Instructions For Using Hollow Core Safe Load Table

A. NOTATION

- A = cross sectional area of Hollow Core sections.
- A_c = cross sectional area of composite hollow core section.
- b_w = minimum web width.
- D = dead loads or related internal moments and forces
- f'_c = specified compressive strength of concrete.
- f'_{ci} = compressive strength of concrete at transfer of prestress
- f_{pe} = compressive stress in concrete due to prestress only (after all losses) at bottom fiber of the section
- f_{pu} = specified tensile strength of prestressing steel.
- f_{ps} = stress in prestressing steel at nominal strength.
- f_{si} = initial or tensioning stress in prestressing steel
- I_g = moment of inertia of the gross Hollow Core section.
- I_{gc} = moment of inertia of the gross composite section.
- l = span length
- L = live loads or related internal moments and forces
- M = service load moment causing flexural tension of $7.5\sqrt{f'_c} = (7.5\sqrt{f'_c}+f_{pe})$
- M_d = moment due to service dead load (including weight of the structural unit)
- M_l = moment due to service live load
- M_s = moment due to service loads modified to correspond the composite section
  = $M_w \frac{I_{gc}y_b}{I_g y_{bc}} + M_{sd} + M_l$
- M_{sd} = moment due to superimposed deadloads (resisted by composite section)
- M_n = nominal moment strength, assuming fully developed strands
- M_u = applied factored moment = $1.2M_d + 1.6M_l$
- M_w = moment due to weight of Hollow Core slab and topping (resisted by Hollow Core section only)
- U = required strength to resist factored loads or related internal moments and forces
- w_l = uniform service live load
- w_s = uniform superimposed load = wsd + w_l
- w_{sd} = uniform dead load due to superimposed loading
- y_b = distance from bottom fiber to center of gravity of the Hollow Core section
- y_{bc} = distance from bottom fiber to center of gravity of the composite section
- ϕ = strength reduction factor
- ϕM_n = design moment strength, assuming fully developed strands

B. UNIFORM LOADING - Whan all superimposed loads are considered to be live loads. ($w_{sd} = 0; w_s = w_l$).

For the given l & w_s select the required standard designation directly from the load table

C. UNIFORM LOADING - When superimposed load consists of both dead and live loads. ($w_s = w_{sd} + w_l$).

a. Calculate modified $w_s = \frac{1.2}{1.6} w_{sd} + w_l$.

b. Enter the table with the given l and modified w_s, and select the standard designation.

D. NON-UNIFORM LOADING

1. Calculate maximum Mu = $1.2 M_d + 1.6 M_l$.
2. Enter the column in the load table entitled "ϕM_n" and select standard designation having $\phi M_n \geq M_u$.
3. Check development requirements of prestressing strands in accordance with Section 12.9 of ACI 318.
4. Check flexural stresses at service loads:
   a. Calculate maximum M_s.
   b. Enter the column in the load table entitled "M". For the standard designation selected in Step 2, M should be $\geq M_s$.
   c. If $M<M_s$, select standard designation having $M \geq Ms$.
5. Check shear strength of concrete to determine if any shear reinforcement is required.

E. CAMBER AND DEFLECTION

1. The table indicates maximum safe loads, however, camber and deflection may limit the use of a prestressed unit even though the load carrying capacity is satisfactory.
2. Camber and deflection must always be investigated for the contemplated loading condition and span so that these factors are compatible with abutting materials in the proposed building. Consult your local manufacturer, Molin Concrete Products Company.

DESIGN CRITERIA

Principal design criteria used for development of the load table are:

1. f_{ps} calculated by Section 18.7.2 of ACI 318.
2. Total loss of prestress assumed = 18% of f_{si} with initial loss at transfer of prestress assumed = 10% of f_{si}.
3. Premissible flexural stresses in concrete at service loads: Compression = $0.45 f'_c$ Tension = $7.5\sqrt{f'_c}$.
4. Shear strength conservatively assumed to be limited to $3.5\sqrt{f'_c}$ in accordance with ACI 318 Section 11.4.2. Additional shear strength may be available with more detailed analysis.

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