Simply Supported Beam Analysis Report

Structural Beam Analysis using TikZ/pgfplots

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Report ID: BA-2026-SONIYA-KUCHEKAR-SSB

Date: February 4, 2026

Table of Contents

0.1. Introduction

This section describes the beam system and the origin of the input dataset used for analysis.

0.1.1 Beam Description

The structure considered is a simply supported beam with a pinned support at the left end and a roller support at the right end. This arrangement allows rotation at both supports while preventing vertical displacement.

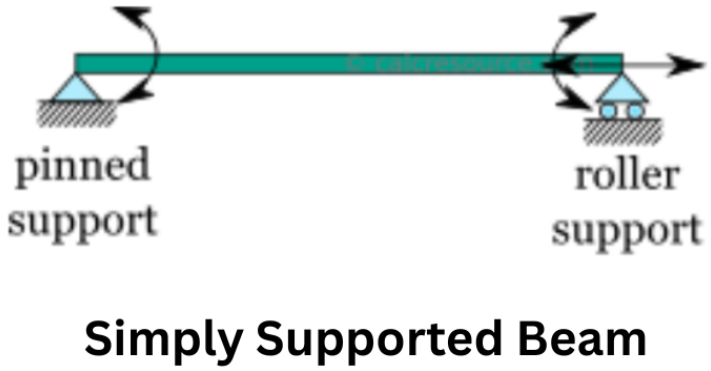


Figure 1: Simply Supported Beam Configuration

0.1.2 Data Source

The force and moment values used in this report are read directly from the provided Excel file (beam_data.xlsx). The next section recreates the Excel table using LaTeX Tabular.

0.2. Input Data

This section recreates the Excel dataset using a LaTeX table (not inserted as an image).

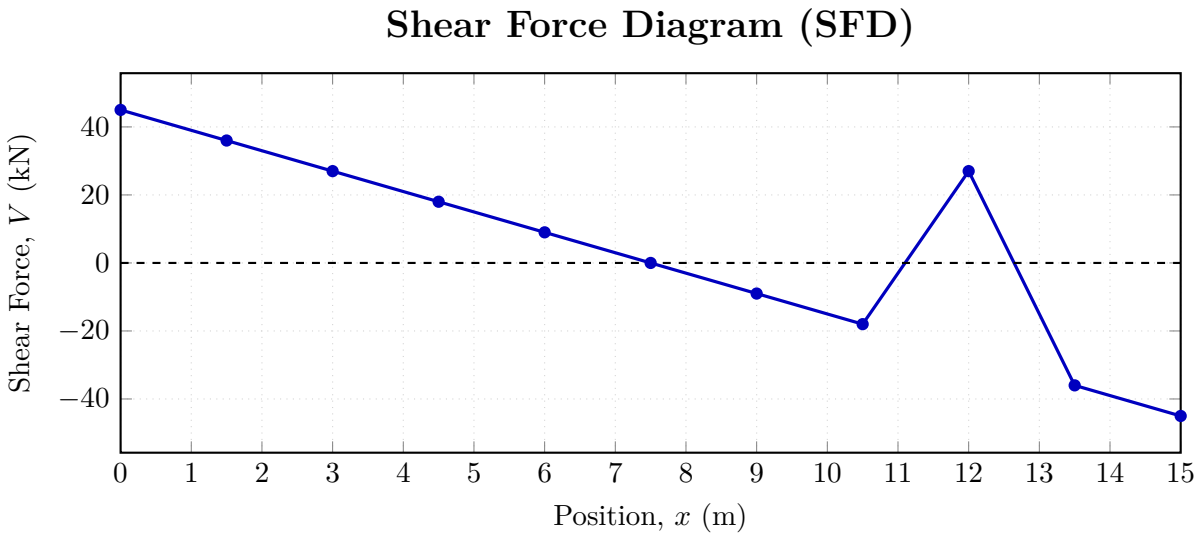
Position (m)	Shear Force (kN)	Bending Moment (kNm)
0.00	45.00	0.00
1.50	36.00	60.75
3.00	27.00	108.00
4.50	18.00	141.75
6.00	9.00	162.00
7.50	0.00	168.75
9.00	-9.00	162.00
10.50	-18.00	141.75
12.00	27.00	108.00
13.50	-36.00	60.75
15.00	-45.00	0.00

0.3. Analysis

This section presents engineering diagrams generated as TikZ/pgfplots vector plots for high-quality output.

0.3.1 Shear Force Diagram

The Shear Force Diagram (SFD) illustrates the variation of shear force along the beam span.



0.3.2 Bending Moment Diagram

The Bending Moment Diagram (BMD) represents the bending moment distribution along the span.