

A New Classical Pilates Reformer

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DESIGN PHILOSOPHY, PROJECT INTENTION

If your body is betraying you very little else matters!

This is a simple fact, exercise, movement, discipline is vital to a healthy life

Joseph Pilates believed this and all of his exercise equipment try's to fulfill this goal

There is a story that NASA had approached him on a few occasions

The first being that Mr. Pilates was one of the few that undertook a study of sleep mechanics photographing people while they slept, he devised a bed that promised a better nights sleep!

The second was when NASA started investigating exercise in zero gravity

Joseph Palates exercise regime and equipment seemed to be very adaptable to use in zero gravity

I hold these examples up to give insight to the depth and value of this work and benefit it would provide to the greater community

My approach has been simple, make it affordable, keep manufacturing costs and complexities down, as well as easy to ship or move when needed by the individual

Maintain the original dimensions and feel that people have become accustomed to in the more traditional schools of Pilates

The simple fact is that the project is rather straight forward

I have tried to keep the number of machined parts to the bare minimum using Speed Rail Fittings and standard Schedule 40 galvanized pipe for most everything

The wheels and casters are the most complex, but the value of having the concave wheel means that the Carriage is self centering and does not need an extra set of four guide wheels on the side

Upholstery has been another limiting factor in conventional Reformer designs

I am instead choosing to use Closed Cell EVA Foam, this will greatly ease in the process of manufacturing

By design the whole unit can be shipped broken down in a standard 10"dia. x 7.5' SonoTube

In a broader scope not specifically addressed within this project but still having impact will be an investigation in how to best use current and evolving technologies to instruct the individual in proper technique!



Contest Criteria Fulfillment List

C O N C E P T	Creative	First "Classical" Reformer In 90 years departing from conventional design and manufacturing methods
	Functional	Working model, tested and approved by established Instructors
	Pushing Boundaries	Designed to be shipped broken down, unique aesthetic/design
	Benefits Society	A large number of people have back issues, many need to exercise, recovery from surgery. Pilates is good for all of these situations. We're making it more accessible to a larger number of people
D E S I G N	Design Detail	3D Modeling, Rendering, multiple iterations
	Base Level Planning	Parts List, Cut List, Jigs for cutting and templates for assembling
	User Friendly	From packaging to function, ease of use has been a focus. Foot Bar Brace is designed as a safety feature, Strap Lock, adjustable for shorter people
P R O D U C T I O N	Reproducible	Low level of skill for production, readily available materials, most parts are off the shelf
	Manufacturing Details	Jigs for cutting pipe, CNC for routing wood Carriage, Out sourcing of Casters, Spring Stop, Foot Bar Lock, Shoulder Stops (all of this can be done internally if more cost effective)
	Scalability	No assembly is required in manufacturing, low level of skill for manufacturing, few specialty parts to inventory
B E N C H M A R K	Viability	Working models are currently in use, interest has already been expressed on Social Media, conversation with multi facility Gym have been started for outfitting internal Pilates Studios
	Realistic Costs	All material costs estimates are full retail "off the shelf" pricing. Casters, Spring Stop, Foot Bar Lock, Shoulder Blocks would have to be priced out by a "job shop" (all of this can be done internally if more cost effective)
	Competitors	It is a simple and rather transparent design, it would be very easy to duplicate! But the uniqueness of design and my reputation in the community is of some value to protect us in the market. I have had conversations with some of the larger manufacturers and they have trouble meeting current demands of orders and have little interest of introducing a different line of Reformers
C O M M U N I C A T I O N	Final Round Requirements	Video
	Documentation	Photos and drawings/renderings, video of project. Video of assembly
	Open Design	It is being designed as a kit so "Open" is built into it
	Marketable	Setting up website, promotional photos and video, positive feedback from the Pilates community. Cost comparison between current choices

