



EFFECT OF STEEL FIBERS ON COMPRESSIVE STRENGTH OF CONCRETE: CASTING DIRECTION AND BOUNDARY CONDITIONS

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Abstract: In this work, the axial strength of 10 cm cubic concrete test specimens was analyzed with and without addition of steel fibers. Two situations were studied: the first one was to quantify the change of the strength when the cast direction of concrete diverges from the loading direction. For this, the specimens were submitted to parallel and perpendicular loads to the cast direction. In this situation was verified the heterogeneity of the concrete without fibers, that presents greater resistance when submitted to parallel loads to the casting than to perpendicular ones. The steel fiber reinforced concrete decreases the anisotropy presenting equivalent resistances independent of the direction of loading, evidencing that the fibers decrease or extinguish this effect resultant internal bleeding of the concrete. The second situation analyzed in this work refers to the influence of friction on maximum concrete axial strength, since the displacement restriction between the test machine dishes and the specimen test modify the resistance element capacity. To evaluate this influence, concrete test specimens with and without fibers were tested, placing grease on the contact faces, characterizing a minimum friction, and glued steel plates of 5 mm thickness on the contact faces representing maximum friction. Regarding this situation, it was observed that concretes without fiber increase the resistance with the lateral restriction created by the boundary conditions and the form of failure goes from columnar to trunk-conical. When fiber reinforced concrete samples are analyzed, a similar restriction effect in concrete without fibers is found and the failure shape is similar too. In this way, it is possible to show that the fiber on the concrete provides a more homogeneous distribution of the internal tension.

Keywords: Steel Fibers; concrete anisotropy; compressive Strength