# Sample Work LP Cover Sheet

This PDF is intended to be used to produce paper tactile/high contrast graphics. The document is not intended to be viewed electronically. This cover page is not part of the graphic and should be discarded before producing the graphics.

For your convenience, brief descriptions of the images in this file are provided below.

Note: When page numbers are referenced in the document image descriptions, they refer to the pages in the actual graphic, excluding this cover sheet. This cover sheet is page 0.

## Document Image Descriptions

This instructor document contains a combination of labeled figures and step-by-step math work. Pages 4, 5, 8, and 11 contain math work. The remaining pages, which contain figures, are described below.

Page. 2: Free body diagram of forces at point A

Page 3: Free body diagram of forces at point A, broken into x and y components

Page 6: Free body diagram of forces at point B

Page 7: Free body diagram of forces at point B, broken into x and y components

Page 9: Free body diagram of forces at point C

Page 10: Free body diagram of forces at point C, broken into x and y components

**DISCARD THIS PAGE BEFORE PRODUCING THE GRAPHIC.**

# Truss Analysis Sample Work

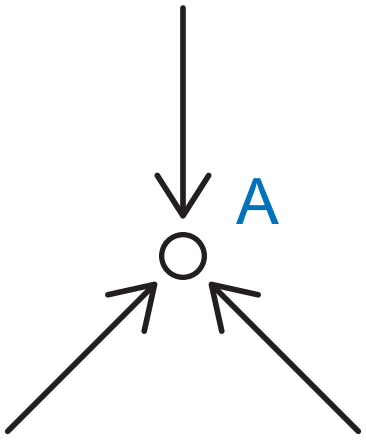
This is an example of what student work might look like as they follow along the MB5 lesson plan and MB5-H-TrussAnalysisOverview.

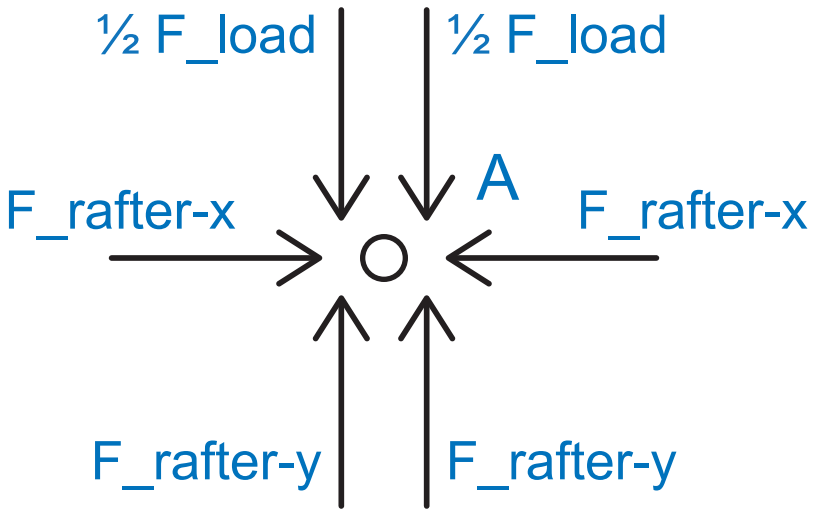
For this example, assume we have chosen a building that is 10 ft x 10 ft on the floor, with 10 ft high columns.

Assume we have chosen a symmetrical gable roof that extends 3 ft above the columns.

Assume we have calculated a total rafter load of 2500 lbs.

Places where these assumptions come into use are marked with “asm”.


A


½ F_load
½ F_load
A
F_rafter-x
F_rafter-x
F_rafter-y
F_rafter-y

asm F_Load = 2500 lbs

$0 = 2 \times F_{rafter\text{-}y} - 2 \times \frac{1}{2} \times 2500 \text{ lbs}$

$= 2 \times F_{rafter\text{-}y} - 2500 \text{ lbs}$

$2500 \text{ lbs} = 2 \times F_{rafter\text{-}y}$

$1250 \text{ lbs} = F_{rafter\text{-}y}$

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asm roof height = 3 ft

asm tributary width = 5 ft

$Roof\_angle = \arctan\left(\frac{3ft}{5ft}\right)$

$= 30.96 \text{ deg.}$

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$F_{rafter} \times \sin(Roof\_angle) = F_{rafter\text{-}y}$

