

P14031 Jib Transfer Bench Detailed Design Review
Summary of PVC Arm Designs Analyzed

Cantilever Arm Designs - Summary of Options Analyzed

Ultimate Strength (psi) -> w/ Thermal Factor	5250.00
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Analysis Number	# of Uprights	Pipe Dia (in)	Schedule	Notes	Max Deflection (total) (in)	Max Stress (psi)	Stress Location	Safety Factor (Need n>1.5)
1	1	4	40		1.457	5291	Lower sides of elbow	0.99
2	2	2	40		10.785	11745	Front of legs	0.45
3	2	2	40	Angle Braces	2.733	17459	Front of legs	0.30
4	3	2	40	Angle Braces	0.710	6611	Inside of center elbow	0.79
5	3	2	80	Angle Braces	0.586	6400	Inside of center elbow	0.82
6	4	2	80	Angle Braces	0.390	3912	Inside of center elbows	1.34
7	4	2	80	Angle Braces top plate	0.180 (plate)	2021	Inside of center elbows	2.60
8	4	2	40	Angle Braces top plate	0.250 (plate)	2162	Inside of center elbows	2.43
9	4	2	40	Angle Braces Half Top-Plate	0.465 (plate)	2744	Inside of center elbows	1.91

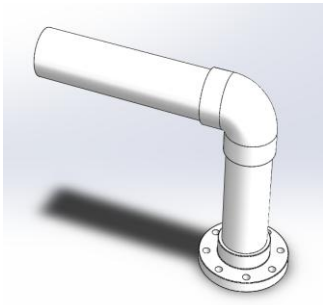
The team has chosen design #9 from the table above.

With an impulse load this design deflects 1.52in

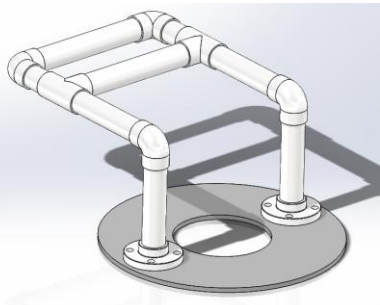
This deflection will cause the chair support to hit the top of the bench. The max stress under this load is 12350psi, this high and will break the assembly (the impulse pressure was 15.43psi on a half plate)

THE USER CANNOT "PLOP" VERTICALLY ONTO THE SEAT (The analysis was done from a height of 6 inches)

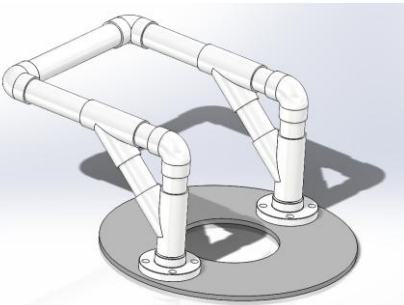
Summary of PVC Arm Designs Analyzed:



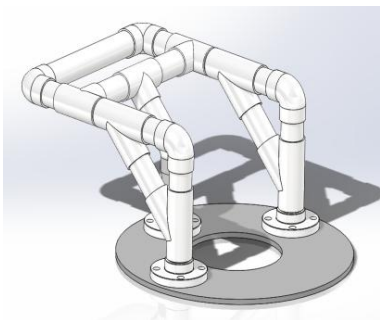
Analysis #1



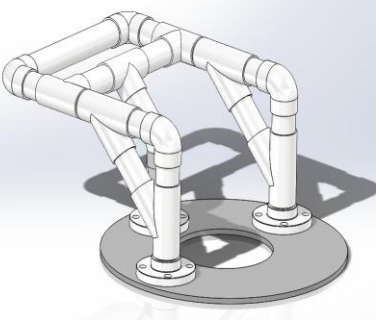
Analysis #2



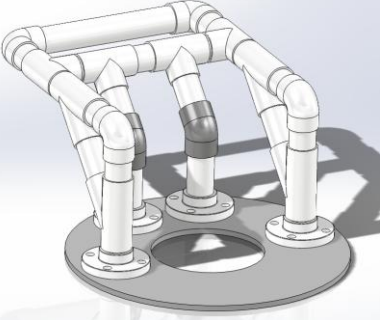
Analysis #3



Analysis #4



Analysis #5



Analysis #6



Analysis #7



Analysis #8



Analysis #9