VILE THINGS

http://www.vilethings.com/lowboy.htm

LOWBOY

As previously mentioned, this prop moving device is not an idea of mine. The unfolding "erector" motion is the product of a professional prop manufacturing company. By no means do I intend to use their theory for any personal or financial gain, nor do I desire ANY association between the LowBoy machine and their copyright, patented (?), attorney-protected product.

That said...

The joys of building wooden models...
What better way to spend those otherwise wasted hours typically reserved for sleeping, socializing, and performing household duties?

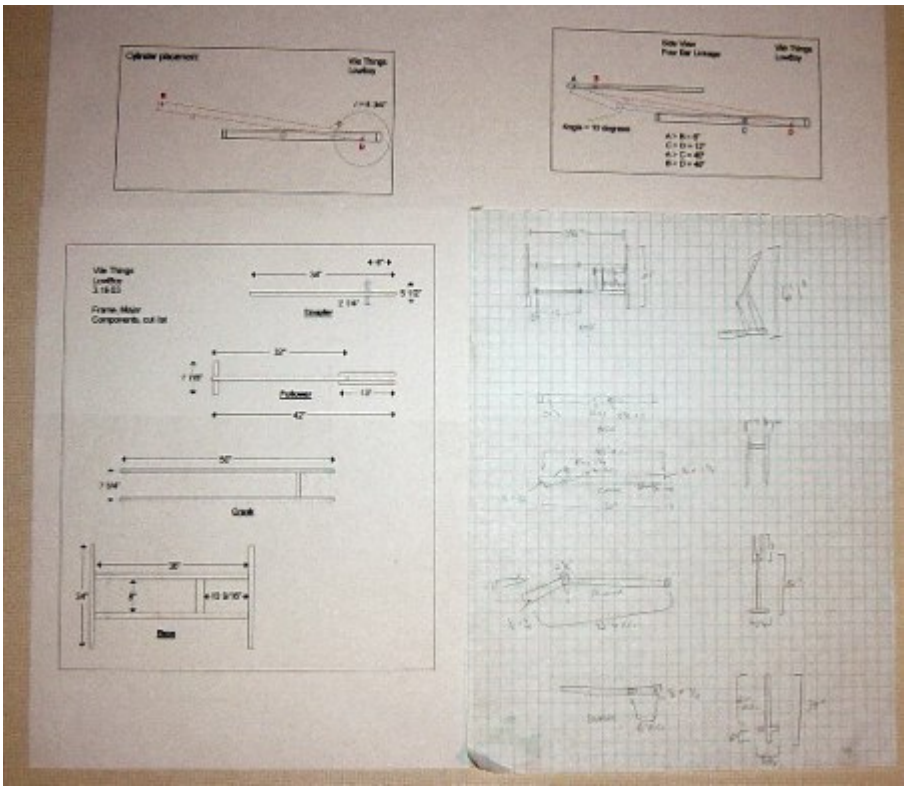
In all seriousness, this is one method for phase two - research and development.

Instead of cutting and welding sticks of costly metal tubing, it's relatively easy to cut and drill small scaps of wood.

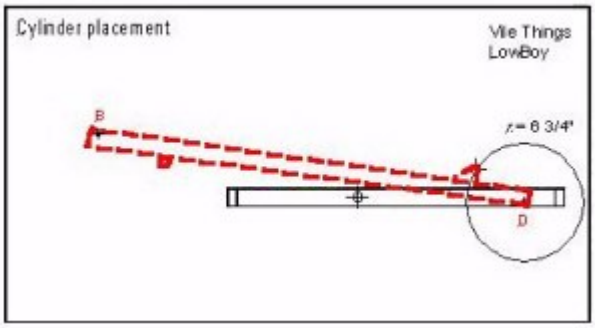
I built this model at a 1:12 scale, meaning the 4" long base would represent a real-world measurement of 4 feet.

Building a working (to scale) model will enable you to fine tune
pivot points, and experiment with linkage length and placement.
It also provides the builder with a vague idea of the design's strengths
and weaknesses, for example, balance.

After the initial sketching, and second-phase model building, I took the design to a CAD program, where I played with actual measurements and arcs.



I learned a valuable lesson last year... Design the mechanism after knowing the cylinder specifications.
I'll be using dual Atlas Cylinders (model number 1.25DXPSS08.0 EH)
1 1/4" bore X 8" throw, pivot mount.



With the majority of the homework done, I'm finally able to dig into the pile of metal. I'll be using 14 ga. 1" X 2" tube for the base. 16 ga. 1" X 2" tube for the crank bars and 14 ga. 1" X 1" tube for the follower and coupler.

Braces and pivot brackets are cut from 1/4" or 3/16" flat stock. For pins I will use 3/8" grade 5 bolts or 3/8" all-thread and nylon locking nuts.

Cut, drill, weld, and grind... and before you know it, something beautiful is born.

At left is a photo of the machine at birth.

The bars are cut, drilled, and welded so they fit together.

This is the stage where I decided to test the basic stability of the prop mover.

The arc in which the prop body will travel occurs mostly over the base, but there is little doubt that it will be necessary to anchor the machine to the ground.

At right is a photo of the pneumatic cylinder's rear pivot mount bracket.

While these items are commercially available, I was concerned with the depth of these brackets.

The version at right consists of 14 ga. 1" X 2" steel tubing and 3/16" X 1" steel flat stock.

The bolts represent the (mounted) Cylinders and remained in place until welding was completed.

This guaranteed accurate component placement.

