

# Applications Created

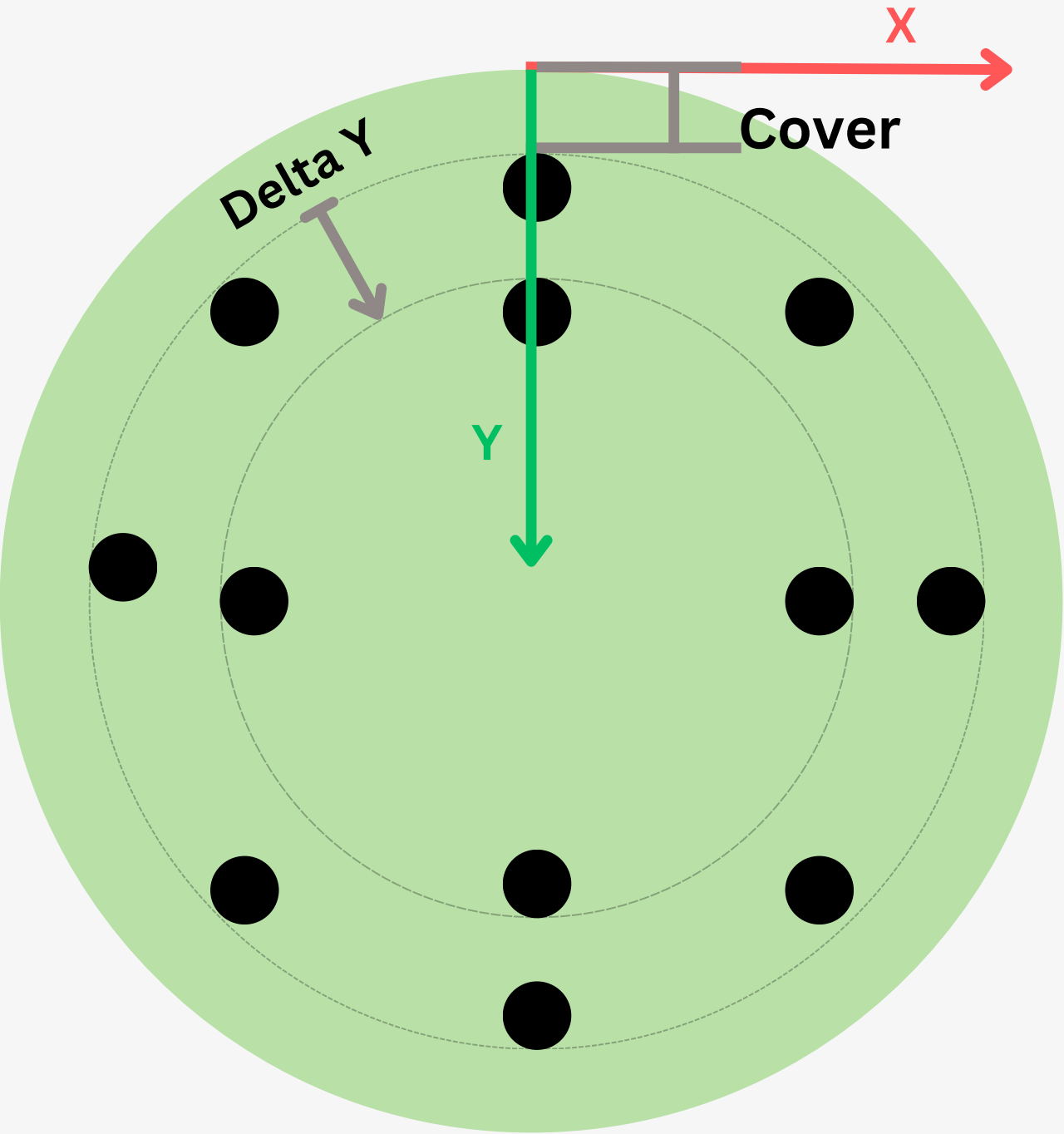
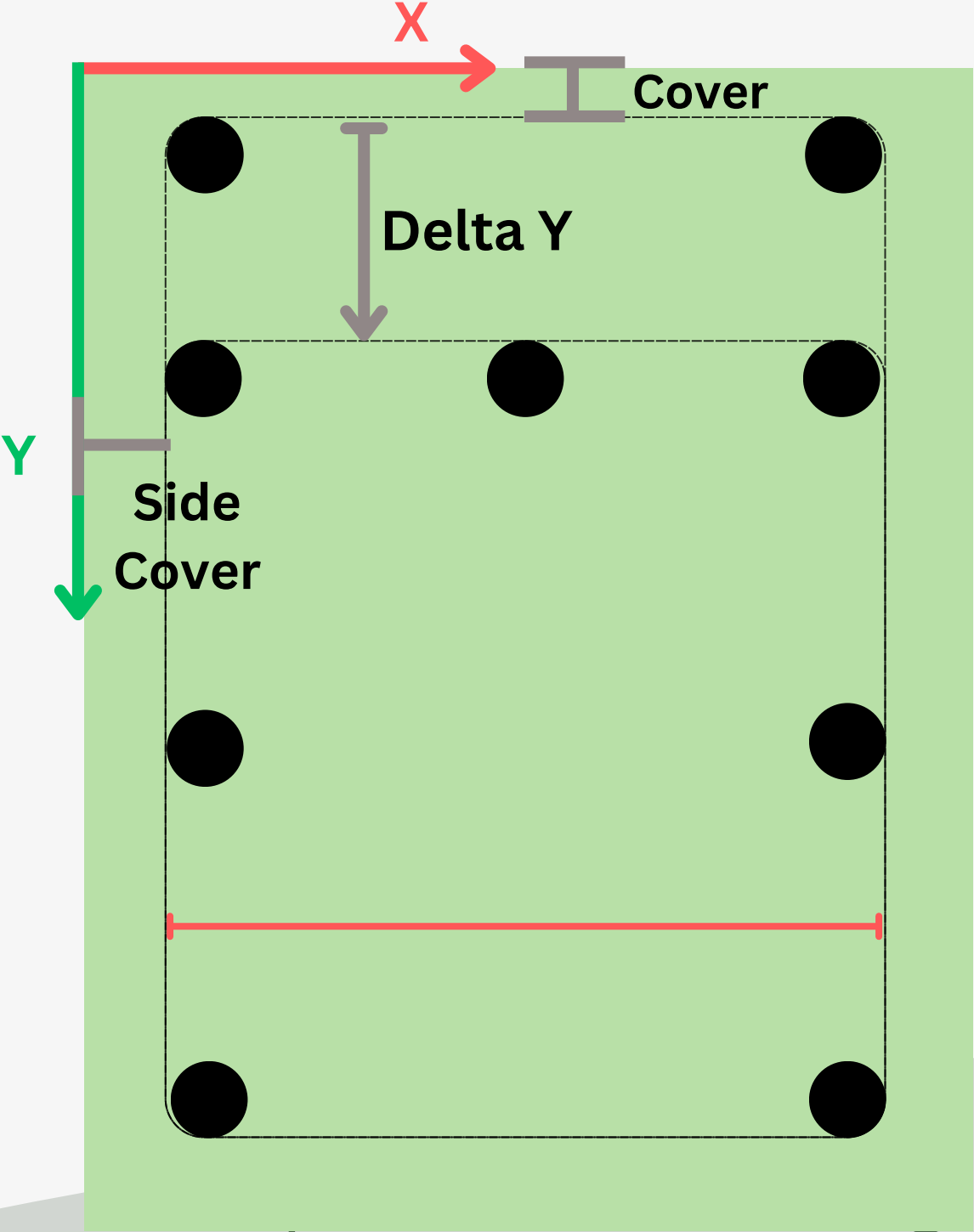
Riddhi Goswami

