SHELL ANALYSIS OF "EXPOSURE"... AN ANTHONY'S GORMLEY SCULPTURE

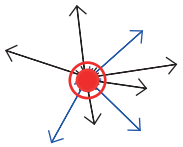
DATA INFORMED STRUCTURES

TUTOR: MANJA VAN DE WORP / ABDULLAH IBRAHIM

STUDENT: VICTOR FERNÁNDEZ

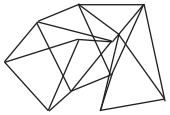
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01_GEOMETRY ANALYSIS



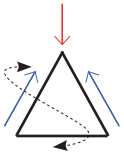
Structural Nodes

* More Material gathered
* Connection POints
* Avoiding structural deformations
* Giving rigidity to the system



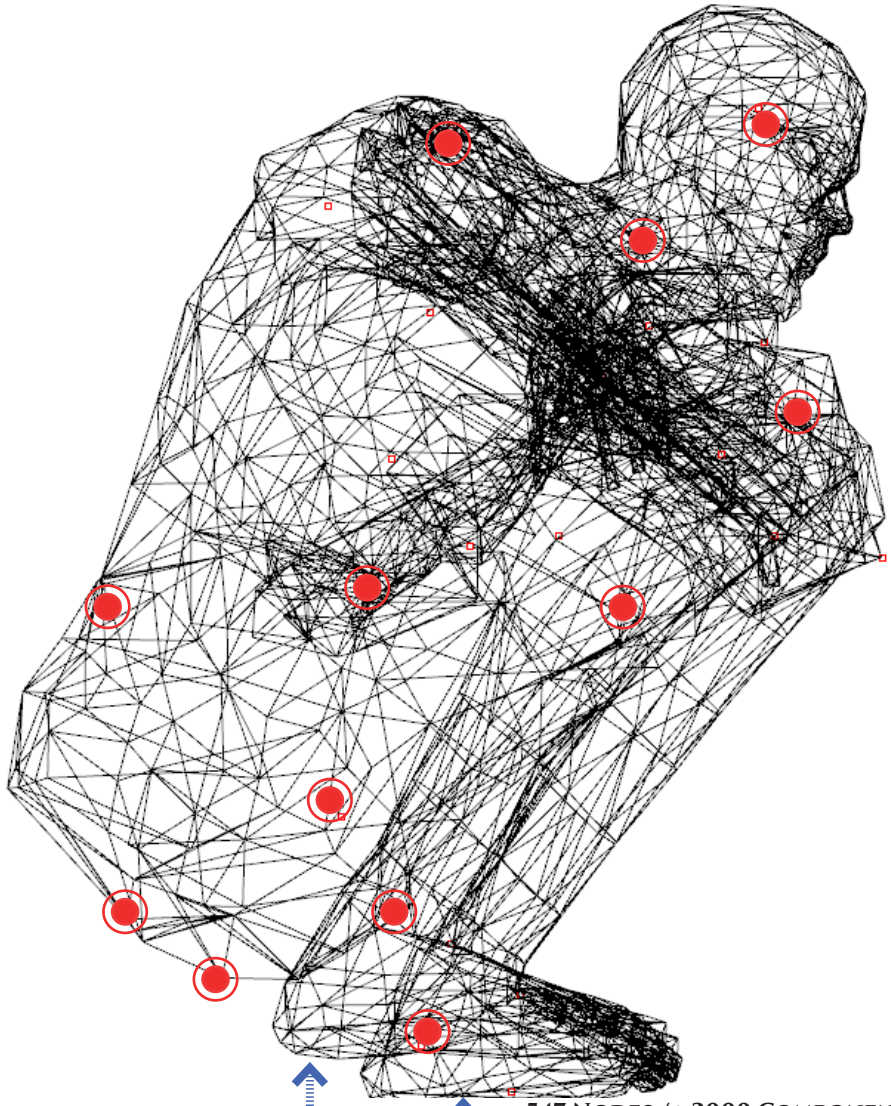
Geometry Support

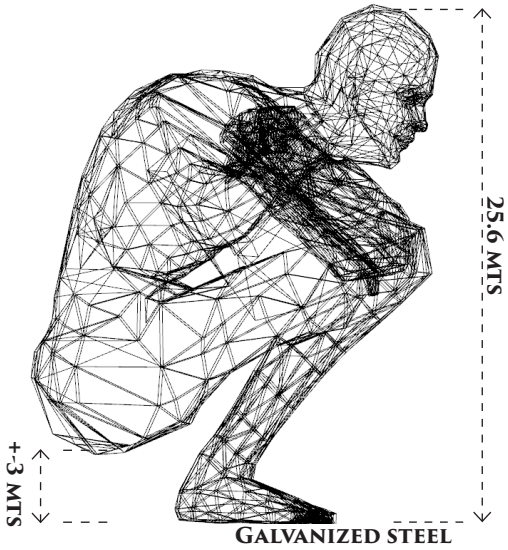
* Triangulated shape in order to distribute forces.
* Better Stability
* Adding stiffness to the sculpture

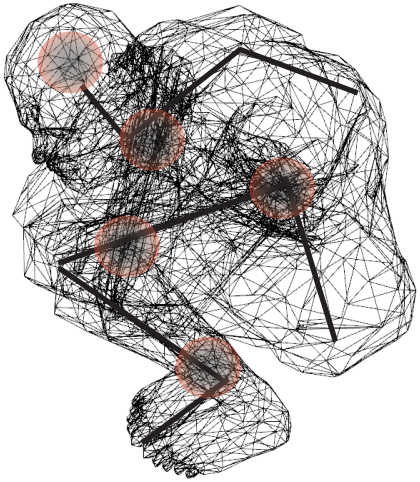


Geometry

* Single layer Grid
* Working in tension & compression
* Open structure.
More lighter & stable in relation with external forces (Climate conditions)







