* 1. General Information
     1. Design Code : ACI318M-14
     2. Unit System : N, mm
  2. Material
     1. f'c : 25.00MPa
     2. Fy : 400MPa
     3. Fys : 400MPa
  3. Length
     1. : 3.500m
     2. : 3.500m
     3. : 1.000
     4. : 1.000
  4. Section

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Wall ID** | **Thickness (mm)** | **Cover (mm)** | **Start Point**  **X(mm)** | **Start Point**  **Y(mm)** | **End Point**  **X(mm)** | **End Point**  **Y(mm)** |
| W01 | 200 | 20.00 | -0.000200 | 3,100 | 1,050 | 3,100 |
| W02 | 200 | 20.00 | 2,450 | 3,100 | 3,500 | 3,100 |
| W03 | 200 | 20.00 | 750 | 1,100 | 750 | 3,100 |
| W04 | 200 | 20.00 | 2,750 | 1,100 | 2,750 | 3,100 |
| W05 | 200 | 20.00 | 750 | 1,100 | 2,750 | 1,100 |



* 1. Reinforcement

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Wall ID** | **Vert. Rebar** | **Hori. Rebar** | **End Rebar** | **Arrangement** |
| W01 | #3@450 | #3@300 | 4-#4@100 | Divide equally by nearest space |
| W02 | #3@450 | #3@300 | 4-#4@100 | Divide equally by nearest space |
| W03 | #3@450 | #3@300 | 4-#4@100 | Divide equally by nearest space |
| W04 | #3@450 | #3@300 | 4-#4@100 | Divide equally by nearest space |
| W05 | #10@450 | #8@300 | 4-#4@100 | Divide equally by nearest space |

* 1. Factors
     1. Cmx : 0.850
     2. Cmy : 0.850
     3. : 0.600
  2. Forces
     1. Forces

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Wall ID** | **(kN)** | **(kN·m)** | **(kN·m)** | **(kN)** | **(kN)** | **(kN)** | **(kN)** |
| W01 | 100.00 | 50.00 | 50.00 | 0.000 | 0.000 | 0.000 | 50.00 |
| W02 | 100.00 | 100.00 | 100.00 | 0.000 | 0.000 | 0.000 | 100.00 |
| W03 | 200 | 200 | 200 | 0.000 | 0.000 | 0.000 | 200 |
| W04 | 400 | 400 | 400 | 0.000 | 0.000 | 0.000 | 400 |
| W05 | 500 | 500 | 500 | 0.000 | 0.000 | 0.000 | 500 |

* + 1. Design Force

|  |  |  |
| --- | --- | --- |
|  |  |  |
| 1,300 | 366 | 1,450 |

* 1. Check Slenderness Ratio
     1. Calculate radii of gyration
        + 818mm
        + 996mm
     2. Calculate slenderness ratio
        + 0.625
        + 0.625
        + 4.279 < 26.50 → Not Slender
        + 3.513 < 26.50 → Not Slender
  2. Check Magnified Moment
     1. Calculate moment magnification factor
        + 1.000
        + 1.000
  3. Check Minimum Moment
     1. Calculate minimum eccentricity
        + 52.46mm
        + 57.29mm
     2. Calculate minimum moment
        + 68.19kN·m
        + 74.48kN·m
  4. Check Design Moment
     1. Calculate design moment
        + 366kN·m
        + 1,450kN·m
        + 1,495kN·m
  5. Check Design Parameter
     1. Calculate rebar ratio
        + 1,580,000mm² 17,368mm²
        + 0.0100 0.0800
        + 0.0110
     2. Calculate eccentricity
        + 1,115mm
        + 282mm
        + 1,150mm
        + Rotation angle of neutral axis = 59.38°
     3. Calculate concentric axial load capacity
        + 33,148kN
        + 26,518kN
        + -9,967kN
  6. Check Moment Capacity
     1. Calculate capacity of compression stress block
        + 0.850
        + 2,107mm 1,791mm
        + 11,819kN
        + 4,319kN·m
        + 12,756kN·m
     2. Calculate capacity of rebar
        + -1,296kN
        + 2,205kN·m
        + 3,237kN·m
     3. Calculate nominal capacity for neutral axis
        + 10,523kN
        + 6,524kN·m
        + 15,993kN·m
        + 17,273kN·m
     4. Calculate strength reduction factor
        + 0.0020 0.0050
        + 0.001186
        + ø = 0.650
     5. Calculate axial load and moment capacities
        + 9,577kN
        + 2,671kN·m
        + 10,687kN·m
        + 11,016kN·m

