

I WANT TO:

DESIGN OPTIMAL BS

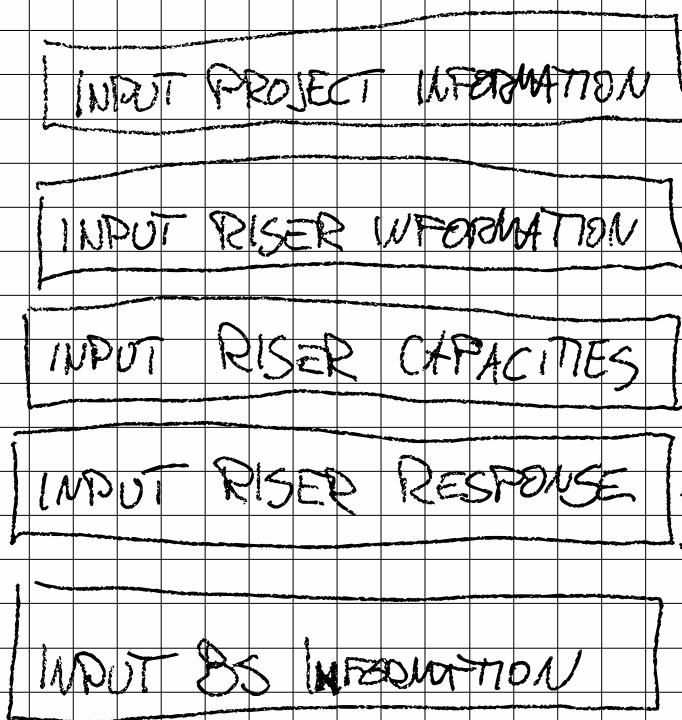
CHECK IF EXISTING

BS DESIGNS ARE SUITABLE

RUN LOAD CASES

ON EXISTING BS

## DESIGN OPTIMAL PS



1  
Editors are  
red if data  
incomplete,  
green if  
complete

→ 80% Normal  
operation  
→ 100% Abnormal  
operation  
→ Norm. Op.  
→ Abn. Op.

[Ex] [Cause]

## Project Information:

Project Name: [ ]

Client : [ ]

Designer Name: [ ]

[OK]

[Cancel]

## Riser Information:

- Riser Identification: [ ]
- Outer Diameter: [ ]
- Outer Dia. Tolerance: [ ]
- Mass per Unit Length: [ ]
- Axial Stiffness: [ ]
- Bending Stiffness: [ ]
- Torsional Stiffness: [ ]
- Riser Length: [ ]

[~~OK~~] [Canc]

## RISER CAPACITIES

- Normal Operation (80% utilization)

No. of Data Points: 5 ← Example

|   | Curvature | Tension |
|---|-----------|---------|
| 1 |           |         |
| 2 |           |         |
| 3 |           |         |
| 4 |           |         |
| 5 |           |         |

- Abnormal Operation (100% utilization)

No. of Data Points: 5

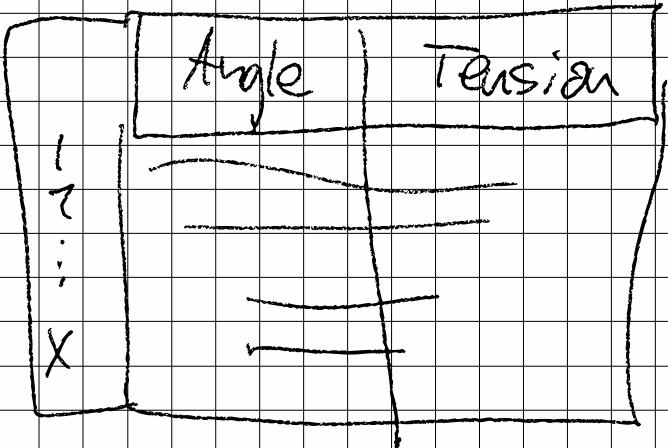
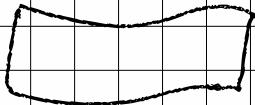
|   | Curv | Tens |
|---|------|------|
| 1 |      |      |
| 2 |      |      |
| 3 |      |      |
| 4 |      |      |
| 5 |      |      |

OK Cancel

# Riser Response

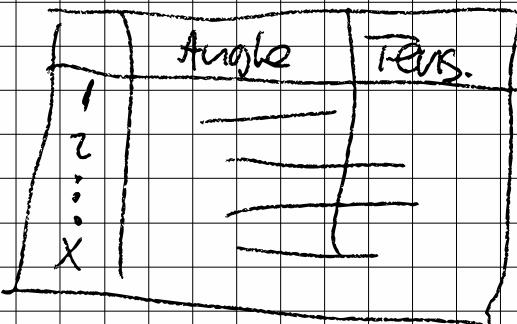
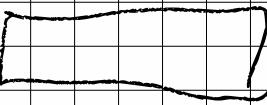
• Normal Operation:

No. of Data Points:



• Abnormal Operation

No. of Data Points:



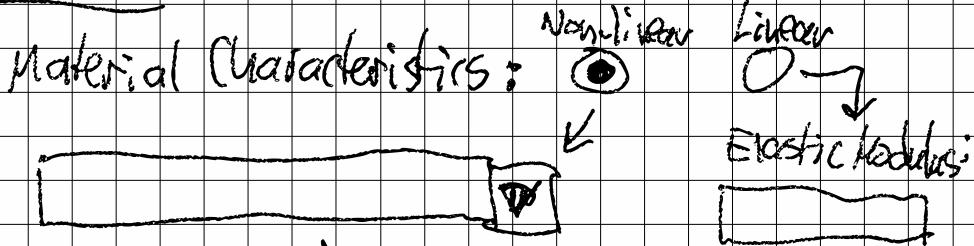
OK  
Cancel

# BS MATERIAL (1/2)

Example  
↓

Nb. of Materials to include: [ 2 ]

Material 1:



Drop-down menu  
to Material Database.

Add new  
material  
should be  
possible

Material 2:

Same as above

[ OK ]

[ Cancel ]

## BS Geometry Restraints:

Input Root Length: [ ]

Default  
600 mm

Input Tip Length: [ ]

Default  
100mm

Input Min Root OD: [ ]

Input Max Root OD: [ ]

Input Min Overall Length: [ ]

Input Max Overall Length: [ ]

Input Clearance: [ ]

Input Minimum Thickn.

BS ID:

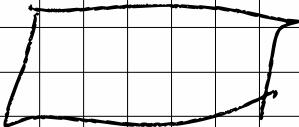
$$\text{Calculated} = \text{Riser OD} + \text{Riser BS tolerance} + 2 \cdot \text{Clear}$$

(Default BS geometry is: Cyl-(Cone-Cyl))

a  
n  
c  
e

# Run Analyses:

Thread Count :



Change Riser Model Parameters

Change FE analysis Parameters

Find Optimal BS!

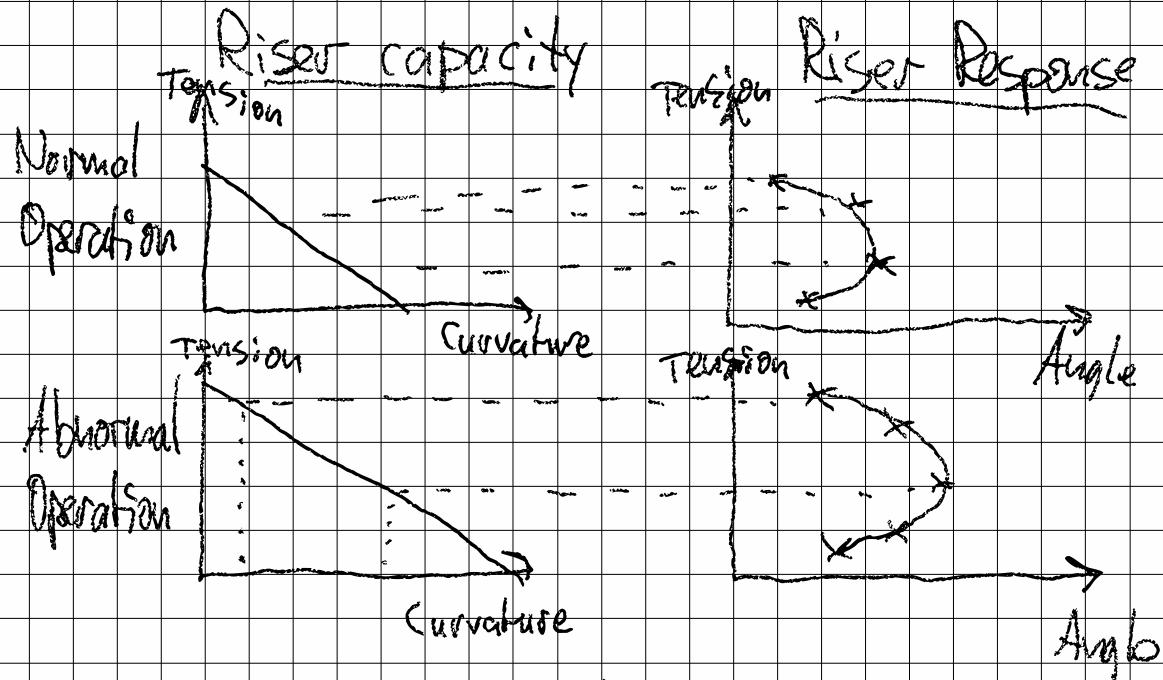
(If analysis crashes, program should  
return to this screen)

If user has selected more than one material, UltraBand has to find one BS per material and one set for Normal Operation and another set for Abnormal Operation.