# Inertia Calculator

## Key Features

- Built using WPF (Desktop App Framework)
- Includes calculation for Rectangular and Circular Section
- Inputs (all in mm):
  - Rectangular - Height, Width, Sidecover, Cover, Stirrup Dia*
  - Circular - Radius, Cover, Stirrup Dia*
- Outputs (all in mm):
  - Rebar Area,  $I_x$ ,  $I_y$ ,  $r_x$ ,  $r_y$*
  - Total Area,  $I_x$ ,  $I_y$ ,  $r_x$ ,  $r_y$*
- Validation Checks applied on user inputs
- Error List which highlights the errors
- Dynamic illustration which is scaled to the inputs

# Guide Diagrams



# Rectangular Section

Inertia Calculator

Calculator

Future Additions

Properties

Section Type

Rectangular Beam

Width (mm)

0

Height (mm)

0

Cover (mm)

0

Side Cover (mm)

0

Stirrup Diameter (mm)

☒ 4 ☐ 6 ☐ 8 ☐ 10 ☐ 12

Row No.	Rebar Diameter (mm)	Number of Rebars	Delta Y	Delete

Calculate

Clear All

Rebar Area (mm<sup>2</sup>)

0

Rebar I<sub>x</sub> (mm<sup>4</sup>)

0

Rebar I<sub>y</sub> (mm<sup>4</sup>)

0

Rebar r<sub>x</sub> (mm)

0

Rebar r<sub>y</sub> (mm)

0

Total Area (mm<sup>2</sup>)

0

Total I<sub>x</sub> (mm<sup>4</sup>)

0

Total I<sub>y</sub> (mm<sup>4</sup>)

0

Total r<sub>x</sub> (mm)

0

Total r<sub>y</sub> (mm)

0

Diagram

Error List

Breadth should have a non-zero positive value.  
Height should have a non-zero positive value.  
Cover can't be greater than or equal to height