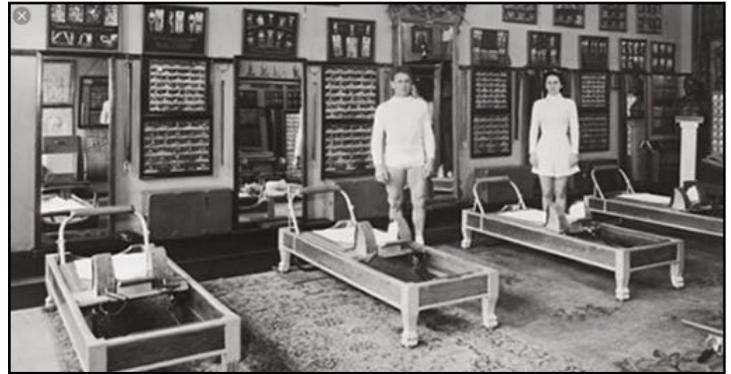
Creative

Hundred Year Evolution of the "Classic" Pilates Reformer

1920s



1940s



1960s



Current



"Hack A Day Prize"
Entry 2019

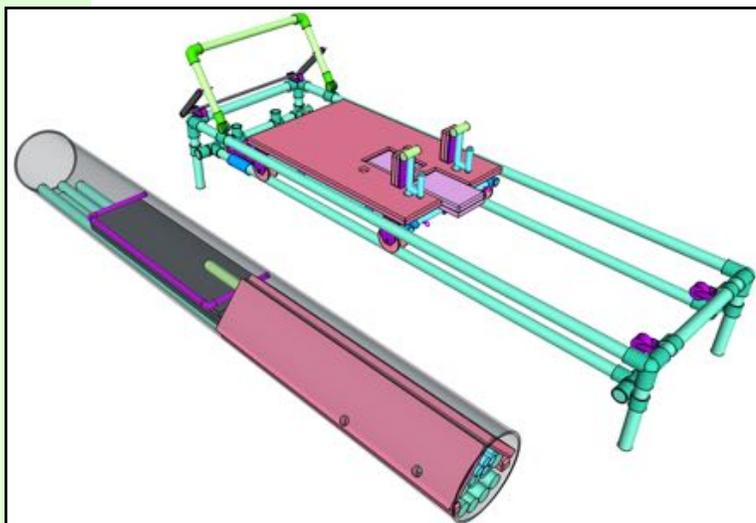


Over the course of nearly 100 years the form and manufacturing of the Reformer has not changed much! The design has stayed nearly identical. The biggest change was switching from wood to aluminum in the 50s

Every aspect of creation is a step of Faith
The blank page, and canvas calling out to be engaged are all acts of bold Faith
All problems waiting to be solved
The need to make Pilates available to a larger audience has called out to me
I Pray to be Faithful in my answer

Pushing Boundaries

God works in mysterious ways. My daughter and her family came back down Sunday to help with my equipment delivery was really nervous about getting the equipment inside from the sidewalk, where it was being delivered because we weren't sure the boxes could be brought in, especially without My husband being here to help. Monday the equipment hadn't even been shipped yet. It was now scheduled to ship Tuesday, and potentially not delivered till the following Monday missing out on my daughter's and her husband's help. Fast forward just two days and the equipment was not only shipped from New York, it was delivered and the kind men brought everything in for us, which even meant unpacking some of the heavier boxes and carrying in equipment. I really didn't know how we were going to pull this off and I literally started crying at a stranger's kindness in doing more for me than he was hired to do. We are just so incredibly thankful for everyone who made this possible for us ❤️ Now to set everything up!

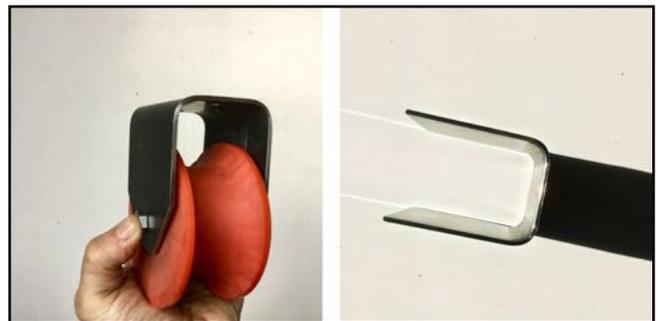


All Reformers based on the Classical design are shipped in large crates with no ability to break down for efficient shipping/moving. This is one of the first of this style that can be broken down for shipping

The materials and design were driven by the necessity and discipline of simplicity To make this affordable, ease of sourcing parts and manufacturing were primary concerns

No welding is needed and even tapping screw threads are kept to a minimum

Using concave profiled wheels means that the Carriage is self centering and alignment is easily achievable by the user



Benefits Society

As for the benefit to society!
I am including a few links to collected research as well as direct studies done.

Their is a very serious effort to prove scientifically the positive effects of a Pilates exercise practice
Personally having been teaching for years the first hand observation and recounting of Clients personal stories of the benefits is proof enough for me!

But as compelling as these stories are it just drives the point home all the more that this methodology should be accessible to a broader audience of people

There is a certain mystique and traditionalism of holding to the very image, form, function and design of what Mr. Pilates has used himself

But honestly this narrowness will ultimately stand in the way of larger acceptance and deny more people the benefits of recovery from injury, and maintaining healthy movement!

With the materials and processes that are now available to us it would be irresponsible to not look at this design, manufacturing and distribution problem in a new light!

