Detailed Joint Calculations

Units: N & mm

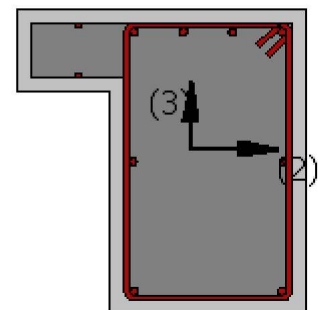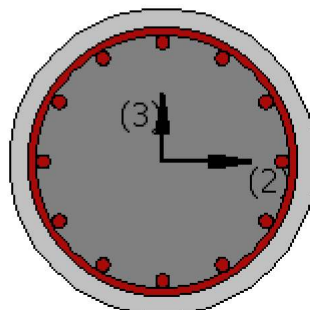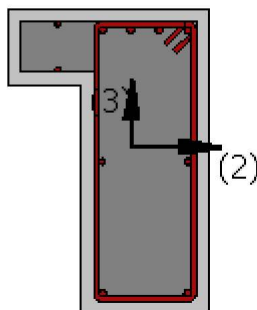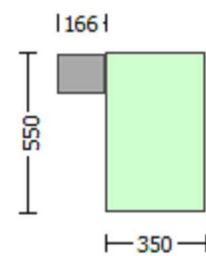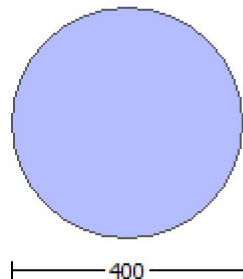**Regulation: ASCE 41-17**

Calculation No. 1

Col. C2 - Beam B2 - Beam B1, Floor : 1

Limit State: Immediate Occupancy (data interpolation between analysis steps 3 and 4)

Analysis: Uniform +X

Check: Shear Force

Demanded Shear Force: Vjhd = Max(Vjhd1,Vjhd2) = 559431.953, where
Vjhd1,Vjhd2 are calculated for beam 1 and beam 2, respectively, using TBDY, (7.11) and ACI 318-14, 18.8.2.1.
Beam 1:
Vjhd1 = 559431.953
with
  Vkol = Min(Vkol,above_joint , Vkol,below_joint) = 17835.698
  As1 = 615.7522
  As2 = 307.8761

New Material: fyd = fs_Lower_bound = 500.00

Beam 2:
Vjhd2 = 443978.423
with
  Vkol = Min(Vkol,above_joint , Vkol,below_joint) = 17835.698
  As1 = 615.7522
  As2 = 307.8761
  Existing Material: fyd = fs_Lower_bound = 400.00
----
  knowledge factor,   = 1.00

Vn = Min(Vn1, Vn2) = 830379.786, where
 provided Shear Forces are calculated for beam 1 and beam 2, respectively
Beam 1:
New Joint: From table 7-7, ASCE 41-17: Final value Vn1,R = 1.0*Vn1 = 830379.786
Vn1 = 830379.786 from (10.4) ASCE 41-17
with
  fc = Min(fc_beam,fc_Column) = 25.00
    New Material: fc_column = fc_lower_bound_column = 25.00
    New Material: fcd_beam = fc_lower_bound_beam= 25.00
  Aj = = 100000.00
   hc = 400.00
   bj = 250.00
    column width = 400.00
    beam width plus joint depth = 650.00
    Min perpedicular distance of beam axis to column sides = 125.00
    = 20.00, from table 10-12, ASCE 41-17)
   column hoops spacing = 100.00