Inertia Calculator

Calculator

Future Additions

Properties

Section Type

Rectangular Beam

Width (mm)

100

Height (mm)

200

Cover (mm)

10

Side Cover (mm)

10

Stirrup Diameter (mm)

☒ 4 ☐ 6 ☐ 8 ☐ 10 ☐ 12

Row No.	Rebar Diameter (mm)	Number of Rebars	Delta Y	Delete
1	10	2	0	
2	10	2	162	
3	10	3	81	

Calculate

Clear All

Rebar Area (mm<sup>2</sup>)

235.5

Rebar I<sub>x</sub> (mm<sup>4</sup>)

1568802.875

Rebar I<sub>y</sub> (mm<sup>4</sup>)

7022825.875

Rebar r<sub>x</sub> (mm)

81.618523

Rebar r<sub>y</sub> (mm)

172.687338

Total Area (mm<sup>2</sup>)

0

Total I<sub>x</sub> (mm<sup>4</sup>)

66666666.666667

Total I<sub>y</sub> (mm<sup>4</sup>)

66666666.666667

Total r<sub>x</sub> (mm)

∞

Total r<sub>y</sub> (mm)

∞

Diagram

Max Delta Y value: 162mm  
If Rebars of Diameter 10mm are used throughout

# Circular Section

Calculator

Future Additi

Properties

Section Type

Circular Column

Radius (mm)

0

Diameter (mm)

0

Cover (mm)

0

Stirrup Diameter (mm)

☒ 4

☐ 6

☐ 8

☐ 10

☐ 12

Row No.	Rebar Diameter (mm)	Number of Rebars	Delta Y	Delete
1	0	0	0	<div><div></div><div></div></div>

Calculate

Clear All

Rebar Area (mm<sup>2</sup>)

0

Rebar I<sub>x</sub> (mm<sup>4</sup>)

0

Rebar I<sub>y</sub> (mm<sup>4</sup>)

0

Rebar r<sub>x</sub> (mm)

0

Rebar r<sub>y</sub> (mm)

0

Total Area (mm<sup>2</sup>)

0

Total I<sub>x</sub> (mm<sup>4</sup>)

0

Total I<sub>y</sub> (mm<sup>4</sup>)

0

Total r<sub>x</sub> (mm)

0

Total r<sub>y</sub> (mm)

0

Diagram

Error List

Cover can't be greater than or equal to radius  
Radius should have a non-zero positive value.  
Diameter should have a non-zero positive value.

Calculator

Future Additi

Properties

Section Type

Circular Column

Radius (mm)

150

Diameter (mm)

300

Cover (mm)

10

Stirrup Diameter (mm)

☒ 4

☐ 6

☐ 8

☐ 10

☐ 12

Row No.	Rebar Diameter (mm)	Number of Rebars	Delta Y	Delete					
1	10	4	0	<div><div></div><div></div></div>	2	10	2	30	<div><div></div><div></div></div>
2	10	2	30	<div><div></div><div></div></div>					

Calculate

Clear All

Rebar Area (mm<sup>2</sup>)

157

Rebar I<sub>x</sub> (mm<sup>4</sup>)

4298777.75

Rebar I<sub>y</sub> (mm<sup>4</sup>)

2697220.75

Rebar r<sub>x</sub> (mm)

165.471297

Rebar r<sub>y</sub> (mm)

131.071545

Total Area (mm<sup>2</sup>)

70650.00236034393

Total I<sub>x</sub> (mm<sup>4</sup>)

397406250

Total I<sub>y</sub> (mm<sup>4</sup>)

397406250

Total r<sub>x</sub> (mm)

74.99999874716354

Total r<sub>y</sub> (mm)

