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IV Pole for Cardiac Surgery

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IV Pole For Cardiac Surgery



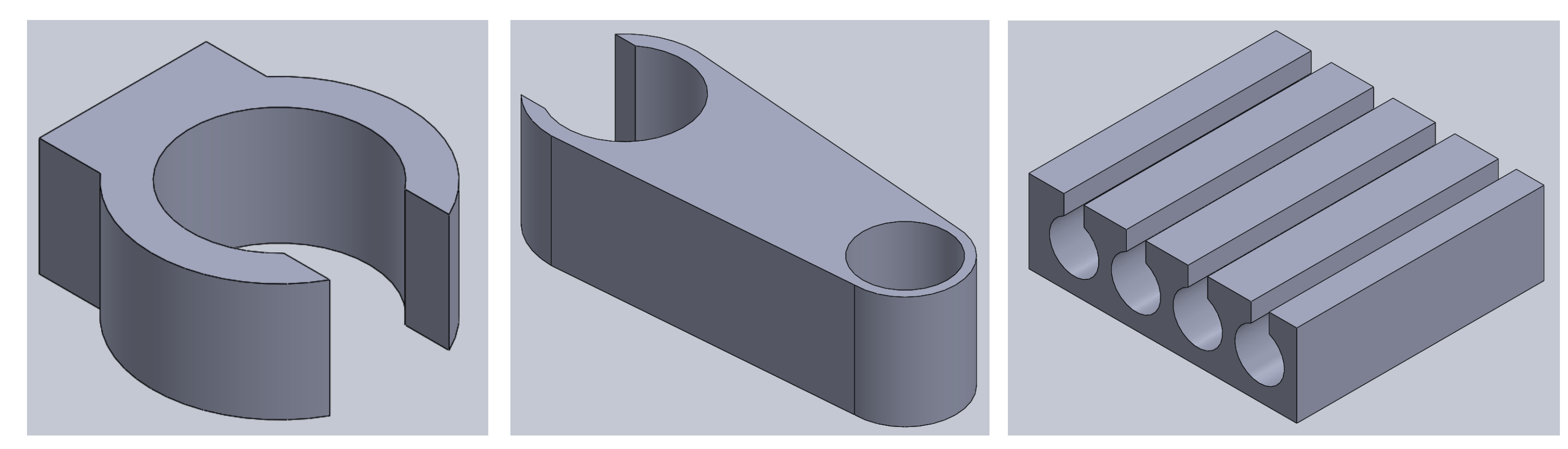
Clinical Need

IV lines need to be transported into the operating room along with the patient. During this process, the weight of the IV bags and infusion pumps can cause the IV pole to fall or bend. This can cause the IV lines to be pulled out of the patient and lead to blood loss or other injuries. In addition, all of the IV bags and tubes look similar. This can cause health care professionals to give the wrong medication to patients, which can be life-threatening.

