Modelling Cane Railways
A C Lynn Zelmer, CaneSIG coordinator

26
Cuban Sugar Cane Loader
CaneSIG: http://www.zelmeroz.com/canesig

A Working 'Choo-Cho' In 1:20.3 Scale by Jim Petropulos

Introduction

My scratch-built working model of a Cuban 'old style' cane loader, or 'Choo-cho', on my Cuban sugar cane railway was built with K & S Brass and is based on various videos and DVDs I collected from people that had filmed there.

This modelling note includes construction details for the pulleys, spreader bar, trolley and frame. A model for indoor use or in a smaller scale might be built using styrene structural shapes rather than brass.

Building the Loader

Having never been to Cuba myself, or found any information on these cane loaders, I drew plans based on 'guesstimating' dimensions from people and cane cars in the video at the loaders.

The simple wood mock-up to determine basic appearance

First I built a simple wood stick mockup to photograph with my cane cars to see if it looked 'right'. Then I laid out K & S brass channel over a pencil drawing on a piece of 3/4 in thick plywood board, and soldered away (drawings pp 9-14).

I still didn't know how I would rig it to actually work. I kept studying the videos to understand how the lines were attached, and which lines did what, made little sketches, and took digital photos off the videos (in pause mode) to obtain the details.

I could not locate any pulleys in scale that were adequate, and besides they had to be brass to hold up well outdoors. So I bought various sizes of brass washers at the hardware store and assembled them onto various diameters of K & S brass tubing. These were then 'sleeved' with the next smaller size diameter of K & S tubing, so they would turn freely. These sleeves were then soldered to U channel mounted where the pulleys would go on the structure (photo below and next page).

Since I didn't have any scale live oxen to operate the loader I had to make some more pulleys to make this a working model. These don't look too bad, even if they aren't prototypical (drawings pp 6-8).

Working pulleys, L to R: Trolley back, load lift, & trolley out.

Three sets were needed. A forward and reverse set for working the trolley, and a third set for lifting and lowering the loading pulleys.

I'm amazed how simple the real loader works—all these moves with what looks like one wheel/drum and a lever shifting rod worked by the operator, and the Oxen for power!

I bought small link brass chain, 20 links to the inch, in 3 ft lengths for the pulley lines. While steel cables are used on the real loaders, I couldn't find suitable flexible 'cable' material in scale and thread was not an option.

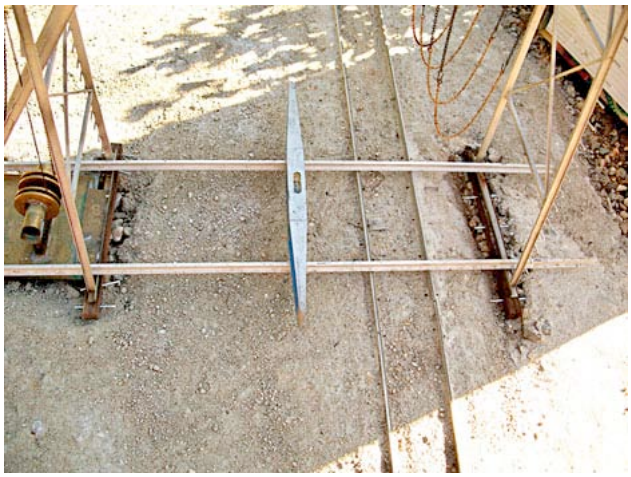
Scalelink.co.uk carries this chain (#SLCH02) in 3 foot lengths, as well as four other link to inch sizes. You can order online, which makes it easy to get, and they ship fast too.

Close up of the scratch-built pulleys and trolley; where unpainted the brass has weathered naturally.

Foundation anchoring detail: the footer plate has two brass screws into 1/2 X 1/2 Redwood strips. The nails were installed to make a 'Rebar' to help anchor the footings. I drilled holes first, then inserted the nails so the wood wouldn't split.

For the trolley wheels I used HOn3 gauge nickel plated wheels. The wheels looked about right size for the trolley, as seen in the videos.

