

Detailed Joint Calculations

Units: N&mm

Regulation: ASCE 41-17

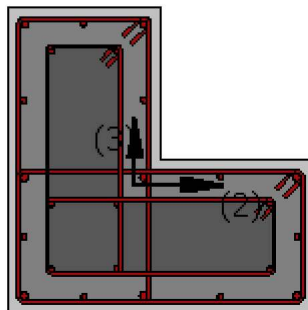
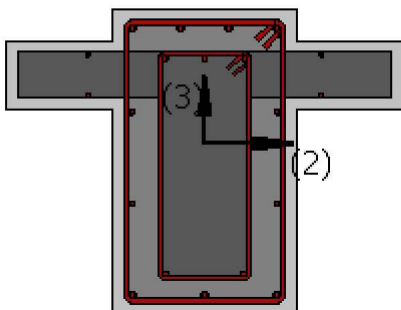
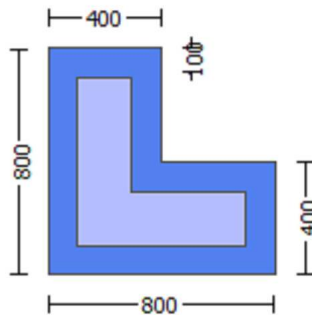
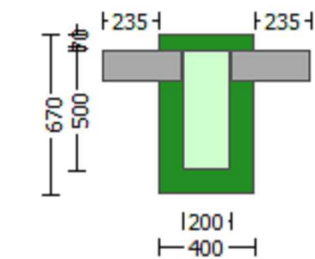
Calculation No. 1

Col. C2 - Beam B9, Floor : 1

Limit State: Operational Level (data interpolation between analysis steps 3 and 4)

Analysis: Uniform +X

Check: Shear Force



Demanded Shear Force: $V_e = 538161.539$ from TBDY, (7.11) and ACI 318-14, 18.8.21.
with

$$V_{kol} = \text{Min}(V_{kol, \text{above_joint}}, V_{kol, \text{below_joint}}) = 16329.564$$

$$As_2 = 0$$

$$As_1 \cdot f_{yd} = As_1_{\text{jacket}} \cdot f_{yd_{\text{jacket}}} + As_1_{\text{core}} \cdot f_{yd_{\text{core}}}$$

$$As_1_{\text{jacket}} = 615.7522$$

$$As_1_{\text{core}} = 339.292$$

$$\text{New Material: } f_{yd_{\text{jacket}}} = f_{s_{\text{Lower_bound_jacket}}} = 500.00$$

Existing Material: $f_{yd_core} = f_{s_Lower_bound_core} = 400.00$

knowledge factor, $= 1.00$

Existing Joint: From table 7-7, ASCE 41-17: Final value $V_{n,R} = *V_n = 1.5943E+006$

$V_n = 1.5943E+006$ from (10.4) ASCE 41-17

Demanded Shear Force: $V_e = 538161.539$ from TBDY, (7.11) and ACI 318-14, 18.8.2.1.
with

$f_c = \text{Min}(f_{c_beam}, f_{c_Column}) = 16.00$

Existing Material: $f_{c_column} = f_{c_lower_bound_column} = 16.00$

Existing Material: $f_{c_beam} = f_{c_lower_bound_beam} = 16.00$

$A_j = 320000.00$

$h_c = 800.00$

$b_j = 400.00$

column width = 400.00

beam width plus joint depth = 1200.00

Min perpendicular distance of beam axis to column sides = 200.00

= 15.00, from table 10-12, ASCE 41-17)

column hoops spacing = 100.00

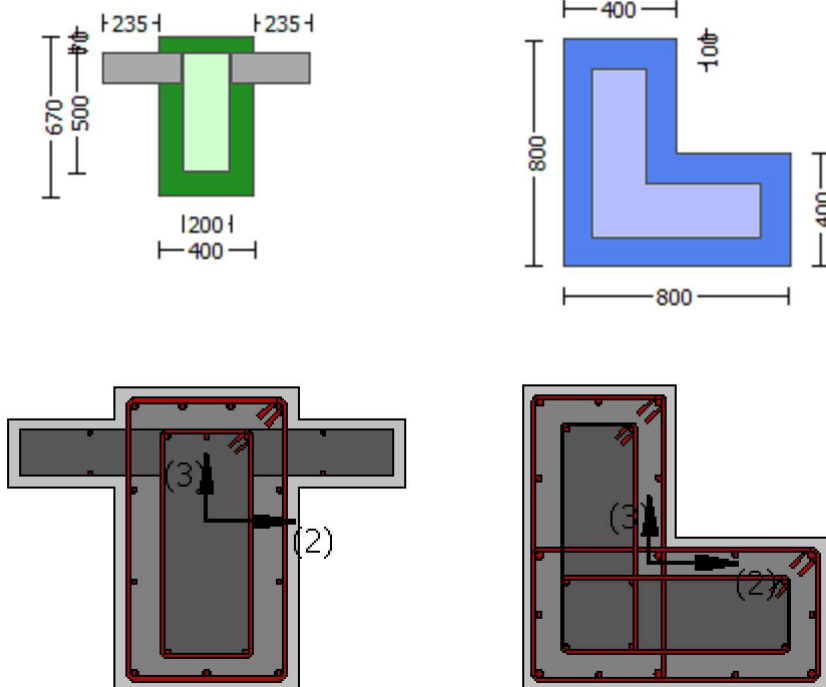
Calculation No. 2

Col. C2 - Beam B9, Floor : 1

Limit State: Immediate Occupancy (data interpolation between analysis steps 4 and 5)

Analysis: Uniform +X

Check: Shear Force



Demanded Shear Force: $V_e = 535399.32$ from TBDY, (7.11) and ACI 318-14, 18.8.2.1.

with

$V_{kol} = \text{Min}(V_{kol,above_joint}, V_{kol,below_joint}) = 19091.783$

$As_2 = 0$

$As_1 * f_{yd} = As_1_jacket * f_{yd_jacket} + As_1_core * f_{yd_core}$

$As_1_jacket = 615.7522$

$As_1_core = 339.292$

New Material: $f_{yd_jacket} = f_{s_Lower_bound_jacket} = 500.00$
Existing Material: $f_{yd_core} = f_{s_Lower_bound_core} = 400.00$

knowledge factor, $= 1.00$

Existing Joint: From table 7-7, ASCE 41-17: Final value $V_n, R = *V_n = 1.5943E+006$
 $V_n = 1.5943E+006$ from (10.4) ASCE 41-17

Demanded Shear Force: $V_e = 535399.32$ from TBDY, (7.11) and ACI 318-14, 18.8.2.1.
with

$f_c = \text{Min}(f_{c_beam}, f_{c_Column}) = 16.00$

Existing Material: $f_{c_column} = f_{c_lower_bound_column} = 16.00$

Existing Material: $f_{c_beam} = f_{c_lower_bound_beam} = 16.00$

$A_j = 320000.00$

$h_c = 800.00$

$b_j = 400.00$

column width = 400.00

beam width plus joint depth = 1200.00

Min perpendicular distance of beam axis to column sides = 200.00

= 15.00, from table 10-12, ASCE 41-17)

column hoops spacing = 100.00