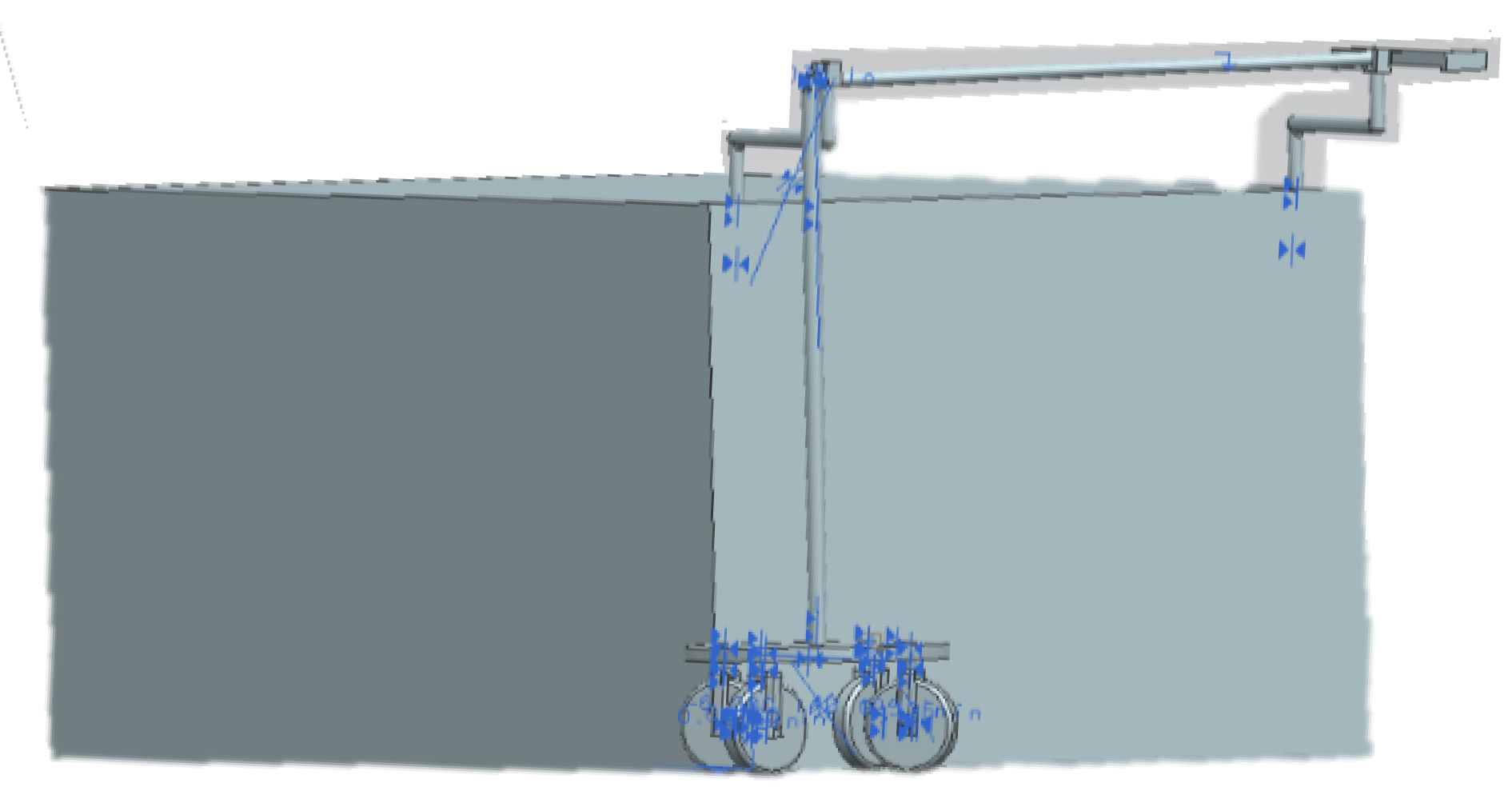
Significance

The more stable IV pole will decrease the number of injuries caused by the collapse of IV poles. In addition, the color-coding and clipping of IV bags and infusion pumps will prevent the misidentification of medication.

