SFGD Box
FEA

Update

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SUMMARY

- FEA has been corrected according to the Test performed at CERN for the 200x200mm^2 Protototype

- Model in Ansys updated and re-performing all the simulations are on going right now.

- All the simulations will be ready by Thurdsday in order to send the them to Neutrino Plattform (M.Nessi)
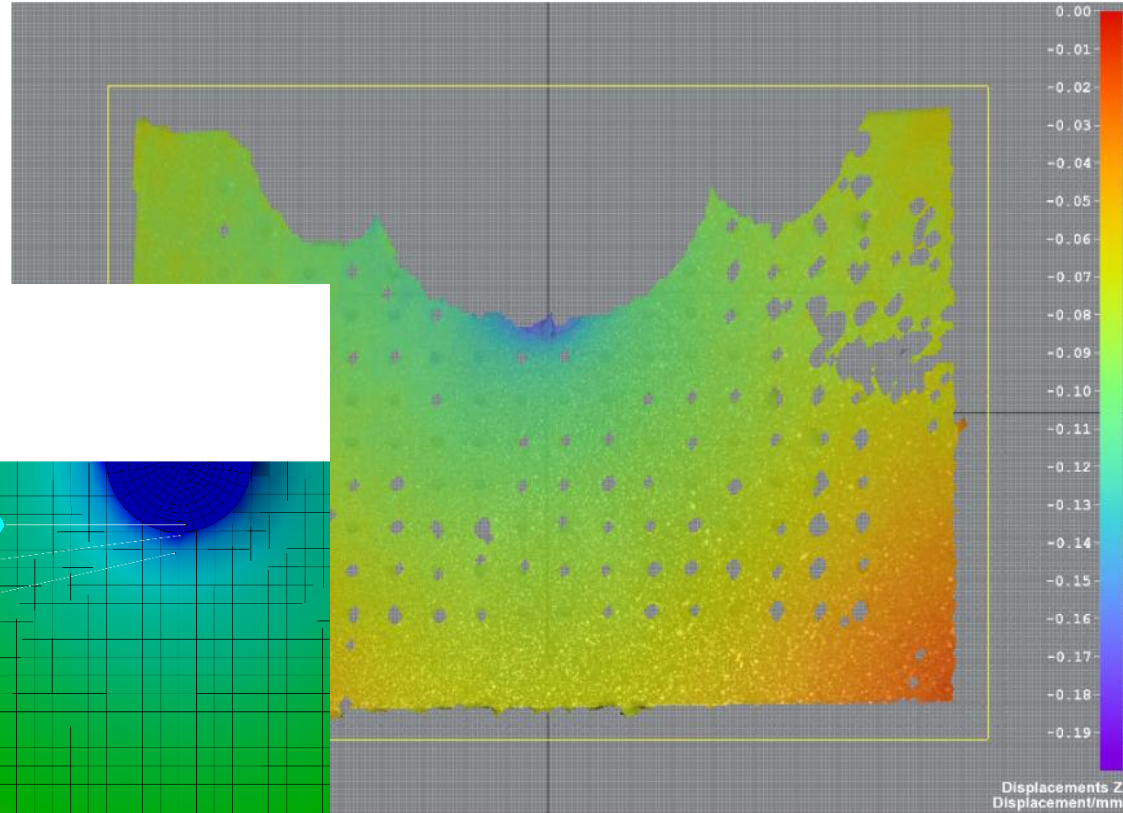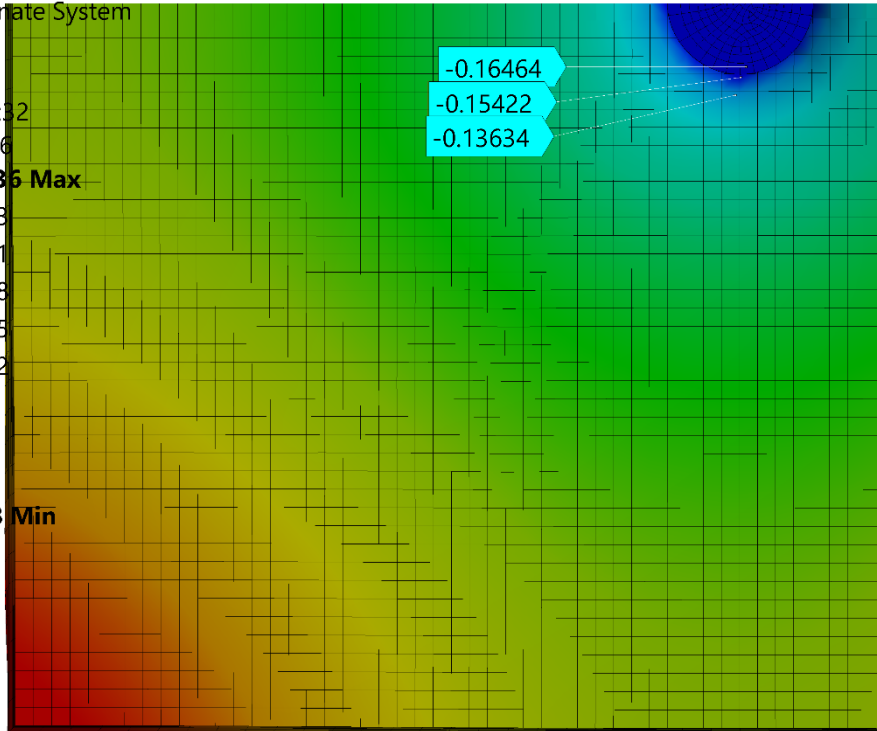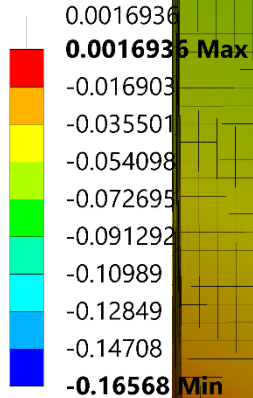
Test at CERN at 5000 N at the 200x200 Proto

