement of specimens in Group 4.



(a) Load vs deflection



(b) Toughness

Figure 12. Comparative influence with respect to S.C specimen; (a) on load and deflection, (b) on toughness.

However, this increase in deformation did not translate into improved structural



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