This has been my driving force in the execution of this project!
It is also the reason for trying to keep the design so modest and the manufacturing simple

Pilates Science Oraginization

PILATES SCIENCE

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0 Comments

Archives

May 2019
February 2019
January 2019
December 2018
September 2018
July 2018
June 2018
May 2018
April 2018
March 2018
February 2018
December 2017

Functional improvements after a pilates program in adolescents with a history of back pain: A randomized controlled trial.

González-Gálvez N, Marcos-Pardo P, Camarero-Poyatos M, Compleser Ther Clin Pract. 2019 May;25(1-7):doi:10.1016/j.ctcp.2019.01.006. Epub 2019 Jan 10. PMID:3003644

Pilates Intervention: Contemporary Pilates Mat exercises.

Effects of Pilates on fall risk factors in community-dwelling elderly women: A randomized, controlled trial.

Alban-Almazán A, Martínez-Armat A, Cruz-Díaz O, De la Torre-Cruz M, Jiménez-García JD, Zagalaz-Aranda N, Pérez-Hernández L, Iñigo-Carmona F. Eur J Sport Sci. 2019 Apr 16;59:doi:10.1080/17443319.2019.1595759. [Epub ahead of print] PMID:30990762

Pilates Intervention: n/a

Effectiveness and cost-effectiveness of the modified Pilates method versus aerobic exercise in the treatment of patients with fibromyalgia: protocol for a randomized controlled trial.

Franco KFM, Franco VICC, Salvador SMM, do Nascimento BCL, Miyamoto CC, Cabral CMN. BMC Rheumatol. 2019 Jan 18;3:2. doi:10.1186/s41927-019-0051-6. eCollection 2019. PMID:30686990

Pilates Intervention: Modified contemporary Pilates exercises on Mat, Cadillac, Reformer, Ladder Barrel and Step Chair, also isolated muscle contractions.

The effects of Pilates vs. aerobic training on cardiorespiratory fitness, isokinetic muscular strength, body

Balance Body Research Library

The screenshot shows the Balanced Body website. At the top, there is a search bar with a magnifying glass icon and a 'Go' button. Below the search bar is a navigation menu with tabs for 'company', 'pilates', 'education', 'community', 'blog', and 'shop'. The 'pilates' tab is selected. Below the navigation menu, there is a section titled 'PILATES' with a sub-section 'Library'. The library section lists various topics: 'Benefits of Pilates', 'Origins of Pilates', 'Pilates Lifestyle', 'General Interest', 'Balanced Body', 'SOREdery', 'Recovery', 'Biography', 'Desktop Wallpaper', 'Getting Started', 'Your Sport & Pilates', 'Pilates Professionals', and 'Other Mindful Movement Practices'. Below the library list, there is a section titled 'Selected bibliography of recent research articles on Pilates'. This section contains a list of research articles with brief abstracts and links to full text where available.

Pilates for Improvement of Muscle Endurance...

Pilates for Improvement of Muscle Endurance, Flexibility, Balance, and Posture

Kloubec, June A.

Journal of Strength and Conditioning Research, March 2010 - Volume 24 - Issue 3 - p 661-667

doi: 10.1519/JSC.0b013e3181c277fa

Original Research

Full

Abstract Author Information Article Outline Article Metrics

Kloubec, JA. Pilates for improvement of muscle endurance, flexibility, balance, and posture. *J Strength Cond Res* 24(3): 661-667, 2010. Many claims have been made about the effectiveness of Pilates exercise on the basic parameters of fitness. The purpose of this study was to determine the effects of Pilates exercise on abdominal endurance, hamstring flexibility, upper-body muscular endurance, posture, and balance. Fifty subjects were recruited to participate in a 12-week Pilates class, which met for 1 hour 2 times per week. Subjects were randomly assigned to either the experimental (n = 25) or control (n = 25). Subjects maintained their assigned location...

Effectiveness of Pilates Exercise...

The Effectiveness of Pilates Exercise in People with Chronic Low Back Pain: A Systematic Review

Cherie Wells, Gregory S. Kolt, Paul Marshall, Bridget Hill, Andrea Bialocerkowski

Published: July 1, 2014 • <https://doi.org/10.1371/journal.pone.0100402>

Article	Authors	Metrics	Comments	Media Coverage
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Abstract
Introduction
Materials and Methods
Results

Abstract

Objective

To evaluate the effectiveness of Pilates exercise in people with chronic low back pain (CLBP) through a systematic review of randomised controlled trials (RCTs).

Data Synthesis

The methodological quality of RCTs ranged from "poor" to "excellent". A meta-analysis of RCTs was not undertaken due to the heterogeneity of RCTs. Pilates exercise provided statistically significant improvements in pain and functional ability compared to usual care and physical activity between 4 and 15 weeks, but not at 24 weeks. There were no consistent statistically significant differences in improvements in pain and functional ability with Pilates exercise, massage therapy, or other forms of exercise at any time period.