74.99999874716354

Diagram

Max Delta Y value: 126mm  
If Rebars of Diameter 10mm are used throughout

# ETABS Workbook Visualisation



## Key Features

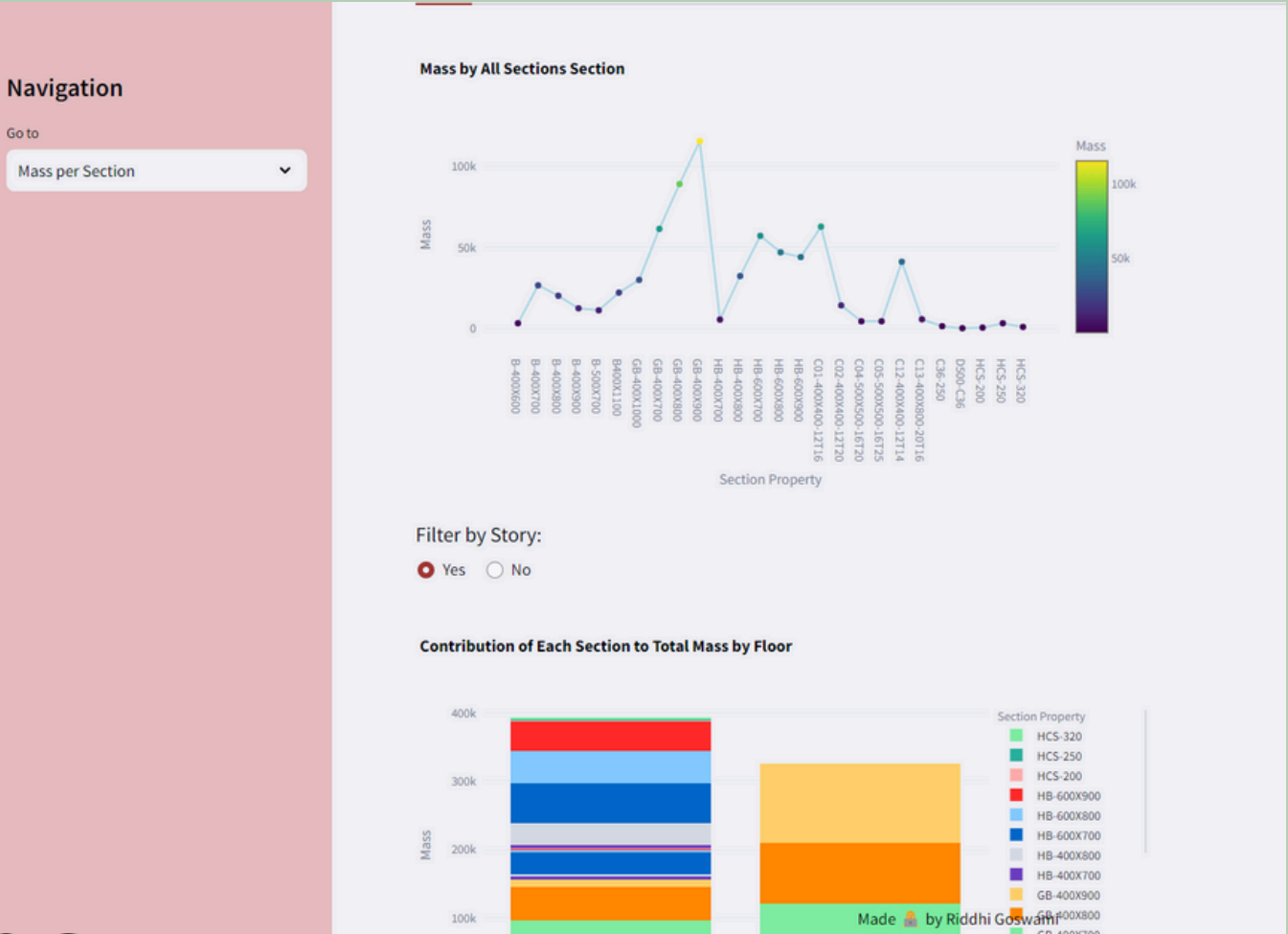
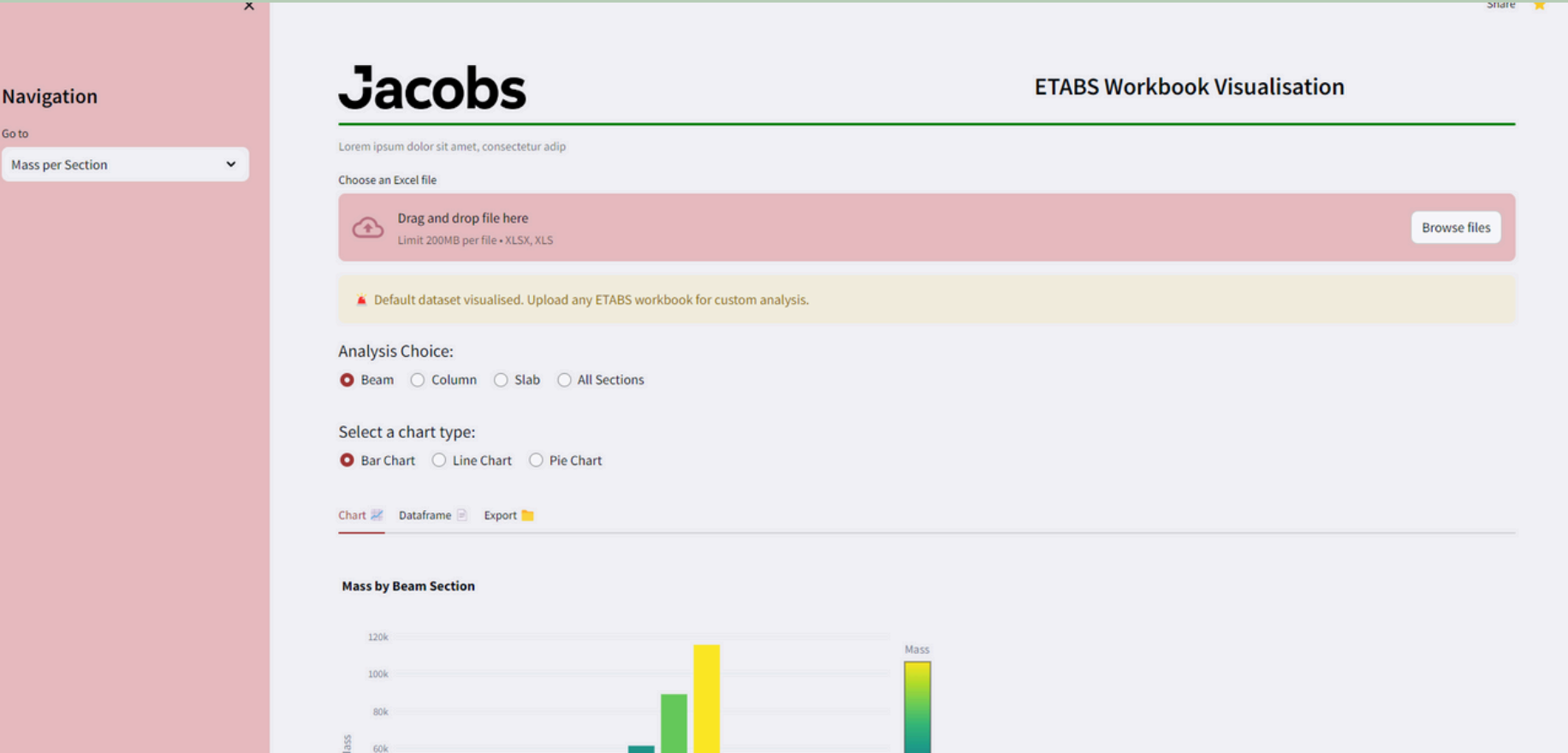
- Dashboards built using Shiny and Streamlit (Python frameworks)
- Responsive visualisations made using Plotly
- Checks placed to ensure only uploading of valid ETABS excel workbooks
- Currently, visualisations for beam, column, slab mass contributions storywise (section wise) are generated
- Download the filtered dataframe (if required)





