

ZSet Demo : Limit load of a tube under internal pressure

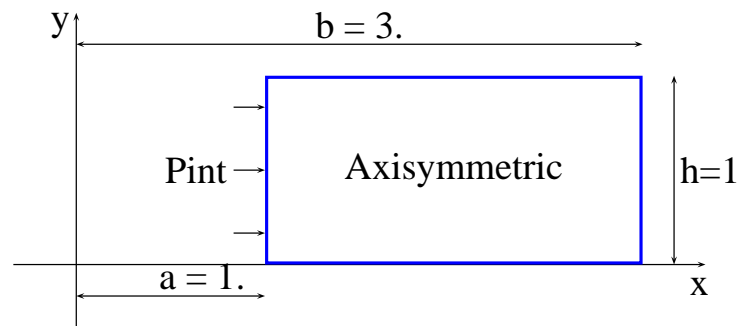


Fig.1 : Conditions of the computations

Presentation of the problem

- o The mechanical response of a tube submitted to an internal pressure is computed using the Finite Element software Zset.
- o Dimensions of the model are given in Fig.1.
- o The material is perfectly plastic with initial yield $R_0 = 100$ MPa.
- o With these conditions an analytical solution exists for the limit pressure that can be applied to the tube :

$$P_{\text{limit}}^* = \frac{2}{\sqrt{3}} R_0 \log\left(\frac{b}{a}\right) = 126.86 \text{ MPa}$$

- o During the demonstration, you will try different simulation parameters (algorithm, time control,...) to compute this analytical value.
- o **The purpose of the exercise is to find the best solution to reach the ultimate pressure in the computation, under either load or displacement control.**

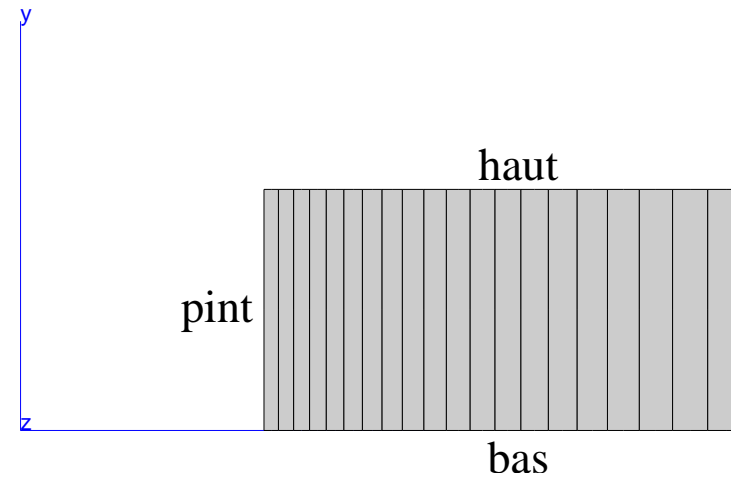


Fig.2 : The suggested mesh, with axisymmetric quadratic 8-node elements (cax8)

How to run the Demonstration

- o Download START2.tar by clicking on [Full directory](#)
- o Copy this file in your home directory :

```
mv Downloads/START2.tar .
```
- o Then uncompress it :

```
tar -xf START2.tar
```
- o Go into the directory called Tube :

```
cd CylPress/Tube
```
- o Run the demo and follow the instructions :

```
./RUN
```
- o A window offering multiple choices allows you to make various modifications in the files, and to run computations either under pressure control or under displacement control.