Subject: DIY Overhead Hoist **Date:** March 21, 2015
Reference: Welding **Author:** KØZR

Overview

In the summer of 2014 I had a 14' x 18' shed constructed for storage of assorted home yard equipment and tools, and of course, antennas, coaxial cable, etc. In the construction of the shed, I took extra measures to have the occasional, lateral 2x4's extending from left-to-right at ceiling height replaced with 2x6's every sixteen inches so I would have a very strong attic. With a suitably strong attic floor, now steps were needed to get some of the heavy things into the attic. An overhead hoist seemed to be the ticket.

Shed Details

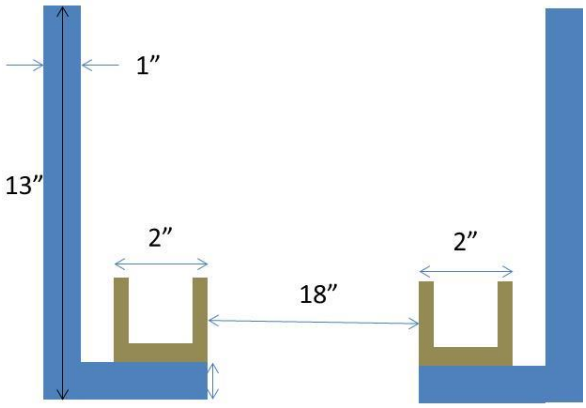
The attic floor consists of two alternating-in-direction layers of chip board on top of the 2x6's. The shed roof is 9-pitch, so the attic floor to the roof's top is 5.25 ft. A few inches are lost due to plywood reinforcement at the junction of the roof trusses; see Figure 1. Approximately 14 ft from the front of the shed, a hole in the ceiling rafters, measuring 32" x 60", allows ready access to the attic from ground level.

In the upper left corner of Figure 1, annotated with an arrow, you see the additional plywood reinforcement for the roof trusses. Each of the "L" brackets nestles along the side of these wood triangles, thus minimizing lateral movement to the left or right; more on that shortly.

Figure 1

Construction of the Winch System

My ultimate goal is to have a winch system which not only hoists a heavy item into the attic, but once at the attic level, also allows movement of the load to the back or front. This requires, in addition to the winch, some type of rail system and moveable assembly which holds the hoist. A little research into commercial rails for such a hoist system quickly shows that such a system suitable for several hundred pounds, and running in sufficient length to allow maneuvering loads once in the attic, could easily exceed $1,000 - $2,000.



The hoist system constructed here is formed from two parallel, ten foot "rails" extending +/- from the hole into the attic. Each rail is made of 2" x 1/8" mild steel channel, reinforced every 16" by "L-shaped" brackets which tie into each roof truss. The brackets are made from 1" x 0.25" steel and welded to form the L-shape.

The primary reason for the 18" dimension is that this is the width of the plywood used to secure the top of each truss. Each 13" bracket nestles along the side of this plywood triangle and in so doing ensures minimal lateral movement from left to right.

Figure 2

Each “L-bracket” is formed by overlapping 13” and 4” length bars, one-inch and welding. Then each is carefully welded to the underneath side of the channel iron, taking extra precautions to keep 90 degree angles where necessary. If you don’t do this, while installing in the attic you will find that you cannot mate the 13” brackets to their respective roof truss.

Figure 3

Figure 3 to the left illustrates the channel iron track and the individual “L” brackets.

A small “car” to hold the winch is welded out of the same 2” channel iron used for the rails, taking every precautions to keep all 90 degree angles as close to 90 degrees as possible. This is easily seen in Figure 3, wherein you are able to see three of the four wheels on the underneath side of the “car”. Obviously, if either the rails or the car is not carefully constructed, the wheels mounted to the little “car” will drag along the sides of the channel, making it more difficult to slide your load back and forth.

Prior to lifting any heavy loads I reinforced my roof trusses. As already seen, in the course of shed construction, each truss was held together at its apex with 3/8 plywood which is pneumatically stapled to the 2 x 6’s. I took the extra precaution to place another six 1 1/8” screws on both sides of this plywood triangle. I believe it is unlikely necessary since I will not be hoisting any single item much over 200 lbs, but I did not want to risk a sinking roof!

Figure 4 shows a close-up of one of the rails and the multiple “L-brackets” holding it in place. Figure 5 shows the small car constructed to hold the winch. Each wheel is conservatively rated at 175 pounds. The principle factor in selecting these wheels was the wheel radius necessary such that the axles would not drag on the edges of the channel iron.

Figure 4

Figure 5 "Car" With Mounted Hoist

Figure 6 Another Picture of Car and Rails

Now on to the next project.

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