# Streamlit

<https://etabs-workbook-visualisation.streamlit.app>

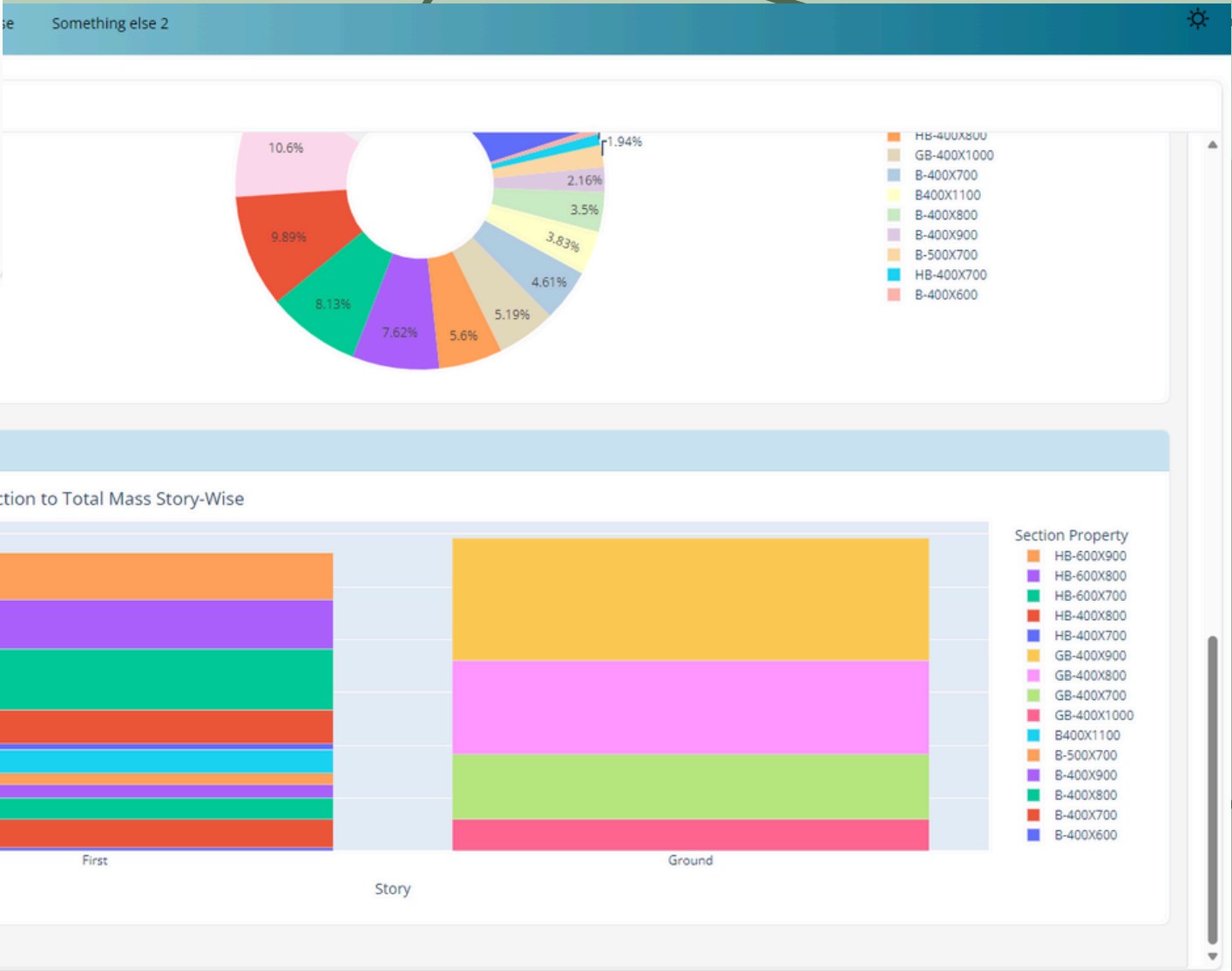
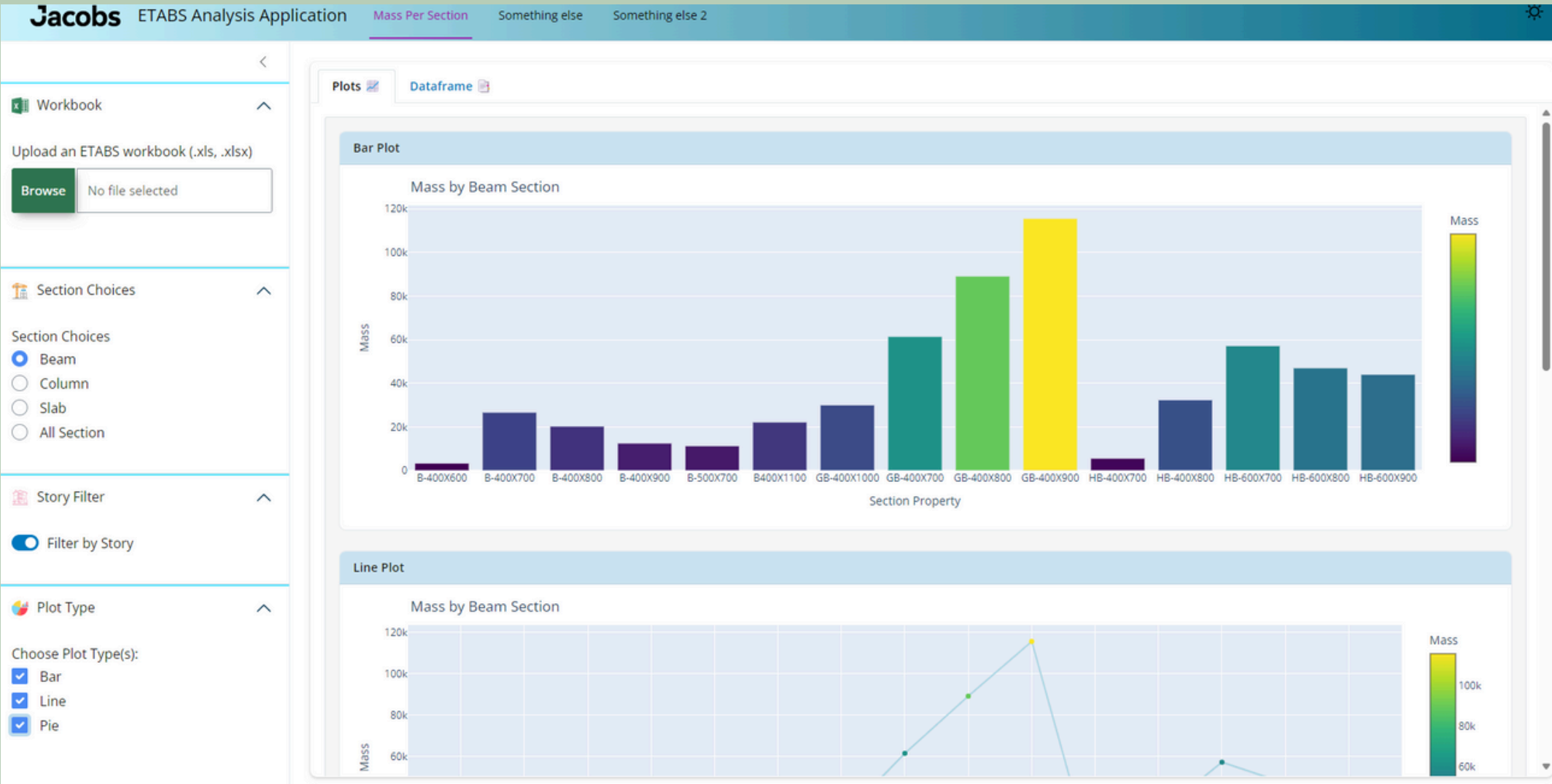