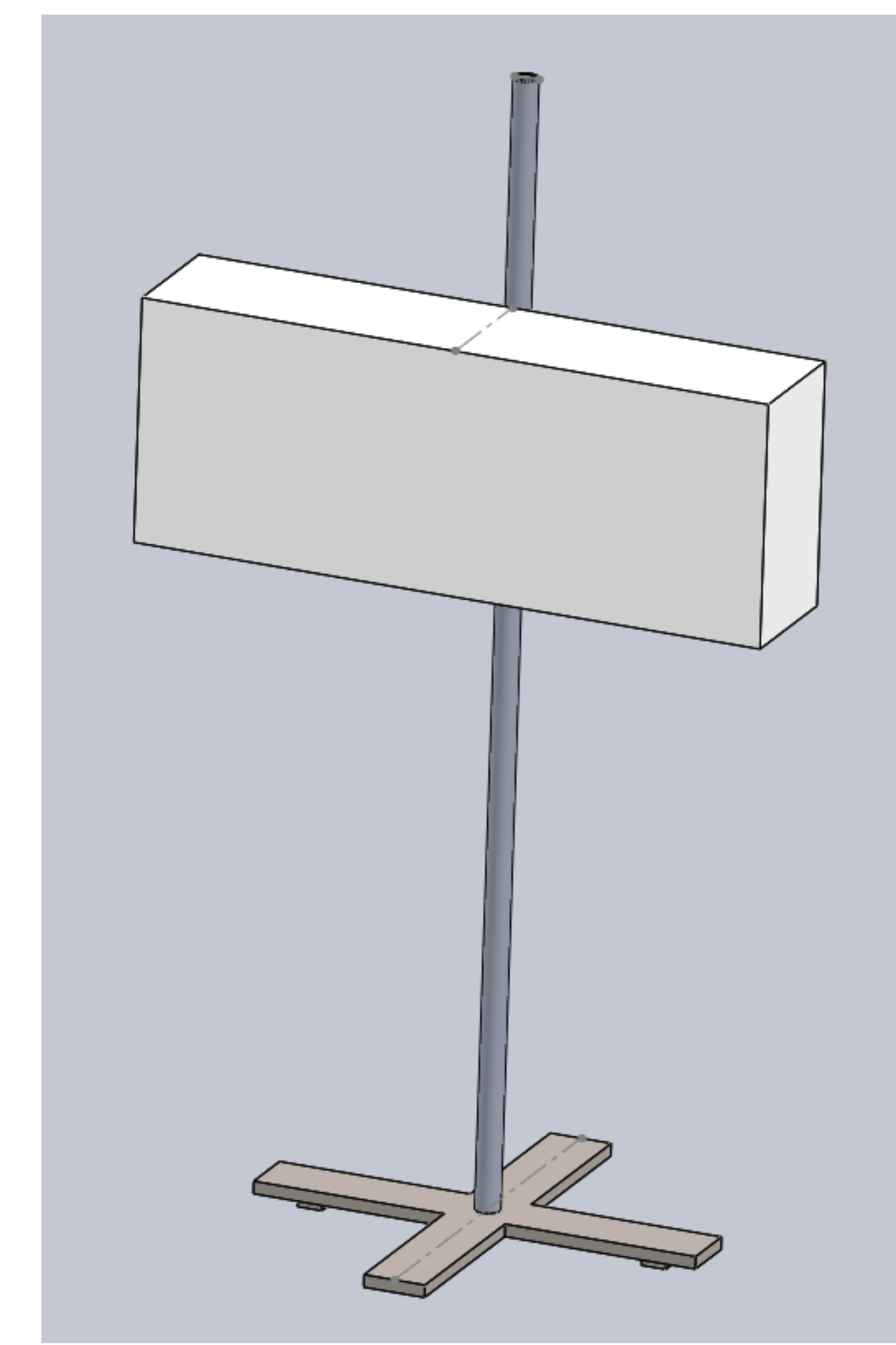
Clasp Designs



Pole Designs



Previous Design: Hinge at 45.5 inches, not implemented due to clinical sponsor need