Design Detail

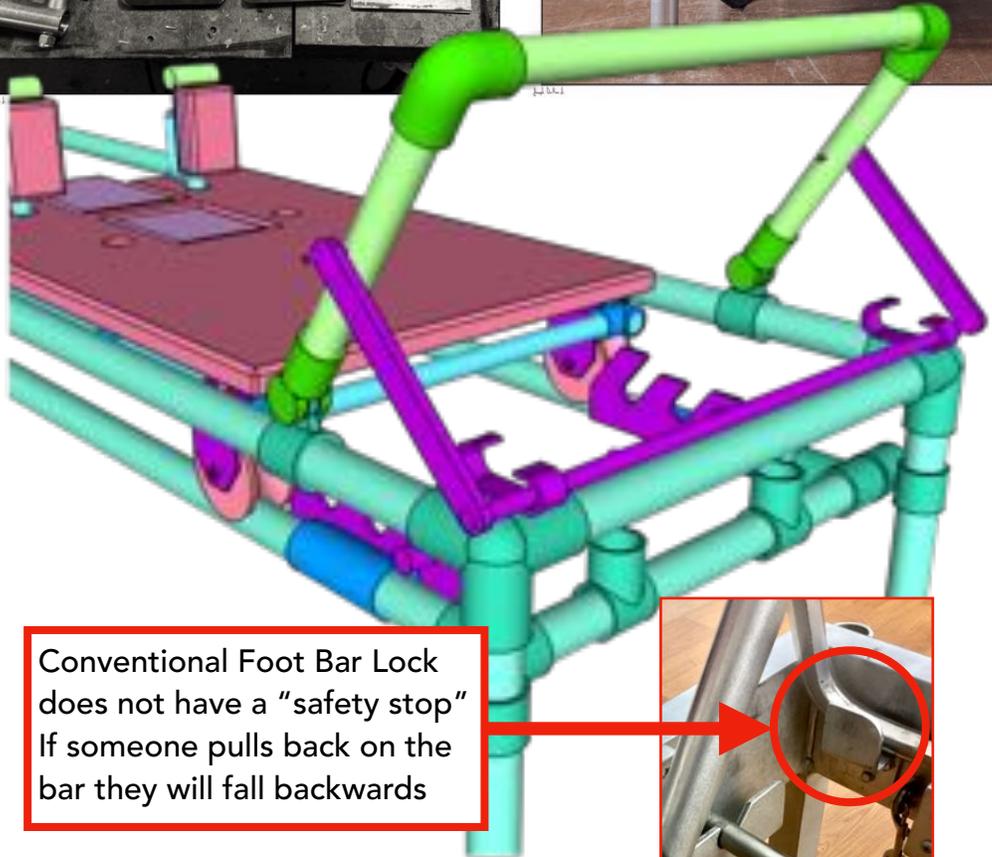
Design is easy!

Cutting shit out of metal is hard!

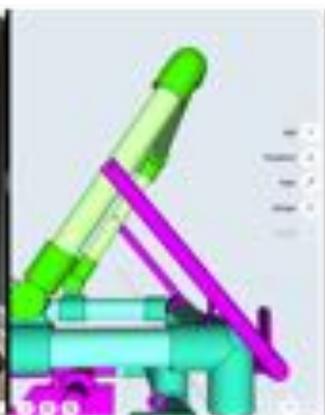
The Foot Bar Lock is an example of the many iterations and focus on design and function

