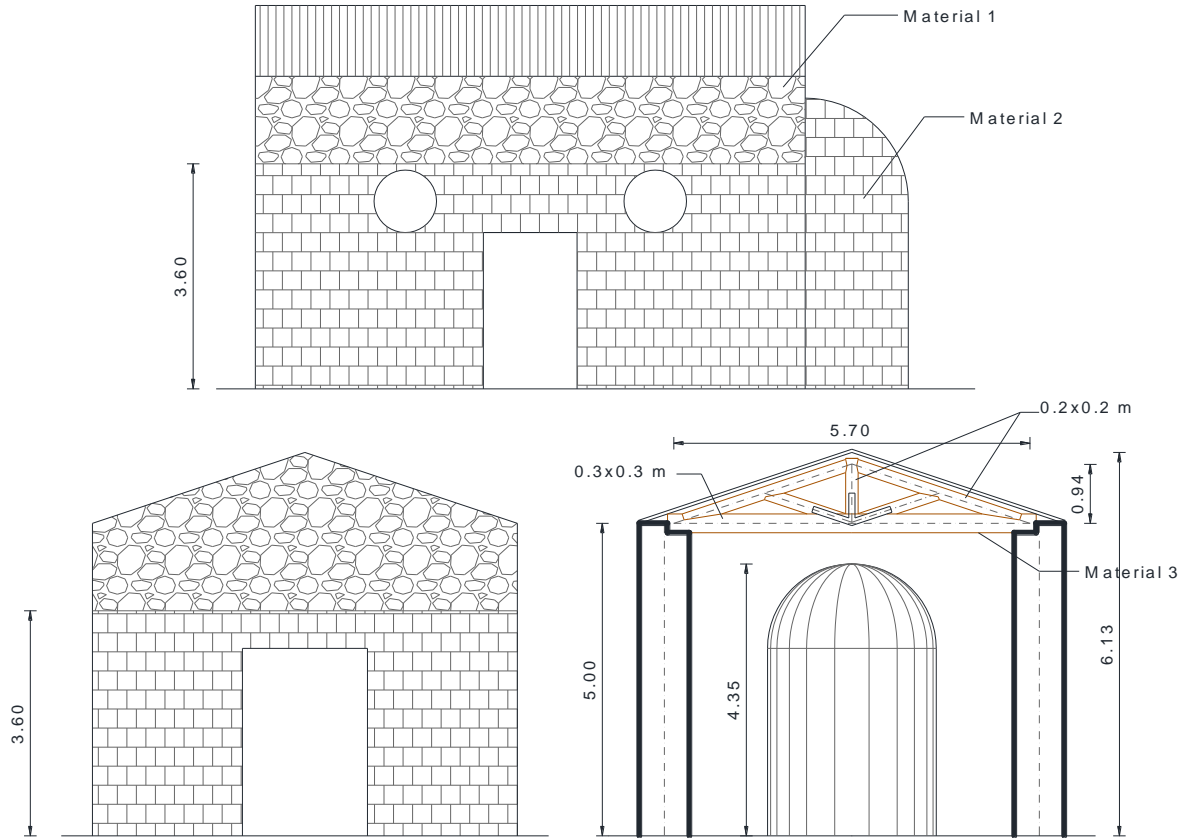
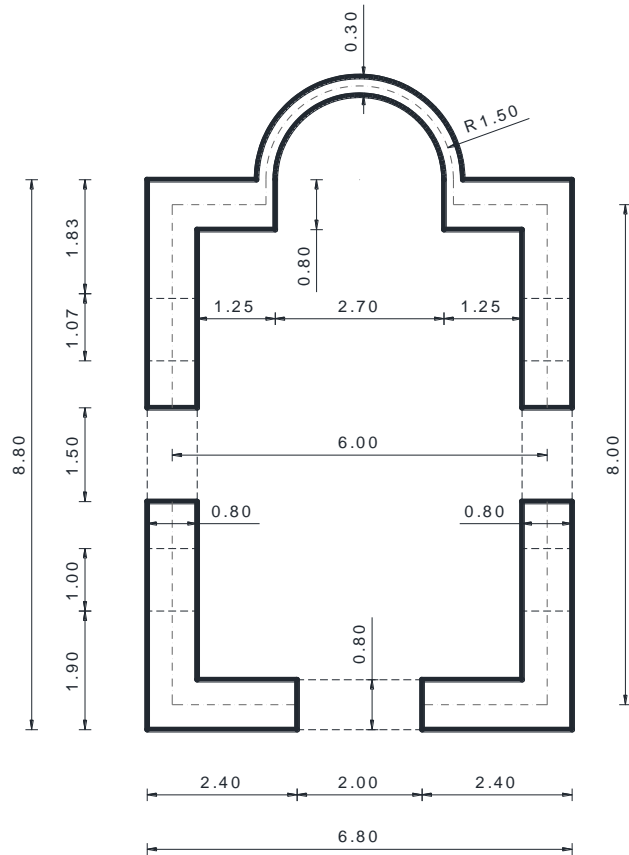


