**Supplementary Data:**

Amaechi, Chiemela Victor; Wang, Chunguang (2022), “Composite CLT theory MATLAB codes”, Mendeley Data, V1, doi: 10.17632/pdjytm9gzx.1

Amaechi, Chiemela Victor (2022), “Dataset on Composite Risers for Deep Water Application”, Mendeley Data, V1, doi: 10.17632/4rvvwkjs27.1

**DATA DESCRIPTION:**

Herein is the attachment which is a MATLAB code used to calculate the effective moduli of the composite riser, using 3D and CLT theories.

 It can be developed upon as the authors also have different versions of this MatLab Code for estimating the Factor of Safety in our designs.

NOTE: Double check that you have the right properties, because it was developed using an older version of Matlab and not been used recently, so please check.

**MODEL SUMMARY:**

This numerical model is based on the local design of composite riser which was utilised to modify the designs to achieve the minimum weight under the five local load cases (these can be found in our paper).

1. For the five local load cases, the possible deformation of the local riser joint would be the displacements in the hoop and axial directions. The fixed end provides the basic support, the free end can be used to apply forces and allow the displacement in the axial direction.

2. In our paper, the failure law is the maximum stress failure. Therefore the safety factor (SF) is defined by the allowance stresses in every directions in each lamina/actual stresses in every directions in each lamina. If SF is larger than 1, it is safe.

3. For the burst case, there are two possibilities: (1)open pipe, (2)closed pipe. In our paper, closed pipe situation was used (more dangerous), the internal pressure would lead to the axial force (can be calculated) in the riser joint. So in our CPR model, axial force and internal pressure were both applied to simulate the burst with end effect.