



Operating Room Light System

Maquet

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PROJECT OVERVIEW

The goal of the project was to redesign the suspension system for operating room lighting. The existing system has problems with the mechanical functions such as positioning, articulating the light, drift, dead zones, and versatility of load.

The constraints of the project included:

- Supporting a load of 20 kg.
- A maximum vertical positioning Force of 16.5 N
- A vertical range of 2.1 meter
- A maximum radial distance of 2.5 meter, which is from the main axis (ceiling tube) to the axis of the end of the lower arm, where it is connected to the light
- No drift is allowed



HOW IT WORKS

The lower arm has similar characteristics to the existing Maquet design. The moving arm contains 5 springs that counter balance the moment from the light. The springs are attached to a gear that rotates about another gear. The light is calibrated to stay at a certain position and the springs will counter that moment to keep the light in that position. When the light is moved the springs will move with the gear so that the moment on the gear from the spring changes to equal the moment from gravity onto the light.

The gear and spring is sized so that a balance is made at all positions.

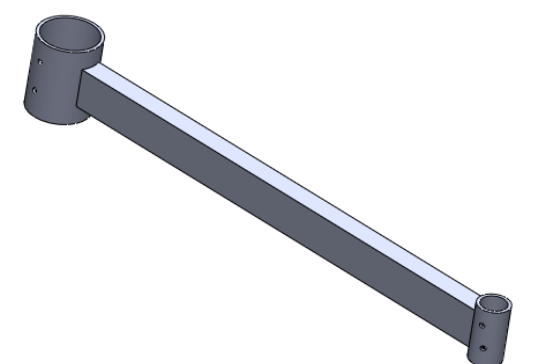
Supporting Frame

- A 1020 square tubing frame with a 750 mm beam mount
- Holds the whole operating room suspension system with a force about 300 N.



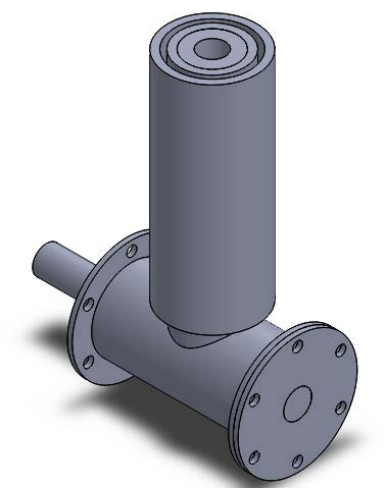
Upper Arm

- 2 cylinder holder with bearing for rotational purpose.
- Welded to a 1 meter long rectangular shape made by steel alloy.



Joint

- Connected upper to lower arms
- Has a shaft fixed to gear 1



Lower Arm

- The control part of the system.
- Has a pair of gears that help for rotation
- Has 5 springs parallel to each other and attached to one gear and the arm.