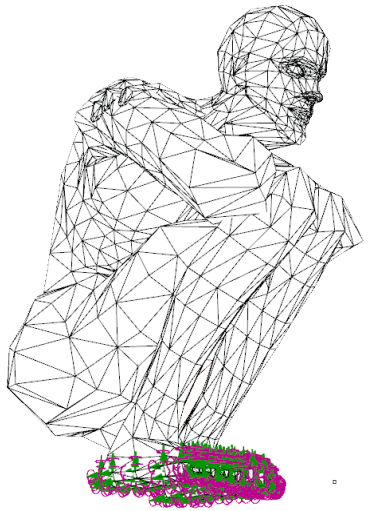
ANTONY GORMLEY - EXPOSURE (2010)
DATA INFORMED STRUCTURES

Tutor: Manja van de Worp / Abdullah Ibrahim
Student: Victor Fernández

Assignment 01_Structural Analysis

Iaac Institute for advanced architecture of Catalonia BARCELONA

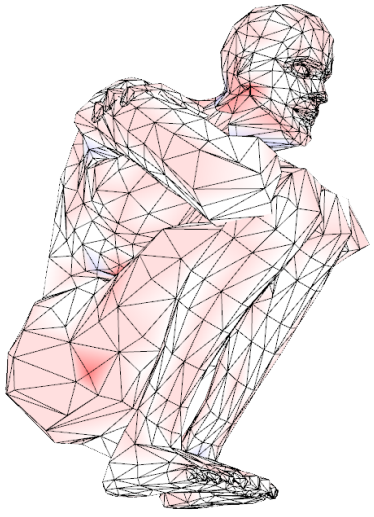
02_SHELL ANALYSIS

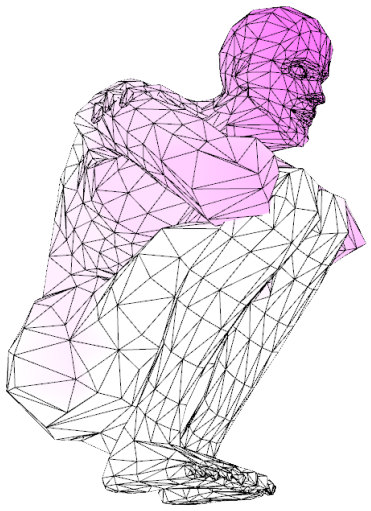


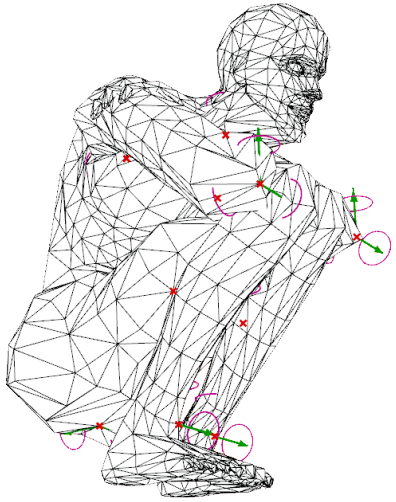
SUPPORTS

° Mostly of the material concentrated in three points, that are related with the joints that distribute the structures.

° All the displacement is taken in the upper part of the structure.



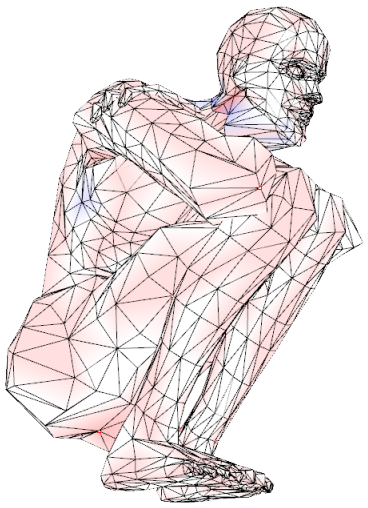


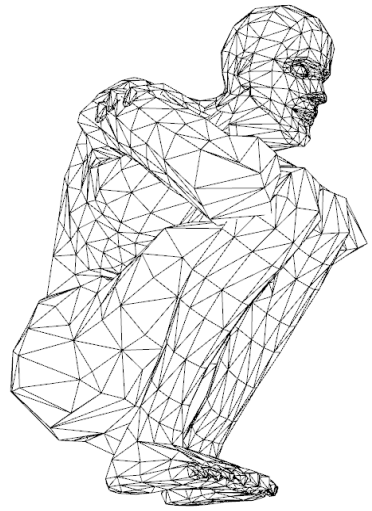


ARTICULATIONS

° Articulations are the points where more material is needed.

° No displacement at all.





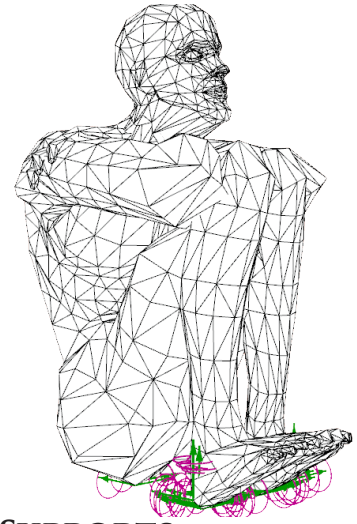
ORIGINAL SITUATION
MATERIAL: Steel A36
MASS: 198.761 ton
LOAD: 1kN/m2
HEIGHT: 1.25cms

ANTONY GORMLEY - EXPOSURE (2010)
DATA INFORMED STRUCTURES

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STUDENT: Victor Fernández
ASSIGNMENT 01_Structural Analysis

