Simply Supported Beam Analysis Report

Automated PyLaTeX Generator

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1 Introduction

This report presents a simple structural analysis of a simply supported beam subjected to point loads. The reactions, shear force diagram (SFD), and bending moment diagram (BMD) are computed and plotted using pgfplots.

2 Beam Description

Beam supports: simple supports at x=0 and x=L. Units are consistent (e.g., meters and Newtons).

Figure 1: Simply supported beam schematic

3 Data Source

Input data read from the Excel file data/forces.xlsx. The following table reproduces the input data used for analysis.

4 Input Data

Table 1: Point loads read from Excel (position in m, load in N)

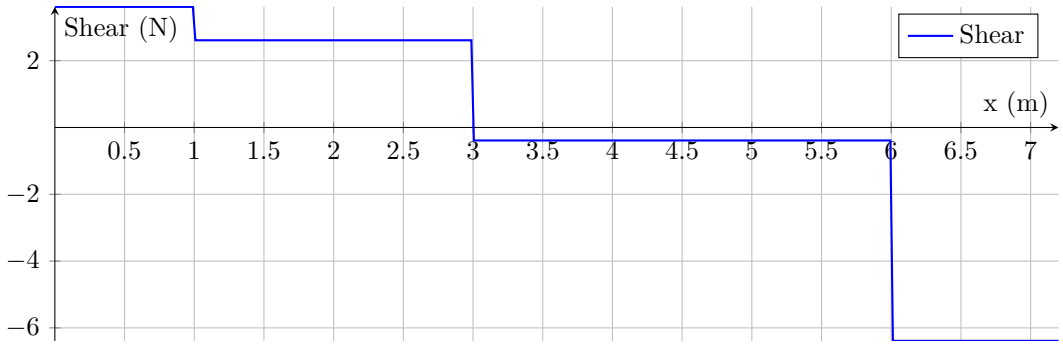
Position (m)	**Load (N)**
1.000	1.000
3.000	3.000
6.000	6.000

5 Analysis

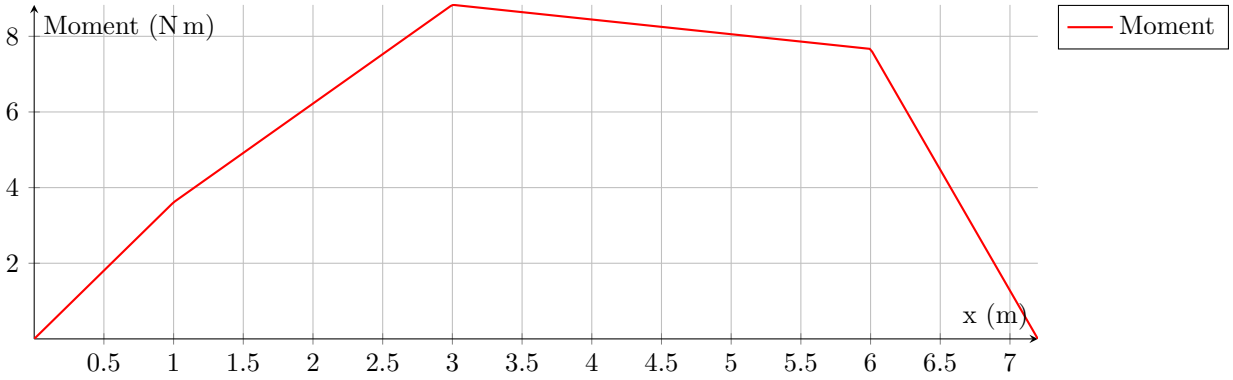
5.1 Support Reactions

Reaction at A (x=0): $R_A = 3.611$ N
Reaction at B (x=L): $R_B = 6.389$ N

5.2 Shear Force Diagram (SFD)



5.3 Bending Moment Diagram (BMD)



5.4 Summary

Key results:Maximum shear: -6.389 N at x = 6.012 m
Maximum moment: 8.831 N m at x = 3.006 m

A Shear Force Diagram (SFD) represents the internal shear force distribution along the beam as a function of position. It shows how shear changes where loads are applied and at supports; abrupt jumps correspond to point loads or reactions.

A Bending Moment Diagram (BMD) represents the internal bending moment distribution along the beam. It indicates where the beam experiences the largest bending effects; these locations are critical for section design and checks.