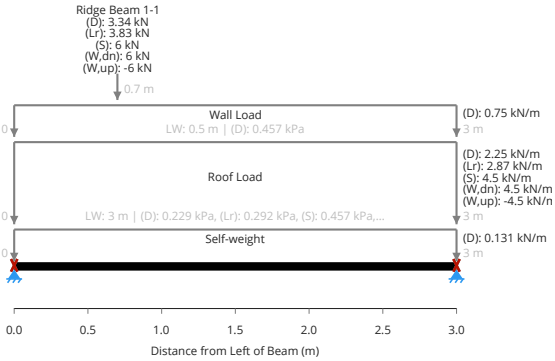
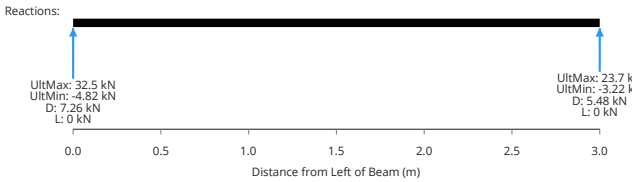
| | | | |
|---|---|---|---|
| **Client:** | My Client | **Date:** | Oct 8, 2020 |
| **Author:** | Brooks Smith | **Job #:** | 12345 |
| **Project:** | Example House Project | **Subject:** | **Garage Lintel 1** |
| **References:** | AISC 360-16 (LRFD) | | |

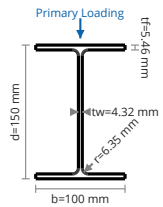
## Summary

| | | |
|---|---|---|
| 97% | Moment Capacity | $\phi M_n = 21.8\ \text{kN} \cdot \text{m}$ |
| 24% | Shear Capacity | $\phi V_n = 136\ \text{kN}$ |
| 61% | Critical Deflection | $\delta_{gov} = -5.09\ \text{mm}$ |
| | Critical Deflection Ratio | $L/ = 589$ |
| 16% | Long-Term Deflection | $\delta_{LT} = -3.25\ \text{mm}$ |
| | Critical Long-Term Deflection Ratio | $(L/)_{LT} = 923$ |
| 33% | Simplified DL+LL Deflection | $\delta_{DL+LL} = -6.57\ \text{mm}$ |
| | Critical Simplified DL+LL Deflection Ratio | $(L/)_{DL+LL} = 457$ |
| | Dead Load Deflection | $\delta_D = -3.32\ \text{mm}$ |




## Key Properties




| | | |
|---|---|---|
| Designation | | W6X9 |
| Yield Strength | $F_y =$ | $350\ \text{MPa}$ |
| Total Length | $L =$ | $3\,000\ \text{mm}$ |
| Continuous Bracing for Lateral Torsional Buckling | | No continuous bracing |

## Design Criteria

| | |
|---|---|
| Design Code for Load Combinations | International Building Code (IBC) 2018 |

## Loads

## Member Properties

| | |
|---|---|
| Gross Area | $A_g = 1\,730\ \text{mm}^2$ |
| Moment of Inertia | $I = 6\,830\,000\ \text{mm}^4$ |
| Section Modulus | $S = 91\,100\ \text{mm}^3$ |
| Elastic Global Buckling Length | $L_r = 2\,940\ \text{mm}$ |
| Fully Plastic Length | $L_p = 967\ \text{mm}$ |

## Section Classification (AISC 360-16 B4)

| | |
|---|---|
| Section Classification - Flanges | Non-Compact |
| Section Classification - Web | Compact |

## Section Flexural Capacity (AISC 360-16, Chapter F)

| | |
|---|---|
| Plastic Moment Resistance | $M_p = 35.7\ \text{kN} \cdot \text{m}$ |
| Nominal Cross-section Bending Resistance | $M_{\text{sxn}} = 35.7\ \text{kN} \cdot \text{m}$ |

## Flexural Capacity - Positive Bending (AISC 360-16, Chapter F)

| | |
|---|---|
| Longest Unbraced Segment - Positive Bending | $L^+_{\text{umax}} = 3\,000\ \text{mm}$ |
| Lateral-Torsional Buckling Governs? - Positive Bending | $LTB^+_{\text{flag}} =$ Yes |
| Governing LTB Resistance - Positive Bending | $M^+_{LTB} = 24.3\ \text{kN} \cdot \text{m}$ |

## Flexural Capacity - Negative Bending (AISC 360-16, Chapter F)

| | |
|---|---|
| Longest Unbraced Segment - Negative Bending | $L^-_{\text{umax}} = 3\,000\ \text{mm}$ |
| Lateral-Torsional Buckling Governs? - Negative Bending | $LTB^-_{\text{flag}} =$ Yes |
| Governing LTB Resistance - Negative Bending | $M^-_{LTB} = 24.3\ \text{kN} \cdot \text{m}$ |

## Shear Capacity (AISC 360-16, Chapter G)

| | |
|---|---|
| Shear Slenderness | $h/t_w = 29.2$ |
| Web Shear Strength Coefficient | $C_{v1} = 1$ |
| Nominal Shear Capacity | $V_n = 136\ \text{kN}$ |

## Comments