

**COWI design**

## Column cross-section

|  |                           |                   |
|--|---------------------------|-------------------|
| Dimension                                    | m                         |                   |
| Diameter                                     | m                         | 10                |
| Plate thickness                              | m                         | 0.04              |
| Effective thickness vertical                 | m                         | 0.051             |
| Effective thickness total                    | m                         | 0.058             |
| Properties                                   |                           |                   |
| Area   | m <sup>2</sup>            | 1.60              |
| I (bending)                                  | m <sup>4</sup>            | 20.03             |
| I (torsion)                                  | m <sup>4</sup>            | 40.06             |
| <b>Radius of gyration about local x-axis</b> | <b>m</b>                  | <b>5.00</b>       |
| Sectional modulus                            |                           |                   |
| Bending                                      | m <sup>3</sup>            | 4.01              |
| Torsion                                      | m <sup>3</sup>            | 8.01              |
| Material                                     |                           |                   |
| Steel density                                | kg/m <sup>3</sup>         | 7850              |
| E  | Pa                        | 2.10E+11          |
| v  | -                         | 0.3               |
| G  | Pa                        | 8.08E+10          |
| Weight                                       | kg/m                      | 14303.67135       |
| <b>Axial stiffness</b>                       | <b>N</b>                  | <b>1.07E+10</b>   |
| <b>Bending stiffness y</b>                   | <b>Nm<sup>2</sup></b>     | <b>4.21E+12</b>   |
| <b>Bending stiffness z</b>                   | <b>Nm<sup>2</sup></b>     | <b>4.21E+12</b>   |
| <b>Torsional stiffness</b>                   | <b>Nm<sup>2</sup>/rad</b> | <b>3.24E+12</b>   |
| <b>Selfweight</b>                            | <b>kN/m</b>               | <b>140.319016</b> |

## Risnes Design

### Column cross-section

|                              |   |             |
|------------------------------|---|-------------|
| Dimension                    | m |             |
| Diameter                     | m | 8           |
| Plate thickness              | m | 0.04        |
| Effective thickness vertical | m | 0.048       |
| Effective thickness total    | m | 0.054588235 |

### Properties

|  |                |             |
|--|----------------|-------------|
| Area   | m <sup>2</sup> | 1.21        |
| I (bending)                                  | m <sup>4</sup> | 9.65        |
| I (torsion)                                  | m <sup>4</sup> | 19.30       |
| <b>Radius of gyration about local x-axis</b> | <b>m</b>       | <b>4.00</b> |

### Sectional modulus

|         |                |      |
|---------|----------------|------|
| Bending | m <sup>3</sup> | 2.41 |
| Torsion | m <sup>3</sup> | 4.83 |

### Material

|               |                   |             |
|---------------|-------------------|-------------|
| Steel density | kg/m <sup>3</sup> | 7850        |
| E             | Pa                | 2.10E+11    |
| v             | -                 | 0.3         |
| G             | Pa                | 8.08E+10    |
| Weight        | kg/m              | 10769.82314 |

|                        |          |                    |
|------------------------|----------|--------------------|
| <b>Axial stiffness</b> | <b>N</b> | <b>1.00800E+10</b> |
|------------------------|----------|--------------------|

|                            |                       |                    |
|----------------------------|-----------------------|--------------------|
| <b>Bending stiffness y</b> | <b>Nm<sup>2</sup></b> | <b>2.02670E+12</b> |
|----------------------------|-----------------------|--------------------|

|                            |                       |                    |
|----------------------------|-----------------------|--------------------|
| <b>Bending stiffness z</b> | <b>Nm<sup>2</sup></b> | <b>2.02670E+12</b> |
|----------------------------|-----------------------|--------------------|

|                            |                           |                    |
|----------------------------|---------------------------|--------------------|
| <b>Torsional stiffness</b> | <b>Nm<sup>2</sup>/rad</b> | <b>1.55900E+12</b> |
|----------------------------|---------------------------|--------------------|

|                   |             |                    |
|-------------------|-------------|--------------------|
| <b>Selfweight</b> | <b>kN/m</b> | <b>1.05652E+02</b> |
|-------------------|-------------|--------------------|