It was a goal from the onset to also make the Reformer safer

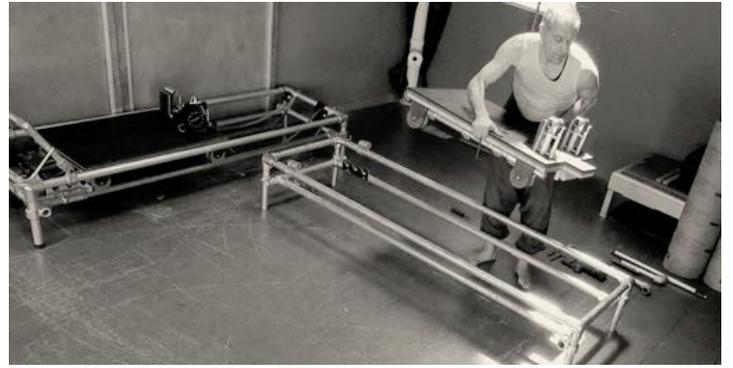
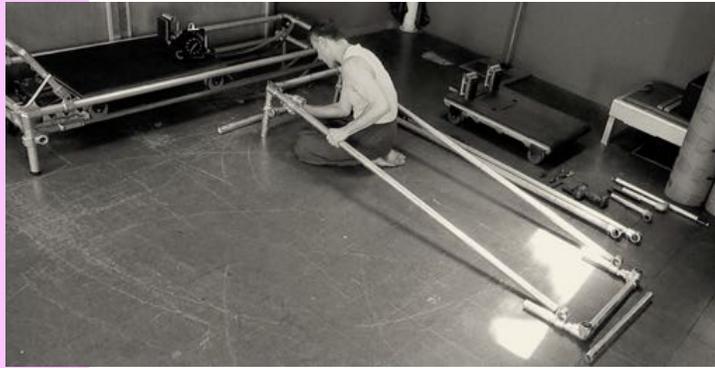
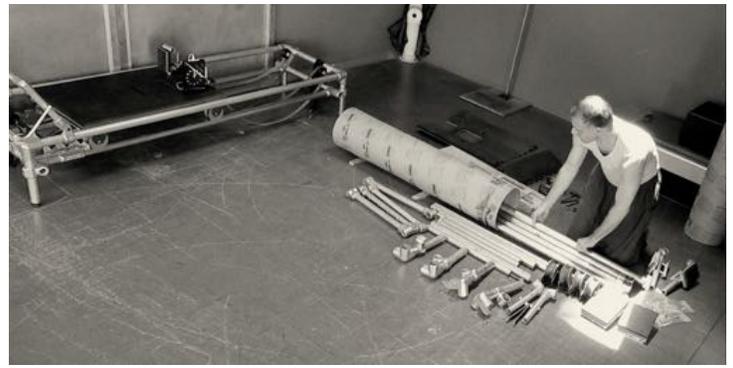
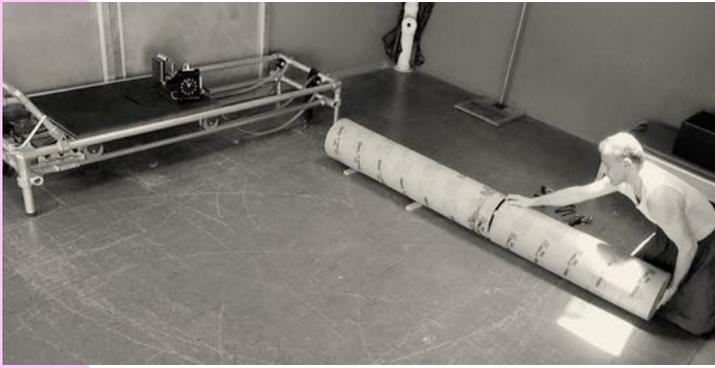
With this design if someone were to pull back on the Foot Bar it will lock into the back position stopping someone from falling backwards



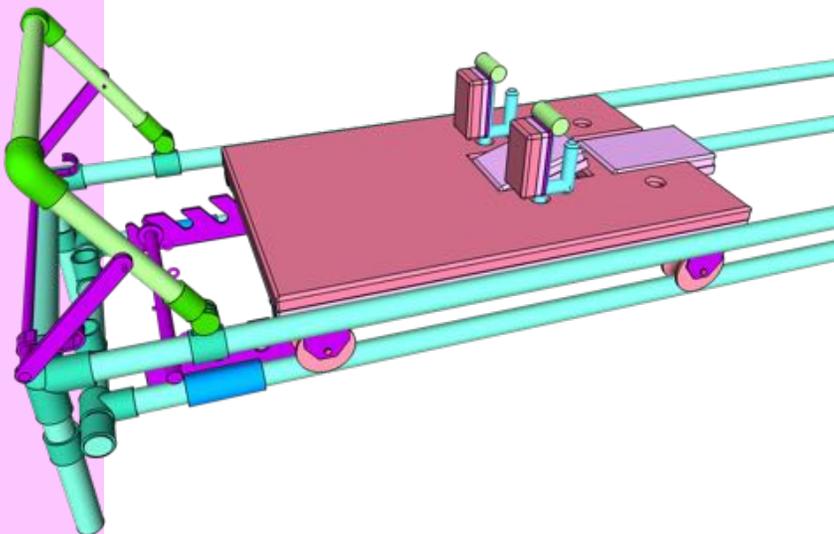
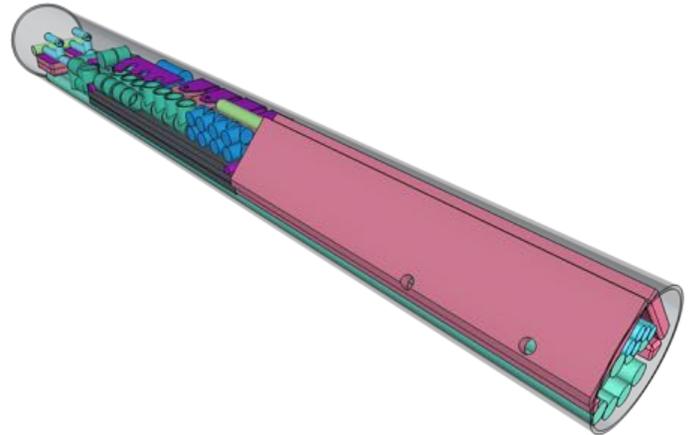
Conventional Foot Bar Lock does not have a "safety stop" If someone pulls back on the bar they will fall backwards