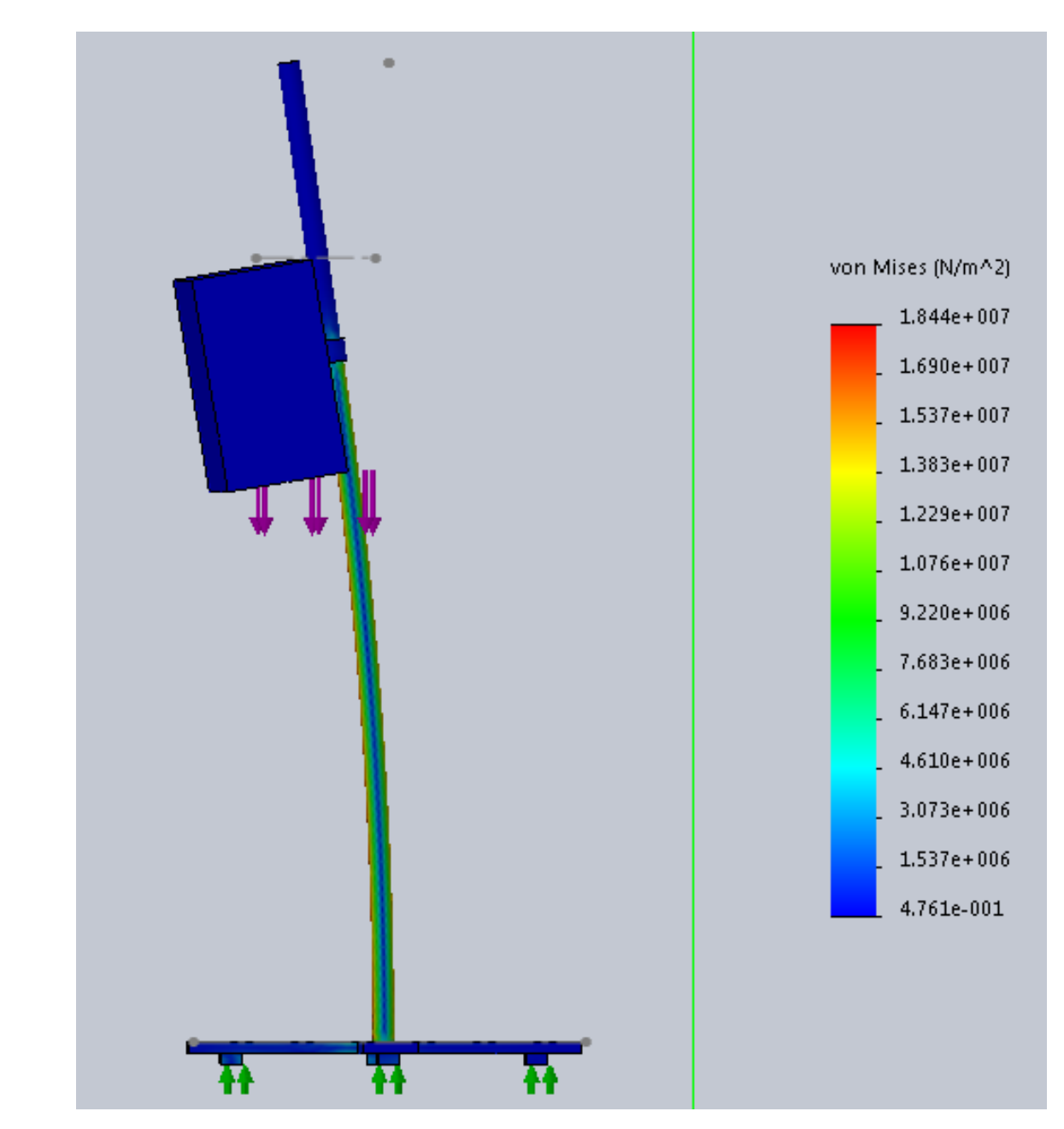


Final Design: Total base height 45.5 inches

Testing

Critical load= 111.227 lb Critical Stress= 277.685 lb/in²
Pump load = 50 lb Pump stress = 124.827 lb/in²
Factor of Safety: >2

Actual stress is less than critical stress therefore yield occurs first and column is considered short. Therefore, Solidworks Simulation stress modeling can be used to determine failure and instability of the pole. According to Solidworks the yield stress is never reached or even close under maximum loading of 50 lb.



Conclusion

Our new IV pole is inherently stable independently and will only be reinforced and increasingly stable when attached to the ICU bed. Overall we have accurately completed our project goals by organizing the IV lines, color-coding the pumps, and making a safer, more stable IV pole for transportation with the patient.