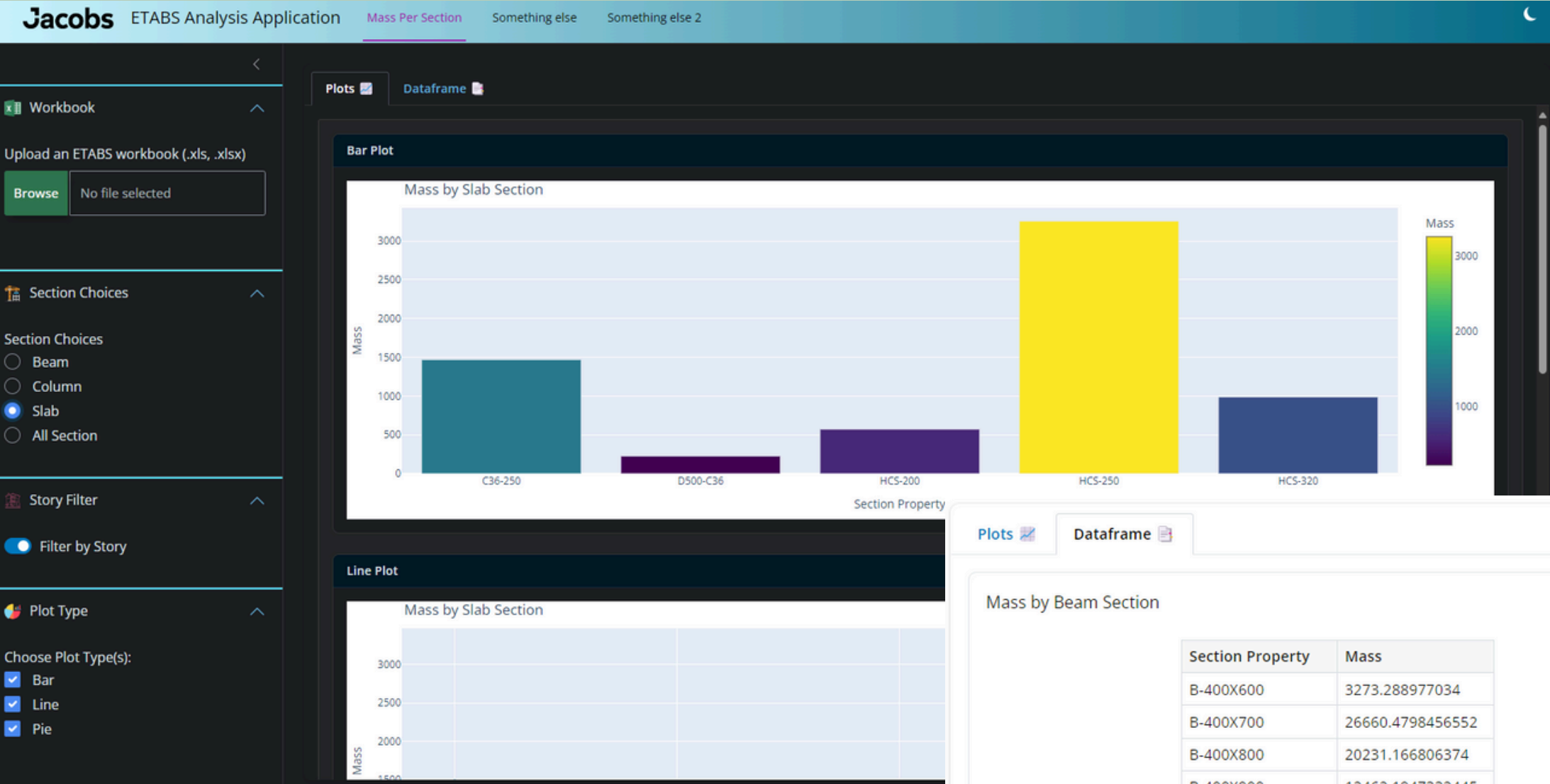
Jacobs



# Shiny

<https://riddhi-goswami.shinyapps.io/etabsvisualisation/>





Plots

Dataframe

Mass by Beam Section

Section Property	Mass
B-400X600	3273.288977034
B-400X700	26660.4798456552
B-400X800	20231.166806374
B-400X900	12462.1947332445
B-500X700	11242.9736160526
B400X1100	22147.3202206331
GB-400X1000	30005.0264171376
GB-400X700	61440.8241202346
GB-400X800	89097.542545366
GB-400X900	115529.5375916091
HB-400X700	5531.9603428066
HB-400X800	32361.5580795547
HB-600X700	57175.4868979111
HB-600X800	46988.5343742035
HB-600X900	44051.7395040085