Materials are very well tuned

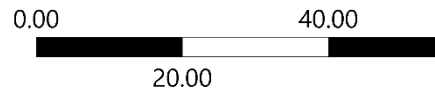

Displacement in Z under a 5000 N Load

C: Static Structural
Directional Deformation 5000 N
Type: Directional Deformation(X Axis)
Unit: mm
Global Coordinate System
Time: 5
Custom
07.12.2020 10:32

0.0016936

0.0016936 Max
-0.016903
-0.035501
-0.054098
-0.072695
-0.091292
-0.10989
-0.12849
-0.14708
-0.16568 Min

-0.16464
-0.15422
-0.13634

...can be observed in the immediately adjacent area to the pusher, while when 5 mm away from the pusher this ...of the displacement sensor readings being affected by this local effect.

...acements in Z obtained with the DIC system can be consulted in the corresponding EDMS document (prior

0.00   40.00

20.00

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INR Test With Cubes (161Kg):

- Deflection Measured at INR → 17.4mm
- Deflection Simulated with Force → ~18.6mm
- ~7% More deflection in Ansys

C: Copy of IRN Center Weight with CF implemented for Holes
Directional Deformation
Type: Directional Deformation(Z Axis)
Unit: mm
Global Coordinate System
Time: 2
Custom
07.12.2020 10:14

	3.4824 Max
	1.0325
	-1.4175
	-3.8675
	-6.3174
	-8.7674
	-11.217
	-13.667
	-16.117
	-18.567 Min

0.00   400.00   800.00 (mm)

200.00   600.00

Simulation with Box weight as a Force:

- Max Deflection is ~3.21mm
- Considering that Force give a ~7% more deflection
- Deflection could be: ~3 mm

