

# Rigging Calculation Report

Quang Anh To

June 30, 2025

## Contents

<b>1</b>	<b>Pipe Weight Calculation</b>	<b>2</b>
<b>2</b>	<b>Position of Center of Gravity (C.O.G)</b>	<b>2</b>
<b>3</b>	<b>Calculation for Each Lifting Point</b>	<b>2</b>
<b>4</b>	<b>Tension Calculation</b>	<b>3</b>
<b>5</b>	<b>Compressive Force Calculation from Sling 5 and 6</b>	<b>3</b>
<b>6</b>	<b>Summary Tables</b>	<b>4</b>

# 1 Pipe Weight Calculation

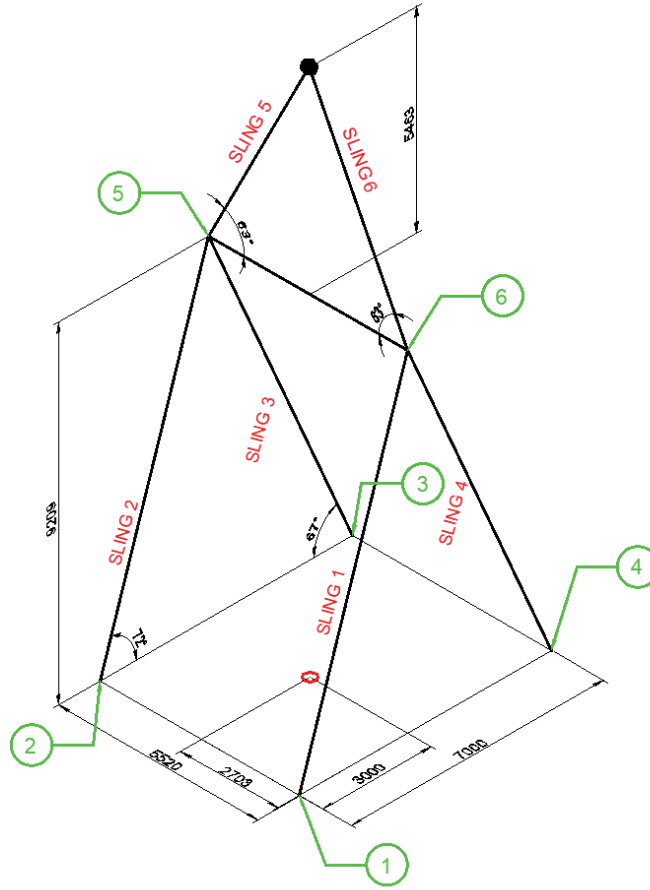
The weight of the spreader bar pipe is calculated as:

$$\text{Weight per Meter} = \text{Outer Diameter} \times \pi \times \text{Thickness} \times 7.85$$

$$\text{Weight} = \text{Weight per Meter} \times \text{Length}$$

The calculated weight of the spreader bar pipe is **2.28 T**.

# 2 Position of Center of Gravity (C.O.G)



The position of the C.O.G is essential for stability. The distances from the C.O.G to each lifting point are used in the load calculations.

# 3 Calculation for Each Lifting Point

The load at each lifting point is calculated using (e.g., lifting point 1 and 2):

$$L = W \times \left( \frac{d_{t1}}{od_{t1}} \right) \times \left( \frac{d_{t2}}{od_{t2}} \right)$$

$$L_1 = 150 \times \left( \frac{5520 - 2703}{5520} \right) \times \left( \frac{7000 - 3000}{7000} \right)$$

$$L_2 = 150 \times \left( \frac{2703}{5520} \right) \times \left( \frac{7000 - 3000}{7000} \right)$$

- Lifting Point 1: 43.74 T
- Lifting Point 2: 41.97 T
- Lifting Point 3: 31.48 T
- Lifting Point 4: 32.81 T
- Lifting Point 5: 76.55 T
- Lifting Point 6: 73.45 T

## 4 Tension Calculation

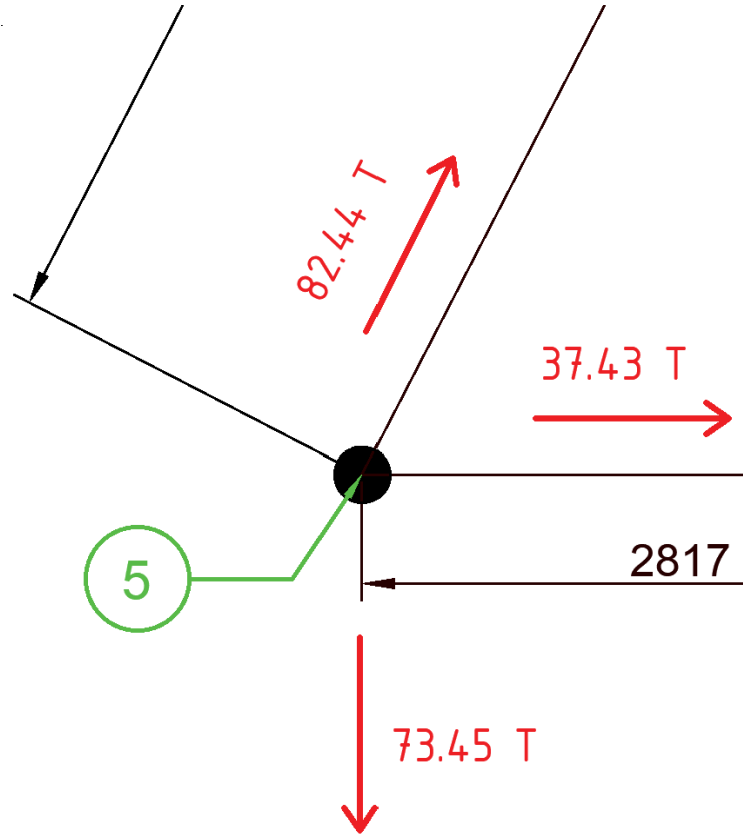
The tension in each sling is:

$$\text{Tension} = \frac{\text{Load}}{\sin(\theta)}$$

- Sling 1: 45.99 T (72°)
- Sling 2: 44.13 T (72°)
- Sling 3: 34.20 T (67°)
- Sling 4: 35.64 T (67°)
- Sling 5: 82.44 T (63°)
- Sling 6: 85.91 T (63°)

## 5 Compressive Force Calculation from Sling 5 and 6

The compressive force on the spreader bar is generated by the horizontal components of the tensions in sling 5 and 6. We can use joint resolution method at lifting point 5 to determine the compression force of the spreader bar (this calculation will have error due to rounded pulling angle)



$$\text{Compressive Force (per sling)} = \text{Tension} \times \cos(\theta)$$

At lifting point 5:

$$F_{c5} = 82.44 \times \cos(63^\circ) = 82.44 \times 0.4540 = 37.43 \text{ T}$$

## 6 Summary Tables

### Lifting Load at 4 Lifting Points and Padeye

Lifting Point	Load (T)
1	43.74
2	41.97
3	31.48
4	32.81
5	73.45
6	76.55

### Tension of the Slings

Sling No.	Tension (T)	Angle (°)
1	45.99	72
2	44.13	72
3	34.20	67
4	35.64	67
5	82.44	63
6	85.91	63

### Compressive Stress on Spreader Bar

Component	Stress (T)
Total Compressive Stress	37.43