In other words, if the user specifies 4 materials, UltraBand must find 4 bend stiffeners for Normal Operation and another 4 for Abnormal Operation.

The "winning" bend stiffener is the shortest of the 8 bend stiffeners that gives a curvature that is equal to or lower than the curvature defined by the capacity curve.

## Example:



- The Riser response defines the cases to run.
- When a case is run for a specific BS, we compare the max curvature achieved to the curvature defined by the capacity curve (at the same tension level).
- There will be one optimum BS per material x "operation"
- The "winning" BS is the shortest BS that does not infringe the Riser's capacities for any of the load cases.

Check if Existing BS Designs Are Suitable

Pages 2 to 7

will be repeated here

# Input BS Geometry:

No. of Bend Stiffeners:

"Repeat the following per BS"

Root Length:

Cone Length:

Tip Length:

Root OD:

Tip OD:

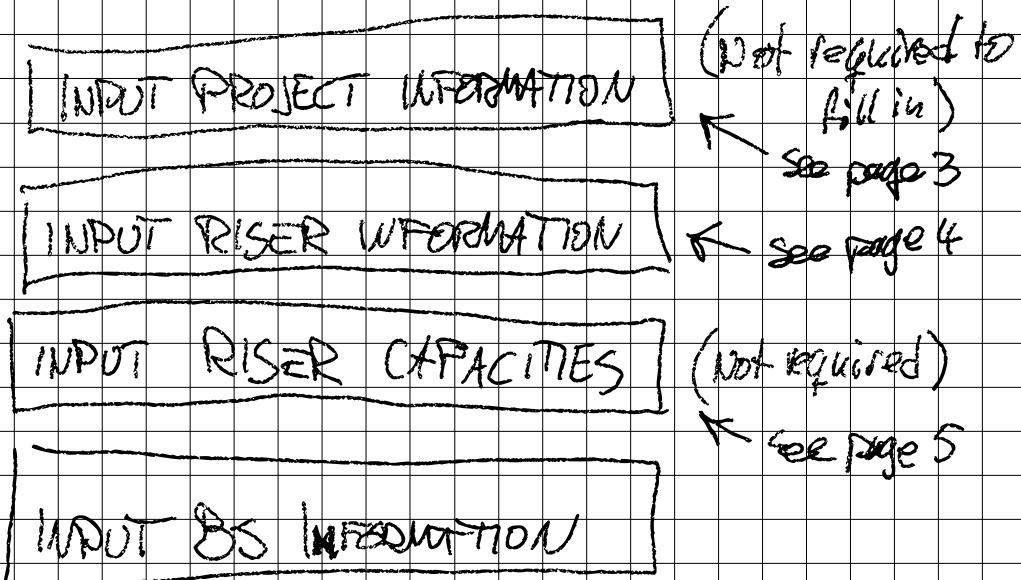
ID:

OK  Cancer

Run analyses

Page 9 should be  
repeated here.

# Run Load Cases on Existing BS



[OK]

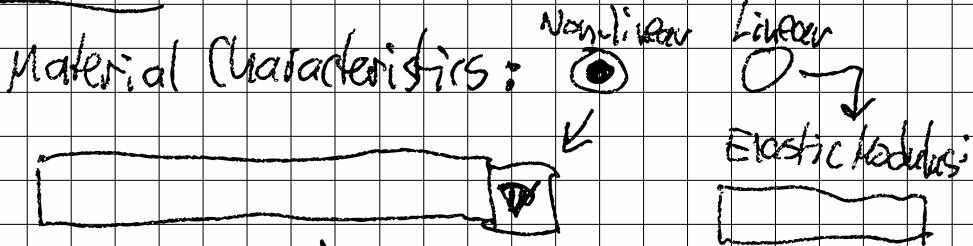
Canceled

# BS MATERIAL (1/2)

Example  
↓

Nb. of Materials to include: [ 2 ]

Material 1:



Drop-down menu  
to Material Database.

Add new  
material  
should be  
possible

Material 2:

Same as above

[ OK ]

[ Cancel ]

## Input BS Geometry:

Default BS geometry should be cyl-cone-cyl, but access to model builder should be here, and the below changes based on chosen geometry:

Root Length: [ ] ?

Cone Length: [ ] ?

TIP Length: [ ] ?

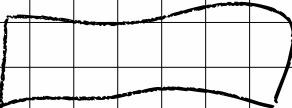
Root OD : [ ] ?

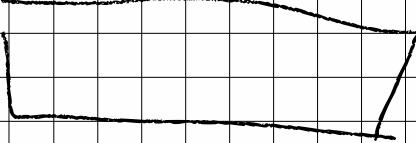
TIP OD : [ ] ?

ID: [ ] ?

[ ] OK [ ] Cancel

# INPUT LOAD CASE

Angle: 

Tension: 

[ Run Analysis ]