Beam 2:
Existing Joint: From table 7-7, ASCE 41-17: Final value Vn1,R = *Vn1 = 930025.361
Vn1 = 930025.361 from (10.4) ASCE 41-17
with
  fc = Min(fc_beam,fc_Column) = 16.00
    New Material: fc_column = fc_lower_bound_column = 25.00
    Existing Material: fc_beam = fc_lower_bound_beam = 16.00
  Aj = = 140000.00
   hc = 400.00
   bj = 350.00
    column width = 400.00
    beam width plus joint depth = 750.00
    Min perpedicular distance of beam axis to column sides = 175.00
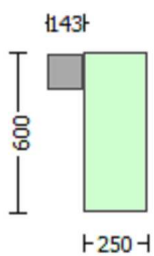   = 20.00, from table 10-12, ASCE 41-17)
   column hoops spacing = 100.00
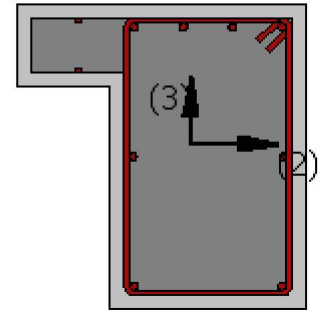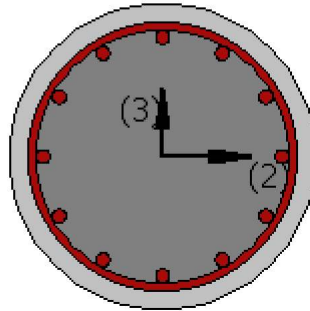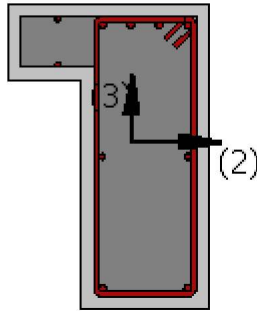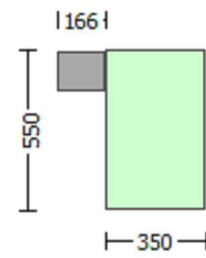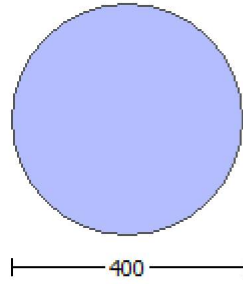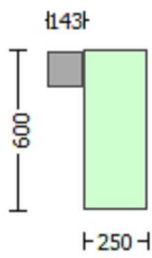
Calculation No. 2

Col. C2 - Beam B2 - Beam B1, Floor : 1

Limit State: Life Safety (data interpolation between analysis steps 4 and 5)

Analysis: Uniform +X

Check: Shear Force

Demanded Shear Force: Vjhd = Max(Vjhd1,Vjhd2) = 555837.347, where
Vjhd1,Vjhd2 are calculated for beam 1 and beam 2, respectively, using TBDY, (7.11) and ACI 318-14, 18.8.2.1.
Beam 1:
Vjhd1 = 555837.347
with
  Vkol = Min(Vkol,above_joint , Vkol,below_joint) = 21430.303
  As1 = 615.7522
  As2 = 307.8761
  New Material: fyd = fs_Lower_bound = 500.00

Beam 2:
Vjhd2 = 440383.817
with
  Vkol = Min(Vkol,above_joint , Vkol,below_joint) = 21430.303
  As1 = 615.7522
  As2 = 307.8761
  Existing Material: fyd = fs_Lower_bound = 400.00
----
  knowledge factor,   = 1.00

Vn = Min(Vn1, Vn2) = 830379.786, where
 provided Shear Forces are calculated for beam 1 and beam 2, respectively
Beam 1:
New Joint: From table 7-7, ASCE 41-17: Final value Vn1,R = 1.0*Vn1 = 830379.786
Vn1 = 830379.786 from (10.4) ASCE 41-17
with
  fc = Min(fc_beam,fc_Column) = 25.00
     New Material: fc_column = fc_lower_bound_column = 25.00
     New Material: fcd_beam = fc_lower_bound_beam= 25.00
  Aj = = 100000.00
   hc = 400.00
   bj = 250.00
     column width = 400.00
     beam width plus joint depth = 650.00
     Min perpedicular distance of beam axis to column sides = 125.00
    = 20.00, from table 10-12, ASCE 41-17)
   column hoops spacing = 100.00

Beam 2:
Existing Joint: From table 7-7, ASCE 41-17: Final value Vn1,R =   *Vn1 = 930025.361
Vn1 = 930025.361 from (10.4) ASCE 41-17
with

fc = Min(fc_beam,fc_Column) = 16.00
  New Material: fc_column = fc_lower_bound_column = 25.00
  Existing Material: fc_beam = fc_lower_bound_beam = 16.00
Aj = = 140000.00
 hc = 400.00
 bj = 350.00
  column width = 400.00
  beam width plus joint depth = 750.00
  Min perpedicular distance of beam axis to column sides = 175.00
 = 20.00, from table 10-12, ASCE 41-17)
 column hoops spacing = 100.00