$F_{rafter} \times \sin(30.96) = 1250 \text{ lbs}$

$F_{rafter} \times 0.514 = 1250 \text{ lbs}$

$F_{rafter} = 2430 \text{ lbs}$

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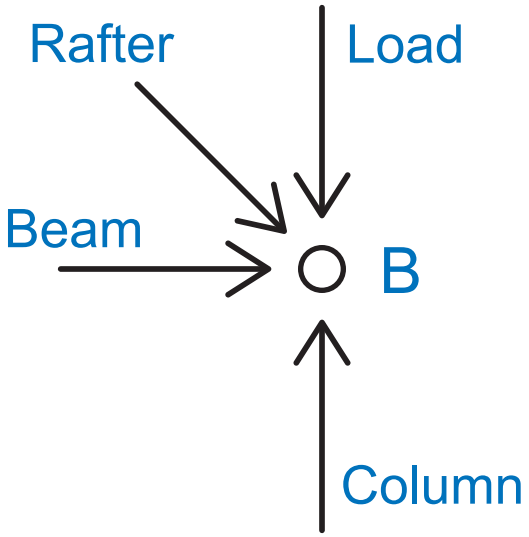
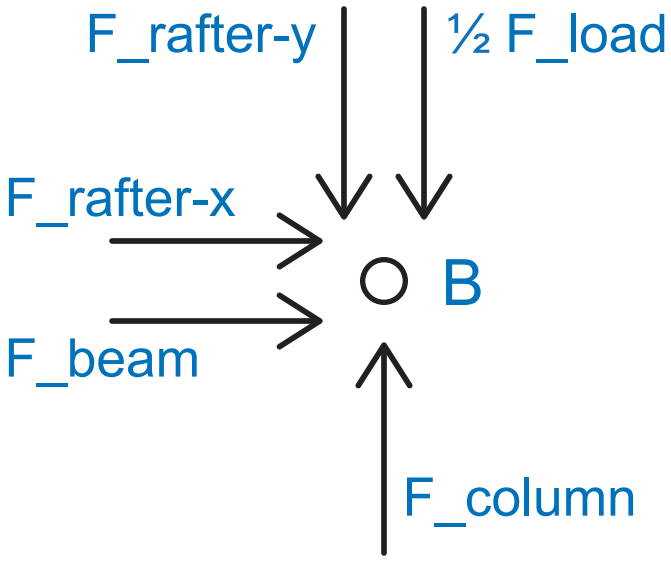
$$F_{rafter\text{-}x} = F_{rafter} \times \cos(Roof\_angle)$$
$$= 2430 \text{ lbs} \times \cos(30.96)$$
$$= 2084 \text{ lbs}$$


Rafter
Load
Beam
B
Column


F_rafter-y
½ F_load
F_rafter-x
B
F_beam
F_column

$$0 = F_{column} - (½)F_{load} - F_{rafter\text{-}y}$$
$$= F_{column} - 1250 \text{ lbs} - 1250 \text{ lbs}$$
$$= F_{column} - 2500 \text{ lbs}$$
$$F_{column} = 2500 \text{ lbs}$$

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$$0 = F_{rafter\text{-}x} + F_{beam}$$
$$= 2084 \text{ lbs} + F_{beam}$$
$$F_{beam} = -2084 \text{ lbs}$$

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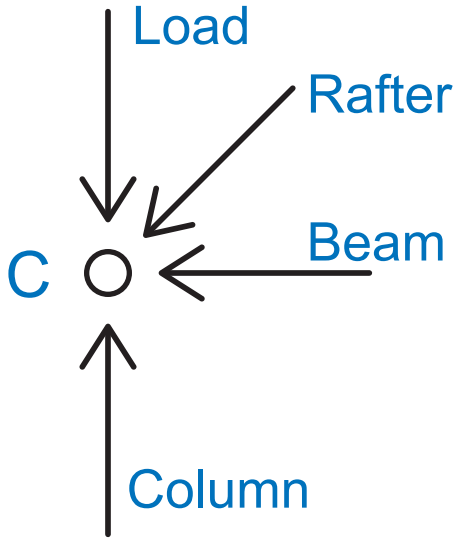
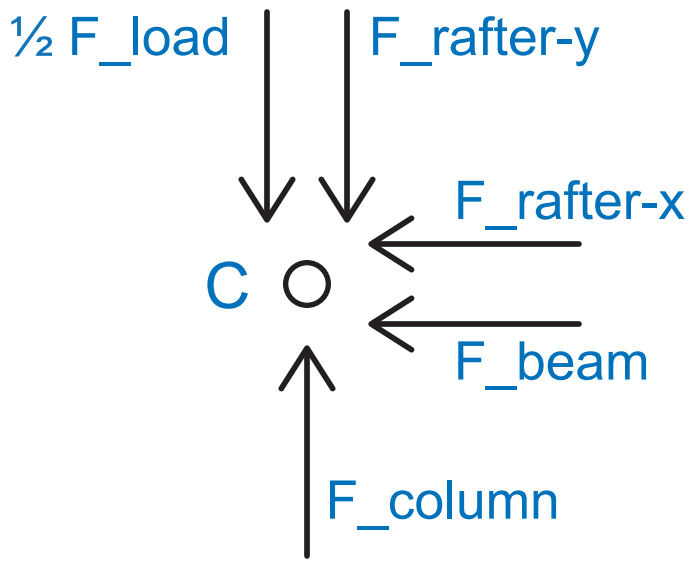

Load
Rafter
Beam
C
Column


½ F_load
F_rafter-y
F_rafter-x
C
F_beam
F_column

0 = F_column - (½)F_load - F_rafter-y

= F_column - (½)2500 lbs - 1250 lbs

F_column = 2500 lbs

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0 = -F_rafter-x + F_beam

= -F_beam - 2084 lbs

F_beam = -2084 lbs