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Transfer Lengths of Pre-stressed Hollow Core Slabs

Hollow-core slabs (HCS) are precast, prestressed concrete structural members used in large-scale construction projects. They are typically used as floor and roof systems in buildings such as hotels, condominiums, and parking ramps.

HCS are constructed in the following way. Steel prestressing strands are anchored at the end of a form on both ends of the prestressing bed, and then tensioned to a specified stress. The concrete is then poured, and allowed to cure (or dry) for a predetermined period of time, ranging from eight hours to a couple of days. Once the concrete has cured, the stress is released from the jack at the end of the form, causing the prestressing strands to partially relax, inducing a compressive force in the concrete.

These strands are installed to reduce the tensile stresses in the concrete induced by external loads. To keep production costs at a minimum, HCS are often made in forms about 300 feet long, then cut with a saw to the desired length. Once the HCS has been cut, the force in the strands at the ends of these slabs is zero. This stress increases from zero at the ends, to the full stress at some distance from the end due to the bond between the strand and concrete, as well as other mechanisms. This increase occurs over a distance denoted as the transfer length. The emphasis of this project will be to determine the transfer length in HCS from two manufacturers.

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