Download CSV

Contribution of Each Section to Total Mass Story-Wise

Story	Label	Design Type	Length	Section Property	Material Type	Area	Volume
First	B10	Beam	5.59999	HB-600X800	C36/45	0.48	2.6879
First	B55	Beam	8.19999	HB-600X900	C36/45	0.54	4.4279
First	B63	Beam	5.59999	HB-600X700	C36/45	0.42	2.3519
First	B64	Beam	5.95001	HB-600X700	C36/45	0.42	2.4990
First	B65	Beam	3.15	HB-600X700	C36/45	0.42	1.323
First	B66	Beam	6.54999	HB-600X700	C36/45	0.42	2.7509
First	B69	Beam	5.59999	HB-600X900	C36/45	0.54	3.0239
First	B70	Beam	9.10001	HB-600X900	C36/45	0.54	4.9140
First	B71	Beam	8.19999	HB-600X800	C36/45	0.48	3.9359
First	B72	Beam	8.20001	HB-600X800	C36/45	0.48	3.9360
First	B73	Beam	8.19999	HB-400X800	C36/45	0.32	2.6239
First	B74	Beam	8.20001	HB-600X800	C36/45	0.48	3.9360
First	B76	Beam	8.1198200001	HB-400X800	C36/45	0.32	2.5983
First	B77	Beam	9.385779723	B400X1100	C36/45	0.44	4.1297
First	B81	Beam	3.15688	B-400X800	C36/45	0.36	1.1264

Viewing rows 1 through 15 of 118

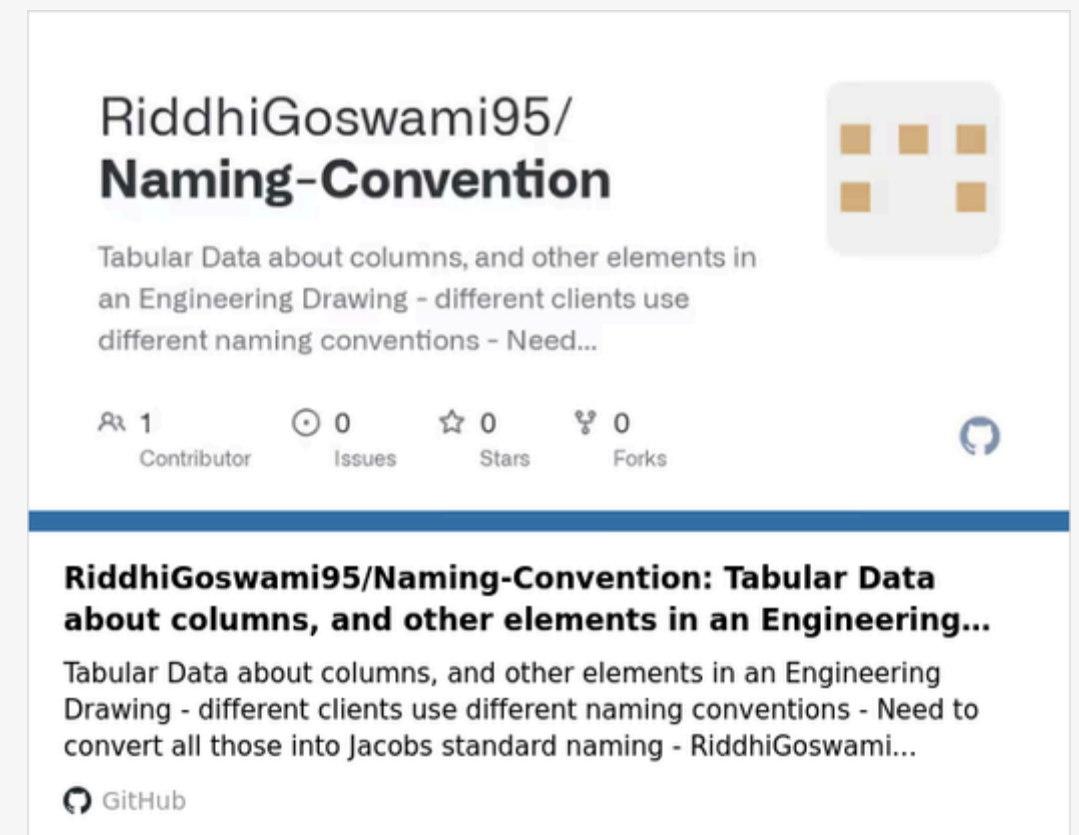
Download CSV

# Enforcing Naming Convention

## Work in Progress

- **Sequence-to-Sequence** (Seq2Seq): Models like LSTMs or GRUs are good for mapping sequences of characters (incorrect name) to another sequence (correct name).
- **Transformer-Based Models** (e.g., BERT, GPT)
- **Fuzzy Matching**

<https://github.com/RiddhiGoswami95/Naming-Convention>





**Thank you!**