TABLETOP ANECHOIC CHAMBER FOR ACOUSTIC ABSORPTION

Mechanical Engineering

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FRESNO STATE

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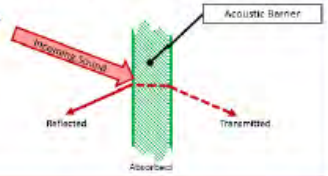
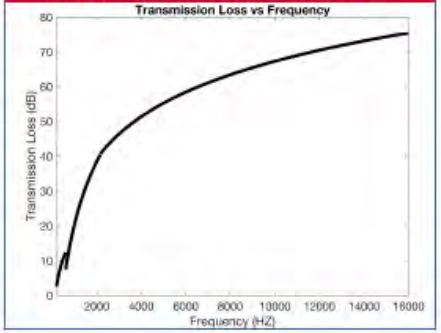
Objective

To design, research, and fabricate a novel low-cost tabletop anechoic chamber for acoustic absorption characterization of composite devices.



Design for Transmission Loss



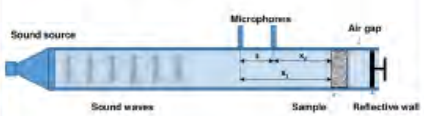
Gas Spring Design

Budget

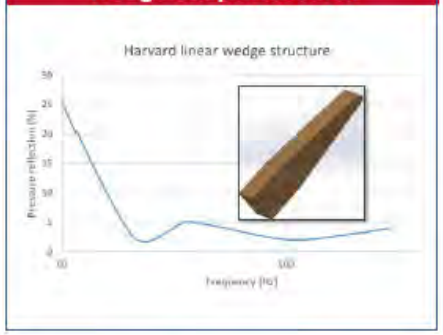
Part	Quantity (pcs)	Price/Quantity ($)	Total Price ($)	Source
Aluminum Tubing	140	$1.00	$196.01	Valley Inn
Aluminum Sheets	137	$3.00	$428.68	BP Precision
Galvanized Angle	1	$0.00	$0.00	Donated
Acoustic Wedges	1	$133.12	$133.12	Sound Resolved
Acoustic Panels	1	$123.92	$123.92	Amazon
HDI Brackets	140	$0.40	$56.54	Home Depot
Handles	5	$18.50	$37.50	McMaster
Hinges (pack of 5)	1	$21.55	$21.55	Home Depot
Gas Springs	2	$7.53	$15.06	Gruber
Glass Latches	2	$17.98	$17.98	Amazon
Blue Handles	4	$14.32	$13.31	McMaster
BNC Bulkhead	8	$2.00	$11.99	Amazon
BNC to BNC Bulkhead	8	$3.95	$3.75	Amazon
BNC Cable	2	$8.99	$18.99	Amazon
Weather Stripping	2	$13.96	$26.72	Fresno Ag
Self Tapping 1/2in #6 Hex Head Screws	200	$0.12	$8.72	SelfDepot
1/4" 20 1 3/4" Flange Bolts	180	$0.16	$28.16	SelfDepot
1/4" 20 2" Flange Bolts	10	$0.24	$2.40	SelfDepot
1/4" Rubber Washers (Pack of 100)	4	$11.72	$45.88	McMaster
1/4" 20 Flange Nuts	170	$0.09	$13.34	SelfDepot
Velcro	4	$15.25	$61.00	Home Depot
Electrically Isolating Tape	2	$16.66	$33.32	Amazon
Caulking	1	$6.29	$6.29	Amazon
Floor Flanges/Expansion Tube Holders	1	$0.00	$0.00	3D Printed
Sam Blades, Drill Bits, etc.	1	$18.25	$18.25	Home Depot
Shipping/Tax Charge (Self Depot)	1	$11.96	$11.96	N/A
Shipping/Tax Charge (Nonwater)	1	$12.19	$12.19	N/A
Cabinet	4	$7.99	$31.92	Lowes
Gas Spring Mounting Hardware	1	$16.19	$16.19	Home Depot
		Total	$1,499.05	
Under/Over Budget $42.58				

Purpose

Testing of devices' resonant frequencies is often necessary in the aerospace industry to keep vibrations from escalating to dangerous levels through constructive interference. When small devices are designed, it is often a big inconvenience to take them to an anechoic room for testing. Instead of traveling with the newly designed device for testing, a tabletop anechoic chamber allows for cost effective testing within the lab.



Wedge Shape Research

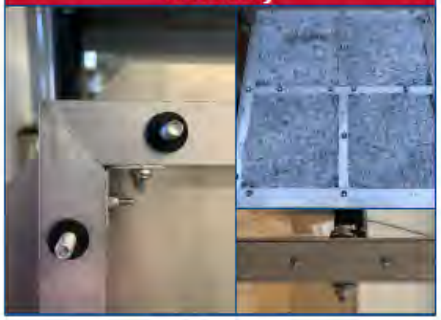


Assembly

Model Render

Cross-sectional View

Assembly



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