TUTORIAL 4

Nonlinear static analysis of a masonry church

Let's consider the structure sketched in the figure



- We suppose the structure subjected to its self weight (**only for speed of execution but we can also consider other load conditions**)
- We suppose the structure made of three materials:
 - ✓ **Material 1:** *masonry-like* material with zero tensile strength and bounded compressive strength; Young's modulus 0.69 GPa, Poisson's modulus 0.2, tensile strength 0 MPa, compressive strength 1.5 MPa, specific weight 19000 N/m³
 - ✓ **Material 2:** *masonry-like* material with zero tensile strength and bounded compressive strength; Young's modulus 1.5 GPa, Poisson's modulus 0.2, tensile strength 0 MPa, compressive strength 2.0 MPa, specific weight 21000 N/m³
 - ✓ **Material 3:** linear elastic material, Young's modulus 8 GPa, Poisson's modulus 0.3, specific weight 10000 N/m³
- We suppose the truss of wooden beams, pinned to the wall (without bending moment transmission)
- We suppose the structure clamped at the base

Some remarks:

- Due to the strong nonlinearity of the material, we will apply the self weight by ten increments (dealing with a *masonry-like* material with zero tensile strength and bounded compressive strength, **this action is strongly recommended**)
 - We will plot some output in the global reference system (using the subroutine plotv.f)
 - We will manage the connection between truss of wooden beams and the structure using utie.f subroutine
-

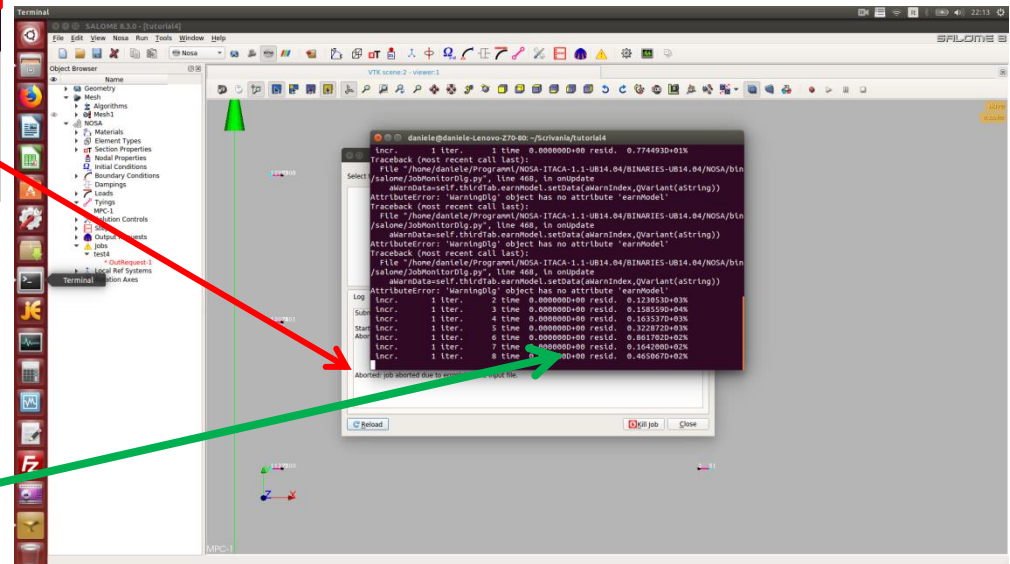
Some remarks:

- Running the analysis it may appear to not work (as shown in the figure below on the left)

```

daniele@daniele-Lenovo-Z70-80: ~/Scrivania/tutorial4
AttributeError: 'WarningDlg' object has no attribute 'earnModel'
incr. 1 iter. 1 time 0.000000D+00 resid. 0.774493D+01%
Traceback (most recent call last):
  File "/home/daniele/Programmi/NOSA-ITACA-1.1-UB14.04/BINARIES-UB14.04/NOSA/bin/salome/JobMonitorDlg.py", line 468, in onUpdate
    aWarnData=self.thirdTab.earnModel.setData(aWarnIndex,QVariant(aString))
AttributeError: 'WarningDlg' object has no attribute 'earnModel'
Traceback (most recent call last):
  File "/home/daniele/Programmi/NOSA-ITACA-1.1-UB14.04/BINARIES-UB14.04/NOSA/bin/salome/JobMonitorDlg.py", line 468, in onUpdate
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Traceback (most recent call last):
  File "/home/daniele/Programmi/NOSA-ITACA-1.1-UB14.04/BINARIES-UB14.04/NOSA/bin/salome/JobMonitorDlg.py", line 468, in onUpdate
    aWarnData=self.thirdTab.earnModel.setData(aWarnIndex,QVariant(aString))
AttributeError: 'WarningDlg' object has no attribute 'earnModel'
incr. 1 iter. 2 time 0.000000D+00 resid. 0.123053D+03%
incr. 1 iter. 3 time 0.000000D+00 resid. 0.158559D+04%
incr. 1 iter. 4 time 0.000000D+00 resid. 0.163537D+03%
incr. 1 iter. 5 time 0.000000D+00 resid. 0.322872D+03%
incr. 1 iter. 6 time 0.000000D+00 resid. 0.861702D+02%
incr. 1 iter. 7 time 0.000000D+00 resid. 0.164200D+02%
  
```

In the truth the analysis is running but, because of a bug in display monitor, you will notice after that the first increment has reached convergence.



Until the bug has been fixed, I suggest you to follow the evolution of the analysis in the terminal