IAAC Institute for advanced architecture of Catalonia BARCELONA

03_SHELL ANALYSIS

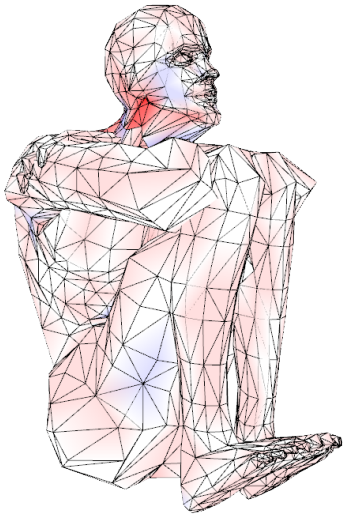


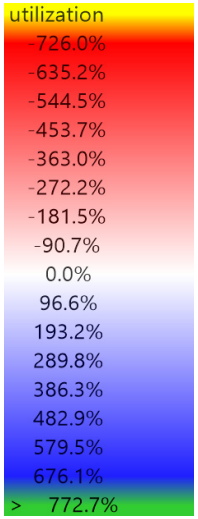
SUPPORTS

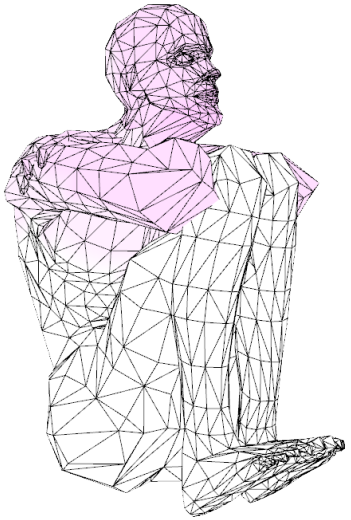
° Increasing the height and load, decreases the displacement of the body, as well the utilization is beter distributed through the structure.

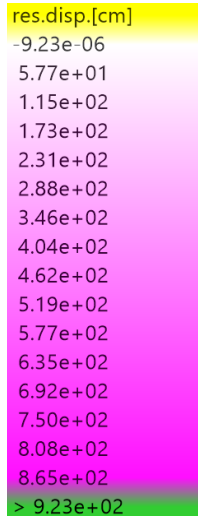
° Utilization it is almost the same as the original postulation; but the efficiency is better, because the sculpture's mass is better distributed.

° The displacement ocurred in the same area as the original model, but is better distributed.