User Friendly



User friendliness is never just one thing, it is the accumulation of many fine points and decisions made! One aspect of the design of this Reformer was ease of moving, in terms of shipping or when ever a studio moves to a new location. The contents of a working Reformer will fit into a 10" Sono Tube 7'3" long! It can be assembled is less than an hour! This is a far cry from what has been the standard process of pallet trucks and professional movers needed to set up a Pilates Studio!



In terms of putting the user first is the fact that no "Classical" Reformer has adjustments for shorter users! I am trying to rectify that through the introduction of Shoulders Blocks that can be moved forward to accommodate those who are shorter.

This process is not as simple as just moving the Shoulder Blocks forward but what must also be taken into account is the Head Rest and lengthening the Pulling Straps to accommodate the more forward body position.

Production

Questions of "Production" are hard to project and confidently solve for!

These are the unknowns that hit you in the back of the head due to lack of experience

It is in the hope of solving these problems that brought me to entering the Hack A Day 2019 Prize

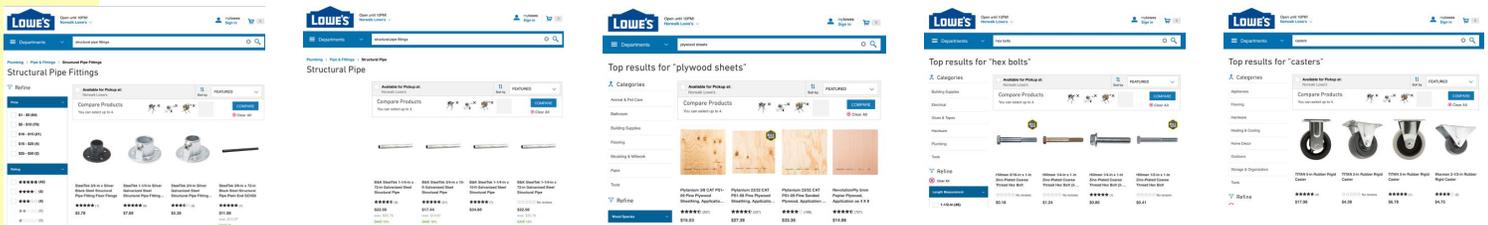
Knowing my strengths, I can design, and prototype, I can test, refine, I can even market!

But! The process of "Business" that is another story!

Reproducible

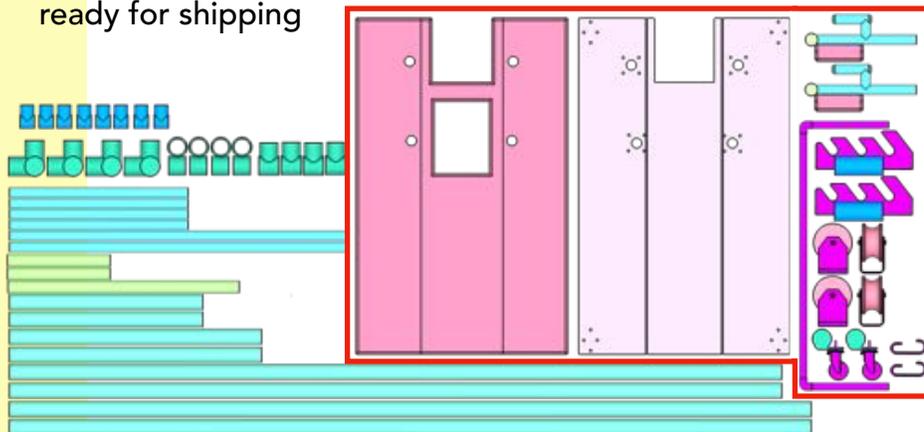
The simple fact is 90% of this is all off the shelf components and material

The central goal and driving force of every decision of this design has been to making the manufacturing easy, reproducibility was a singular focus!