C: Static with G and Nominal Cubes Weight
Directional Deformation
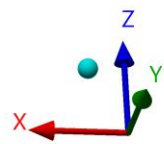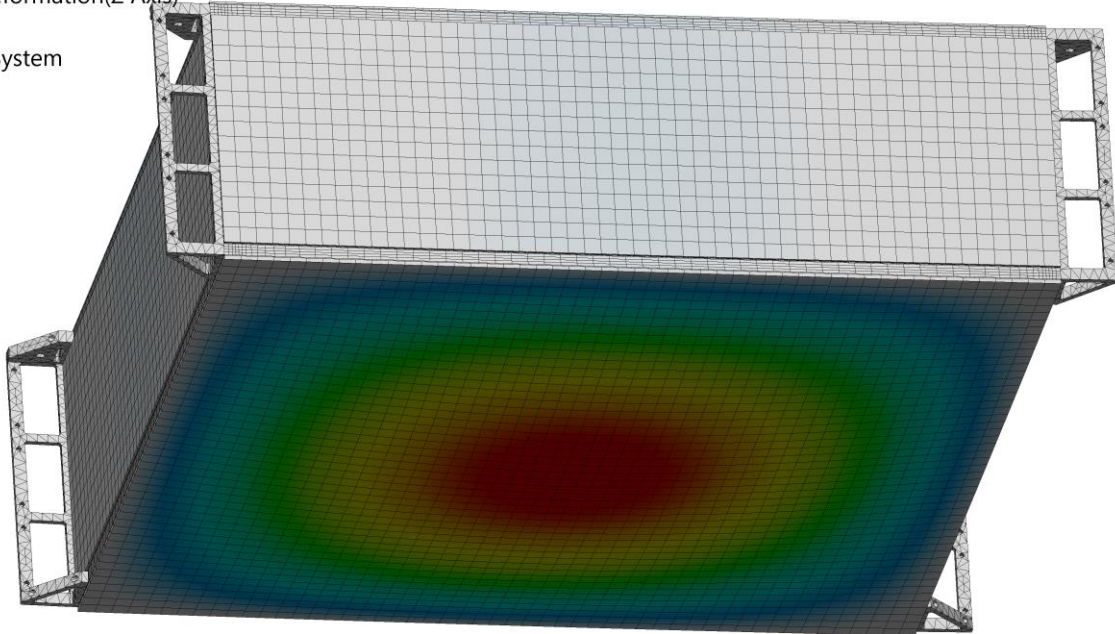Type: Directional Deformation(Z Axis)
Unit: mm
Global Coordinate System
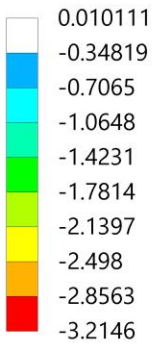Time: 1
Custom
Max: 0.010111
Min: -3.2148
07.12.2020 16:25

| 0.010111 |
| -0.34819 |
| -0.7065 |
| -1.0648 |
| -1.4231 |
| -1.7814 |
| -2.1397 |
| -2.498 |
| -2.8563 |
| -3.2146 |

0.00   500.00   1000.00 (mm)

250.00   750.00

Simulation with Box weight as a Force adding 0.65g:

- Max Deflection is ~5mm
- Considering that Force give a ~7% more deflection
- Deflection could be: ~4.65mm

Note: this doesn't mean that with an Earthquake we will have this deformation. Actualy already from the previous calculation by studying the Vibration spectrum, the deflection due by the response was much smaller

D: Static Earthquake Load Bottom Panel
Directional Deformation
Type: Directional Deformation(Z Axis)
Unit: mm
Global Coordinate System
Time: 1
Custom
Max: 0.015335
Min: -5.021
07.12.2020 16:24

| 0.015335 |
| -0.54424 |
| -1.1038 |
| -1.6634 |
| -2.223 |
| -2.7825 |
| -3.3421 |
| -3.9017 |
| -4.4613 |
| -5.0209 |

0.00   500.00   1000.00 (mm)
250.00   750.00

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