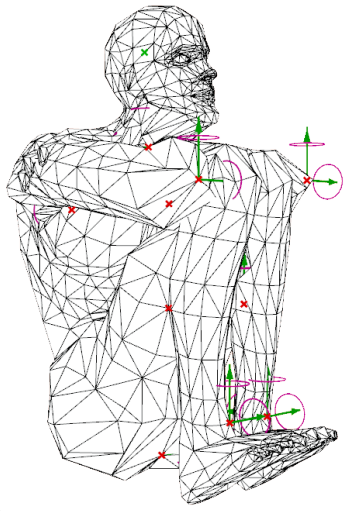






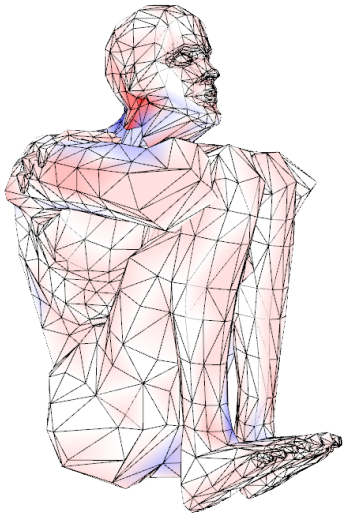


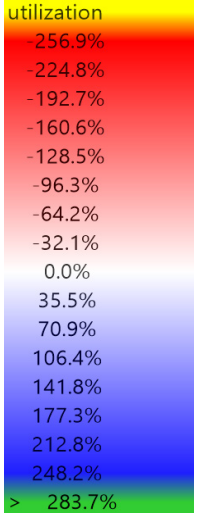
ARTICULATIONS

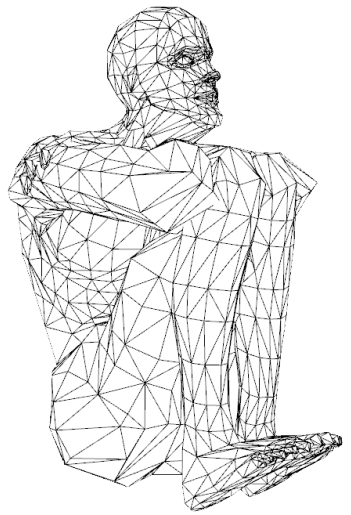


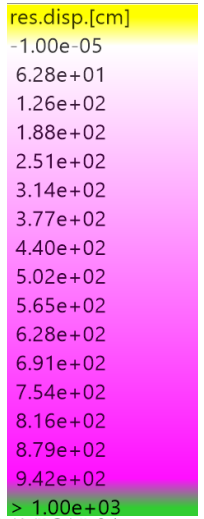
° Increasing forces and weight, the utilization around the neck and arm rises in comparison with the original model.

° Two articulations, Neck and butt, are the one's wich are more propensed to forces; and where the majority of the components joined, so that's why they need to concentrate more amount of material.









POTULATION 01
MATERIAL: Steel A36
MASS: 318.018 ton
LOAD: 2kN/m2
HEIGHT: 2.00cms

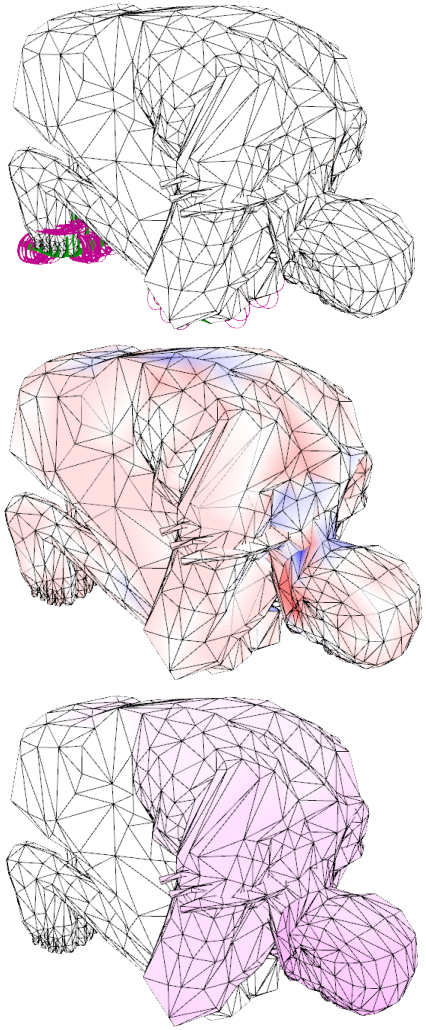
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ASSIGNMENT 01_Structural Analysis