Manufacturing Details

What you see here are the parts that would be considered ready for shipping



The bulk of the parts are off the shelf with nothing more than cutting gas pipe
Of the six other groups highlighted here, these need some level of "fabrication" or hand work
This can range from some machining, metal press bending, or simple wood work

Scalability

Seeing that there is such little hand work to the fabrication and and so few pieces that need to be custom fabricated the process of scaling up should not be so daunting

Devising a smooth and intelligent workflow is what will be called for, but much of that can't be determined until a sense of magnitude is assessed

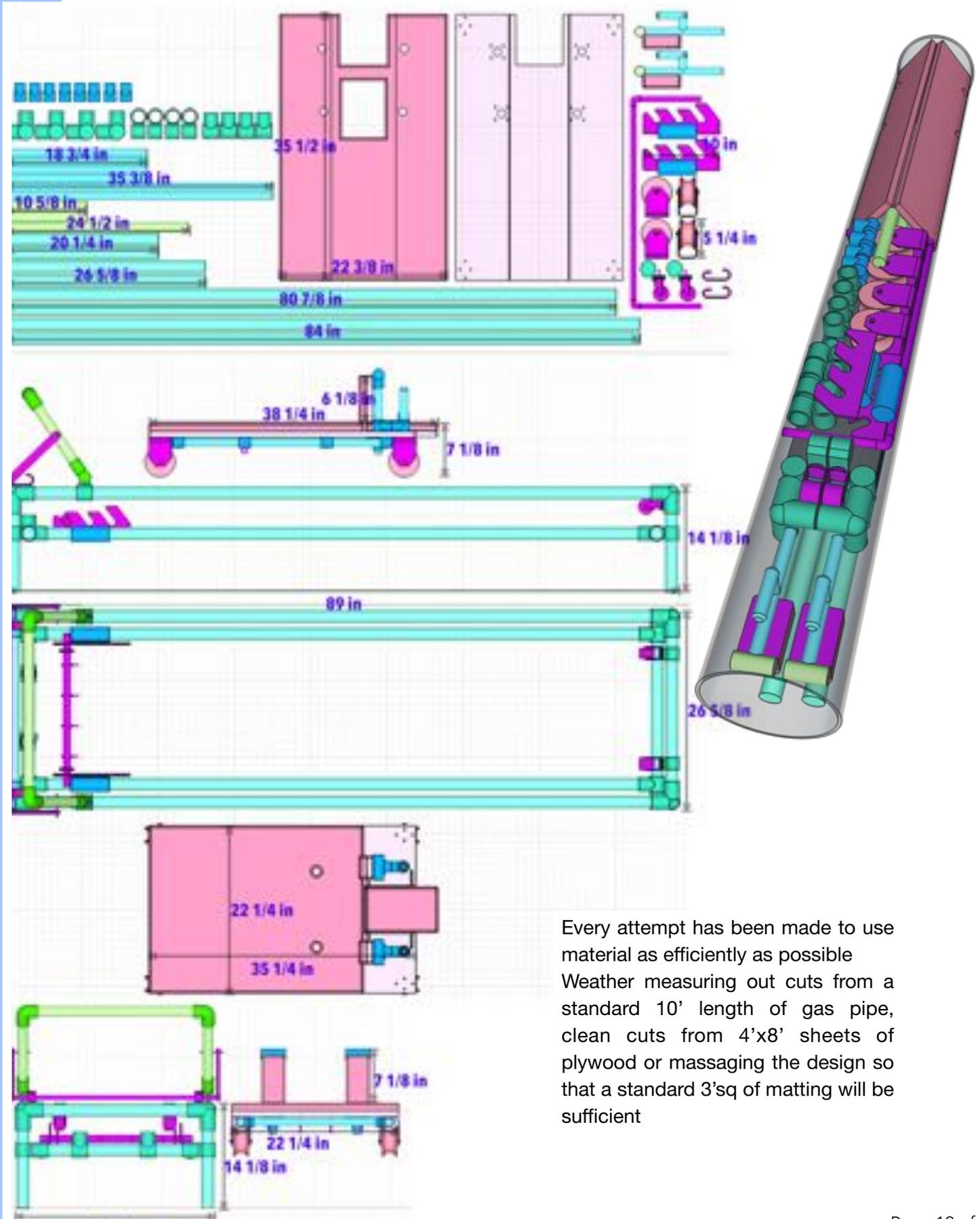
Communication

Material Cost

Parts	To Purchase	Vendor	Model	Category	URL	Photo	Weight	Price	Qty	Total Lbs	Total \$
47 Global Pipe Fitting - Single Socket Tee 1.64" Dia	☑	Lowe's	675-1084C	Frame	https://www.lowes.com/pd/SteelTek-1-1-4-in-x-90-Degree		1.28	\$4.38	6	7.68	\$26.28
47 SteelTek 1-1/4 in x 90-Degree	☑	Lowe's	673-8084C	Frame	https://www.lowes.com/pd/SteelTek-1-1-4-in-x-90-Degree		2.49	\$10.98	6	14.94	\$63.90
47 SteelTek 1-1/4 in 90-Degree	☑	Lowe's	676-1084C	Frame	https://www.lowes.com/pd/SteelTek-1-1-4-in-x-90-Degree		1.5	\$4.62	6	9.0	\$39.48
47 SteelTek 1-1/4 in x 90-Degree Table-Outlet Tee, 1.64"	☑	Lowe's	671-6084C	Frame	https://www.lowes.com/pd/SteelTek-1-1-4-in-x-90-Degree		1.87	\$8.98	3	5.61	17.94
47 Male Single Socket Socket Member, 1-1/4"	☑	Global	M50.7	Fast Bar	https://www.globalindustrial.com/p/storage- fittings-brackets-and-tees		0.79	\$9.50	2	1.58	19
46 Female Single Socket Socket Member, 1"	☑	Global	M50.4	Fast Bar	https://www.globalindustrial.com/p/storage- fittings-brackets-and-tees		0.75	\$7.80	2	1.5	12.44
46 Global Pipe Fitting - 90 Degree T-Flow 1" Dia	☑	Global	90P90721	Frame	https://www.globalindustrial.com/p/storage- fittings-brackets-and-tees		0.66	\$5.70	6	3.96	23.8
45 Global Pipe Fitting - Single Socket Tee 1" Dia	☑	Lowe's	682P90728	Carriage	https://www.lowes.com/pd/SteelTek-1-1-4-in-x-90-Degree		0.68	\$3.88	16	10.88	42.08
