Re: End Crushing of Hollowcore Ends

Because hollowcore is an extruded product, the filling of the ends is not doable in production. In the field, it is nearly impossible to fill the voids with grout, especially at the 1" wide butt joints, since the grout does not flow as one might think it would.

However, the filling of voids is typically not required since the grouted joints and unfilled hollowcore has a capacity that is not reached until the building reaches high (8 or more stories) elevation. The attached calculation and excerpts from PCI Manual for Design of Hollowcore MNL 116, shows that except for extreme conditions, the end capacity is adequate for normal applications.

End Crushing Equation 6"

With No Grout in the Butt Joint (a)

Ru= %(.85) (f'c) (S1 + S2) (bw)

% = .7

f'c = 5 ksi (This value can be increased due to our slabs achieving 6000 psi plus compression breaks)

S1 + S2 = This is the sum of the bearing amounts on the bearing walls. Typically 3 ¼" for each plank = 6 ½"

bw = Web width across 48" of slab width. (6 inch hollowcore has 16.0 inch of web in 48" width)

So,
Ru=.595 (5) (6.5 in.) (16 in/4ft)

Ru= 309.4K/slab = 77.4 K/ft

With Grout Between Ends Only (b)

S3 = 1 inch = Width of butt joint

309.4K/slab + .595 (3 ksi grout) (48 inch) = 395.08 K/slab = 98.8K/ft

End Crushing Equation 8”

With No Grout in the Butt Joint (a)

Ru= % (.85) (f’c) (S1 + S2) (bw)

% = .7

f’c = 5 ksi (This value can be increased due to our slabs achieving 6000 psi plus compression breaks)

S1 + S2 = This is the sum of the bearing amounts on the bearing walls. Typically 3 ¼” for each plank = 6 ½”

bw = Web width across 48” of slab width. (8 inch hollowcore has 16.0 inch of web in 48” width)

So,
Ru=.595 (5) (6.5 in.) (14.89 in)

Ru= 287.9K/slab = 71.98K/ft

With Grout Between Ends Only (b)

S3 = 1 inch = Width of butt joint

287.9K/slab + .595 (3 ksi grout) (1 inch) (48 inch) = 316.5K/slab = 79.1K/ft

End Crushing Equation 10”

With No Grout in the Butt Joint (a)

Ru= % (.85) (f’c) (S1 + S2) (bw)

% = .7

f’c = 5 ksi (This value can be increased due to our slabs achieving 6000 psi plus compression breaks)

S1 + S2 = This is the sum of the bearing amounts on the bearing walls. Typically 3 ¼" for each plank = 6 ½"

bw = Web width across 48" of slab width. (10 inch hollowcore has 10.5 inch of web in 48" width)

So,
Ru=.595 (5) (6.5 in.) (10.5 in)

Ru= 203.04K/slab = 50.76K/ft

With Grout Between Ends Only (b)

S3 = 1 inch = Width of butt joint

203.04K/slab + .595 (3 ksi) (1 inch) (48 inch) = 288.7K/slab = 72.2K/ft