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03_SHELL ANALYSIS

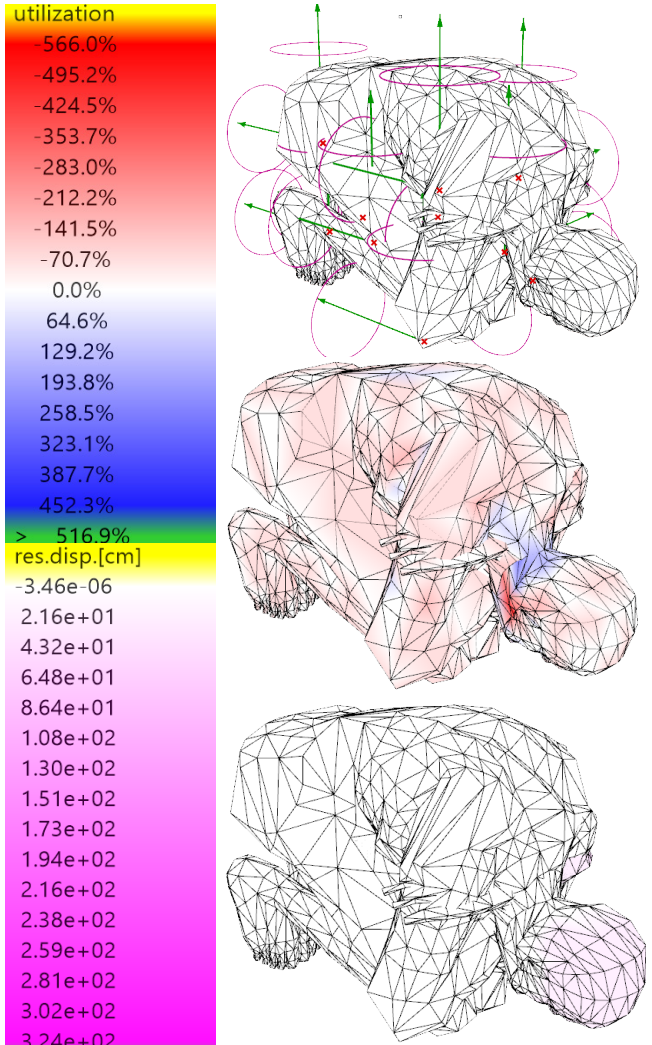


SUPPORTS

° Increasing the height and forces in the sculpture, the more material is needed, and the displacement decreases.

° The critical points of utilization, increases in comparison with the first two postulations. It can be noticed that in the spine is where more material is needed.

° As a common agent, taking in account the original sculpture, most of the displacement occurs where the head is situated.

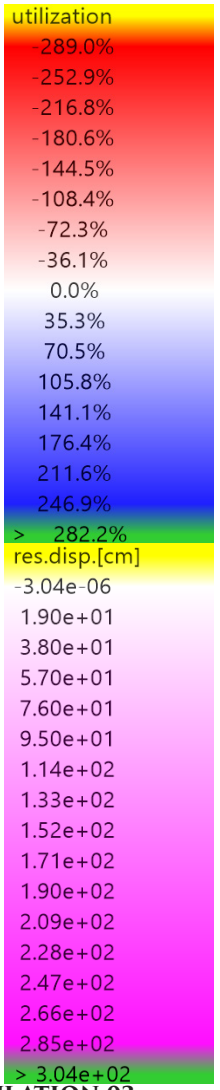


ARTICULATIONS

° Comparing the utilization of the basement supports against the articulations; it can be said that the concentration of material are in this last points.

° The more the force and weight is, the more the utilization increase.

° Displacement in articulations appeared in the head, for the first time.



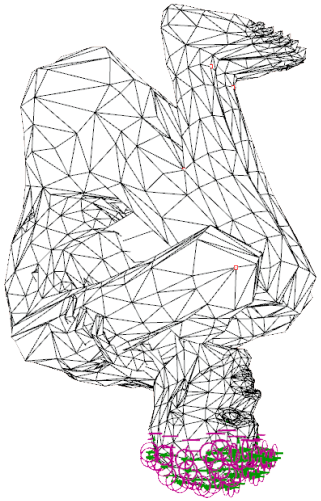
POSTULATION 03
MATERIAL: Steel A36
MASS: 397.522 ton
LOAD: 2kN/m2
HEIGHT: 2.5cms

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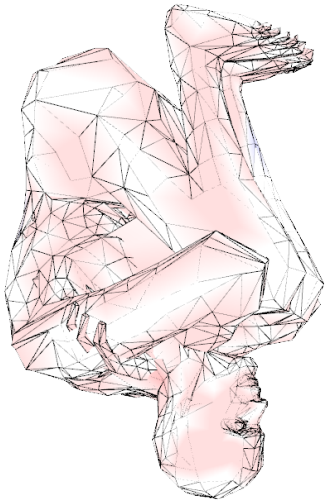
04_SHELL ANALYSIS