0.136 < 1.000 → O.K

0.136 < 1.000 → O.K

![](data:None;base64,)

* 1. Check Shear Capacity

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Wall ID** | **LCB** |  |  |  |  |  |  |
| W01 | LCB1 | 50.00 | 170 | 119 | 450 / 450 | 300 / 300 | OK(0.173) |
| W02 | LCB1 | 100.00 | 170 | 119 | 450 / 280 | 300 / 210 | OK(0.346) |
| W03 | LCB1 | 200 | 324 | 227 | 450 / 280 | 300 / 300 | OK(0.363) |
| W04 | LCB1 | 400 | 324 | 227 | 450 / 280 | 300 / 300 | OK(0.726) |
| W05 | LCB1 | 500 | 324 | 672 | 450 / 450 | 300 / 300 | OK(0.502) |

* 1. Check Shear Capacity : W01
     1. Calculate maximum shear strength
        + 0.750
        + 840mm
        + 697kN
        + 523kN

→ O.K

* + 1. Calculate shear strength by concrete
       - 227kN
       - 227kN
    2. Calculate maximum space
       - 450mm
       - 450mm (by Rho)
       - 450mm
       - 450
       - 300mm (by Rho)
       - 300mm
    3. Calculate shear strength

→ O.K

→ O.K

* + - * 170kN
      * 119kN
      * 289kN

→ O.K

* + 1. Calculate rebar ratio
       - 0.00150 0.00000
       - 0.00250 0.00237

→ N.G

→ N.G

* 1. Check Shear Capacity : W02
     1. Calculate maximum shear strength
        + 0.750
        + 840mm
        + 697kN
        + 523kN

→ O.K

* + 1. Calculate shear strength by concrete
       - 227kN
       - 227kN
    2. Calculate maximum space
       - 350mm
       - 280mm (by Rho)
       - 280mm
       - 210
       - 300mm (by Rho)
       - 210mm
    3. Calculate shear strength

→ N.G

→ N.G

* + - * 170kN
      * 119kN
      * 289kN

→ O.K

* + 1. Calculate rebar ratio
       - 0.00250 0.00000
       - 0.00250 0.00237

→ N.G

→ N.G

* 1. Check Shear Capacity : W03
     1. Calculate maximum shear strength
        + 0.750
        + 1,600mm
        + 1,328kN
        + 996kN

→ O.K

* + 1. Calculate shear strength by concrete
       - 432kN
       - 432kN
    2. Calculate maximum space
       - 450mm
       - 280mm (by Rho)
       - 280mm
       - 400
       - 300mm (by Rho)
       - 300mm
    3. Calculate shear strength

→ N.G

→ O.K

* + - * 324kN
      * 227kN
      * 551kN

→ O.K

* + 1. Calculate rebar ratio
       - 0.00250 0.00000
       - 0.00250 0.00237

→ N.G

→ N.G

* 1. Check Shear Capacity : W04
     1. Calculate maximum shear strength
        + 0.750
        + 1,600mm
        + 1,328kN
        + 996kN

→ O.K

* + 1. Calculate shear strength by concrete
       - 432kN
       - 432kN
    2. Calculate maximum space
       - 450mm
       - 280mm (by Rho)
       - 280mm
       - 400
       - 300mm (by Rho)
       - 300mm
    3. Calculate shear strength

→ N.G

→ O.K

* + - * 324kN
      * 227kN
      * 551kN

→ O.K

* + 1. Calculate rebar ratio
       - 0.00250 0.00000
       - 0.00250 0.00237

→ N.G

→ N.G

* 1. Check Shear Capacity : W05
     1. Calculate maximum shear strength
        + 0.750
        + 1,600mm
        + 1,328kN
        + 996kN

→ O.K

* + 1. Calculate shear strength by concrete
       - 432kN
       - 432kN
    2. Calculate maximum space
       - 450mm
       - 450mm (by Rho)
       - 450mm
       - 400
       - 300mm (by Rho)
       - 300mm
    3. Calculate shear strength

→ O.K

→ O.K

* + - * 324kN
      * 672kN
      * 996kN

→ O.K

* + 1. Calculate rebar ratio
       - 0.00250 0.00000
       - 0.00250 0.01699

→ N.G

→ O.K