45 Global Pipe Fitting - Flange Hanger 1" Dia	☑	Lowe's	673-1084C	Carriage	https://www.globalindustrial.com/p/storage- fittings-brackets-and-tees		1.1	\$5.38	6	6.6	21.52
45 SteelTek 3/4 in x 90-Degree	☑	Lowe's	670-8084C	Carriage	https://www.lowes.com/pd/SteelTek-3-4-in-x-90-Degree		0.64	\$3.98	2	1.28	11.90
47 Lowe's Galvanized Structural Pipe	☑	Lowe's	315 1/2X1/20	Frame	https://www.lowes.com/pd/SteelTek-1-1-4-in-x-90-Degree		2.77	\$2.90	35	94.95	101.1
46 Home Depot Galvanized Steel Pipe - 2"	☑	Home Depot	501-4884C	Fast Bar	https://www.homedepot.com/p/3-4-in-x-70-ft-Galvanized-Steel-Pipe-501-4884C		0.58	\$1.37	6	3.52	5.48
46 Home Depot Galvanized Steel Pipe - 3"	☑	Home Depot	A27M8021	Frame	https://www.homedepot.com/p/3-4-in-x-70-ft-Galvanized-Steel-Pipe-501-4884C		0.58	\$1.65	16	9.12	25.1
3/4 in. x 8 ft. x 8 ft. Ground Contact Pressure Treated Pine Performance Rated Sheathing	☑	Home Depot	Per Sq. Foot	Carriage	http://www.homedepot.com/p/3-4-in-x-4-ft-x-8-ft-Ground-Contact-Pressure-Treated-Pine-501-4884C		2.13	\$1.02	6	12.78	6.12
47 Steel 3-in Rubber Pipe Fittings	☑	Lowe's	43208PFLM	Frame	https://www.lowes.com/pd/TTDM-3-in-Rubber-Rigid-Fittings			\$10.68	2	0	21.36
46 Mats Interlocking Size 1.25 inch	☑	Great Mats	Per Sq. Foot	Carriage	https://www.greatmats.com/product/informatsinfo			\$2.25	6	0	13.1
46 Galvanized Steel Pipe	☑	OnlineMetal	8'x12' galvanized	Carriage / Exterior	https://www.onlinemetal.com/en/usa/catalog/87534galv		0.824	\$5.64	6	19.336	10.96
46 Universal Weathered Wood 4" dia	☑	Universal Weather	5/8 inch 5 3/4" long bolts For Custom cut weather threads off. diameter of bolt is 2" long for wheel	Carriage	http://www.universalweather.com/Universal_Product			\$4.55	6	0	24.3
Totals											
										Total Lbs	Total Cost
										184.686	469.88

Communication

Specifications Of Design



Every attempt has been made to use material as efficiently as possible. Weather measuring out cuts from a standard 10' length of gas pipe, clean cuts from 4'x8' sheets of plywood or massaging the design so that a standard 3'sq of matting will be sufficient.

Communication

Marketability/ Branding

