Project 1

Cover Page

Analysis of a Steel Frame Building

Name
Date Submitted
Lab Section
Table of Contents

VERITICAL
LOAD FLOW & ANALYSIS

ASSEMBLY WEIGHTS ........ Pp. 1-5
LIVE LOADS AND MAPPING .... P. 6
BEAM 1 ...................... Pp. 7-8
GIRDER 1 .................... Pp. 9-10
COLUMN 1 .................... Pp. 11-12
Roof Assembly

- Roof & Gravel
- Metal Deck
- Steel Framing
- M.E.P.
- Ceiling & Tile

2" x 5' x 2'

Roof Assembly
Section 1/8" = 1'-0"

Total 30 psf

Other Assemblies, Floors & Soffits will look like this minus the gravel and roof membrane.
Wall Assembly

- 20 PSF (TABLE 2A)
- 5 PSF (P.3)
- 65 PSF (P.13)
- 10 PSF ()
- 5 PSF (P.3)

Total 105 PSF

Plan View 1/2" = 1'-0"

Corrugated
Asbestos
N.T.S.

Metal Stud Dimensions
DC stacks = 120 psf
LL stacks = 200 psf

TRIB AREA:

1. DC load = (120 psf) (25 ft) = 3000 lbs
2. LL load = (200 psf) (25 ft) = 5000 lbs

GIRDER SUPPORTS BEAMS:

\[ R_{Ax} = 0 \]
\[ R_{Ay} = 10k \]
\[ R_{By} = 10k \]

\[ \sum F_x = 0 \quad \Rightarrow \quad R_{Ax} = 0 \]
\[ \sum F_y = 0 \quad \Rightarrow \quad R_{Ay} = 10k \]

\[ \sum M_x = 0 = -10k(5') - 10k(10') + R_{Ay}(15') \]
\[ \theta = -50k \cdot ft - 100k \cdot ft + 15ft \cdot R_{Ay} \]
\[ \theta = -150k \cdot ft + 15ft \cdot R_{Ay} \]

\[ \sum F_y = 0 = R_{Ay} - 10k - 10k + R_{By} \]
\[ \theta = 10k - 10k - 10k + R_{By} \]
\[ \theta = -10k + R_{By} \]
\[ R_{By} = 10k \]
Axial Shear Moment Diagrams

\[ \Delta_1 = (10k)(5') \]
\[ \Delta_1 = 50k \cdot ft \]
\[ A_2 = -50k \cdot ft \]

Positive slope: Change in \( M \) 5 + 50k·ft

Zero slope

Negative slope