The photo at left shows the machine with the pneumatic cylinders mounted.

At this stage the linkage has not been tested using compressed air.

Instead, I'm manually lifting and lowering things while checking for accuracy.

It's important that nothing binds, bends, or twists.

This would likely damage or destroy the Machine or its hard-working pneumatic components.

As it stands, the machine reaches a total height of 6' 1". With the prop attached, the finished height should be just under seven feet.

In it's retracted state, the total height of the mechanism is only 8 inches - LowBoy is a fitting name.

The rod clevis' are attached to home made brackets. Generally, the clevis "sandwiches" the bracket and a pin fitted with external snap rings secures the joint.

Since I'm using dual cylinders with this machine, It made sense to use a single pin to secure the cylinders to the brackets.

Locking nuts and dual jam nuts will keep things in line and still provide ample room for movement.

--- April 12, 2003 ---

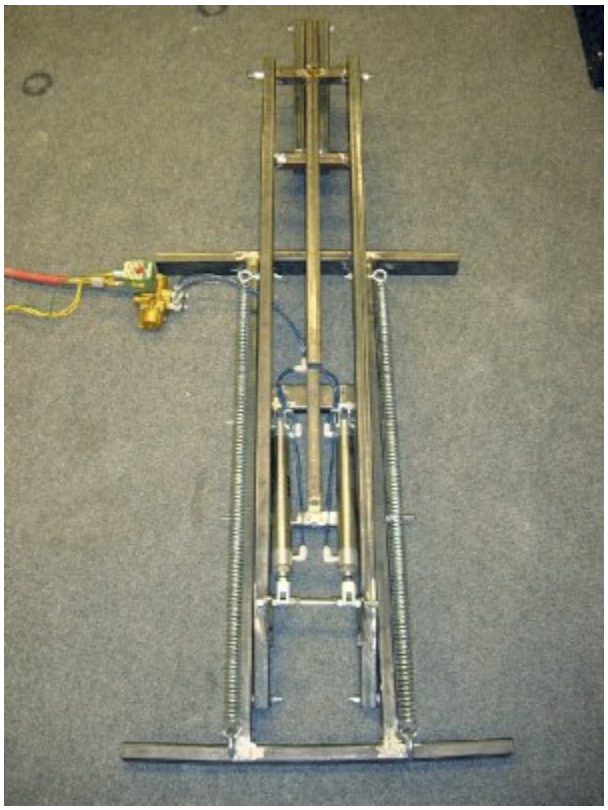
Testing proved a few things...

First, CAD programs are great, even for someone like me, who has no idea how to use them. I was able to solve some problems before they actually existed.

Second, I need to find a pneumatic power calculator of some sort. I hoped to run the machine (minus the prop) at or around 40 p.s.i.

Finally, this machine hits hard. Flow controls are an absolute must. The force required during the intial portion of the lift is FAR greater than the required force near the end of travel. (travel starts slow, and finishes fast) The return stroke would be self destructive without some means of flow control.

Without the aid of any springs, the machine moves at 50 p.s.i., and moves fast at 60 p.s.i. ...More than I hoped for, but still acceptable. The addition of springs should aid in providing sufficient start-up movement at 55 p.s.i. with the prop attached.



I was inspired to experiment with instant tube fittings. (thanks Brent, thanks Frank) These are much easier to use, and they do seem to tidy things up a bit.

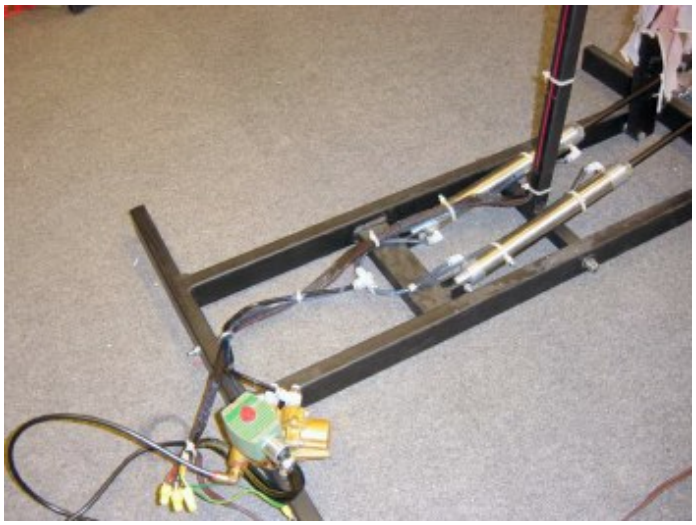
It would make more sense to install flow controls at the cylinder ports, but the design of the LowBoy won't allow for that.

Instead, Flow controls are installed in each of the solenoid valve's ports.

Keeping the tubing lengths to a minimum will help maintain equal line pressure despite this design flaw.

I was also concerned with achieveing proper adjustment between the two cylinders. If the two cylinders are not metered alike in both directions, this would likely put unwanted stress on the machine.

It's time for a paint job and a series of grueling tests.



Here's the LowBoy machine ready for action. All of the wiring and plumbing is permanently installed.

As with the other machines, A switch has been added to the linkage. This will control the effect lights.

Finished Prop Measurements

Retracted / Extended
high ..... 9" / 84"
wide ..... 60" / 60"
deep ..... 64" / 48"

--- Links to push fitting sites of interest, partial list ---
Adams Air and Hydraulics
Nycoil Fittings
Pisco Pneumatic Equipment
Swagelok
Norgren Web Store
(SMC) Z fittings, flow controls
Flowline