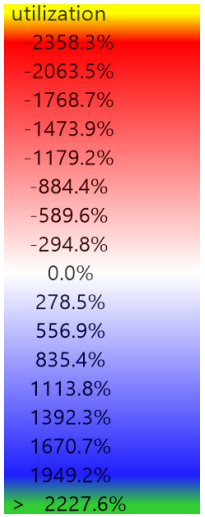


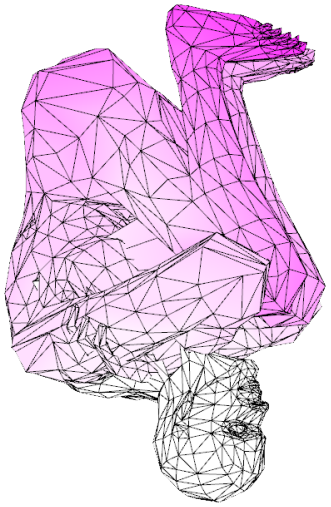
° Changing basement supports doesn't affect to the critical points, that in all the models are the same, but can be said, that the displacement is affected in almost the entire model.

° Thicker the material is, the less utilization of it is needed.

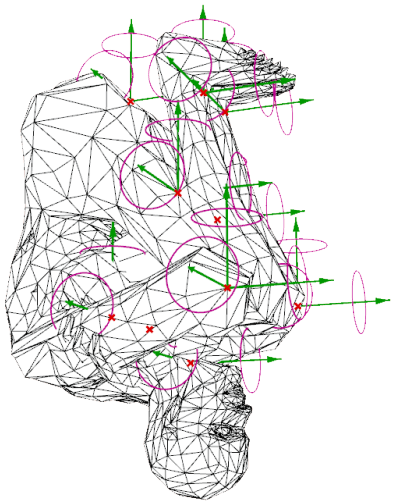
° Increasing the load, the mass of the sculpture increases as well, although the relation between load and mass remains the same between all the models.





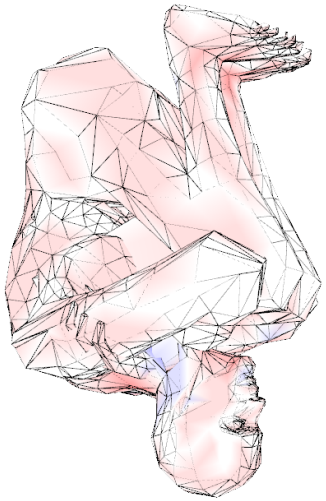


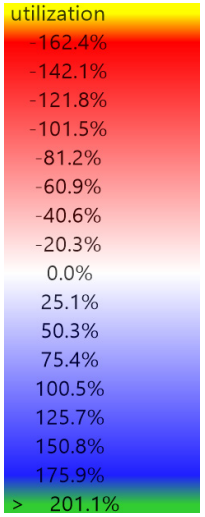
SUPPORTS

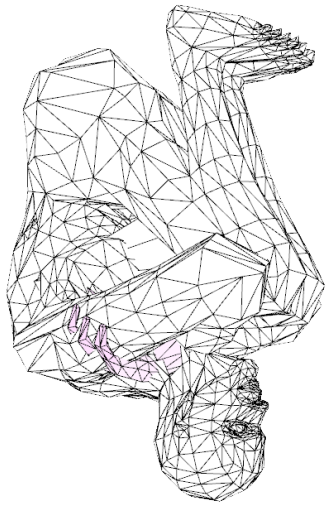


° Only exists concentration of displacement near the shoulder. Comparing it with the previous postulation, displacements in articulations are almost none.

° Can conclude that the area between the shoulders and the head is where more material is needed, but only in specific points as it is shown in the next figure.







ARTICULATIONS

POSTULATION 04
MATERIAL: Steel A36
MASS: 795.05ton
LOAD: 4kN/m2
HEIGHT: 5cms

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