Code 100 rails were soldered to the top of the structure. The hard part here was the gauge, just over 1 inch to fit the width of the top. I had to re-gauge the wheelsets to work for this purpose and ruined several pairs before I succeeded.



Levelling the loader with the rails prior to installation.

Installation and Finishing

When I was satisfied the installation site was level left to right and fore and aft, I poured some cement and

blended it into the rest. (That is all cement, not dirt in the pictures.) I left the screw heads above 'ground' (photo previous page) in case I need to remove the loader for any reason later on, so won't have to dig the loader out at least. It's now been in place since March 2007.

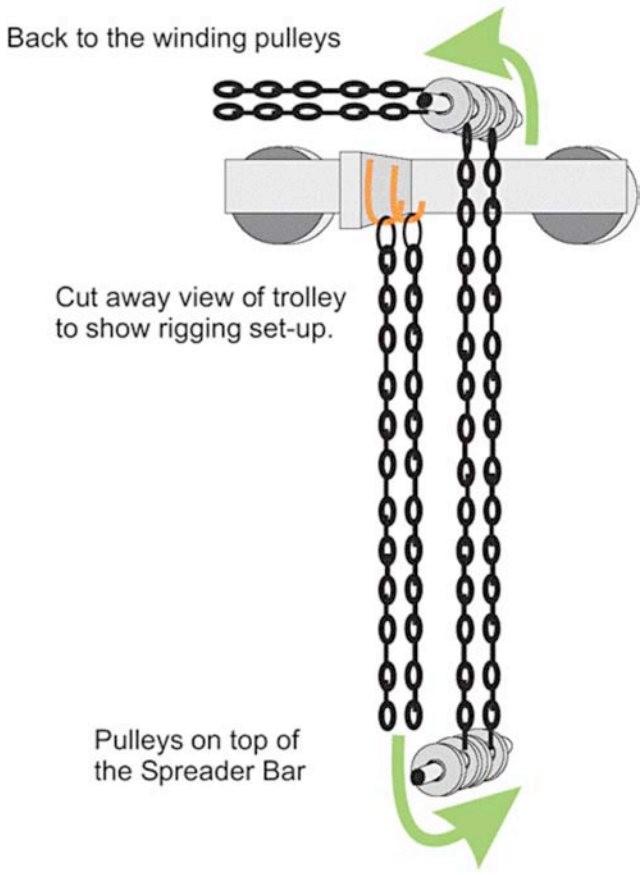
I spray painted the structure a light grey as seen in the video. It has weathered naturally and has even got some rust stains from the chain I first used, which was brass plated steel and rusted through, leaving a nice streaking effect on the top deck. I replaced those original chains with the solid brass chains from Scale Link mentioned above.

This was a fun and challenging project to build. Now I'm ready for the 'Zafra' (harvest) as seen in the loading scene photos below.

Scale details

1:20.3 (15mm - 1') uses Gauge 1 track ('G' Scale or 45mm) to exactly represent 3' gauge on 45mm track. It's an odd measure compared to good old 1:24 and lists in the large scale standards along with 1:22.5, which I believe is the 'correct' scale to use for metre gauge European equipment. There is also a 1:32 designation representing American 'standard' gauge equipment on 45mm track! Confusing? Yes!

I use 1:24 scale model cars and trucks and built my (huge) mill buildings using 1:24 scale. I tell people I'm in 'mixed gauge' since I use 1:24 as well.



Lift chain rigging: Dual sets of pulleys give stability (and strength to the real loader).

Loading begins by lifting the load of wholestick cane off the truck

The trolley is advanced over the waiting cane car…

and the load is released.

Top view details, note rust streaks from first chains used.

Making the Deck Span

To make the deck span (drawing pg 5) I started with two 1/4” X 1/4” K & S angles 13 1/8" long (cut from a 36“ long piece of L angle).

At each end I cut a 1/2” slot into the vortex of the angle then bent down one side of the cut, out of the way to allow the other half to attach the two sets of legs. See drawing next page for details.

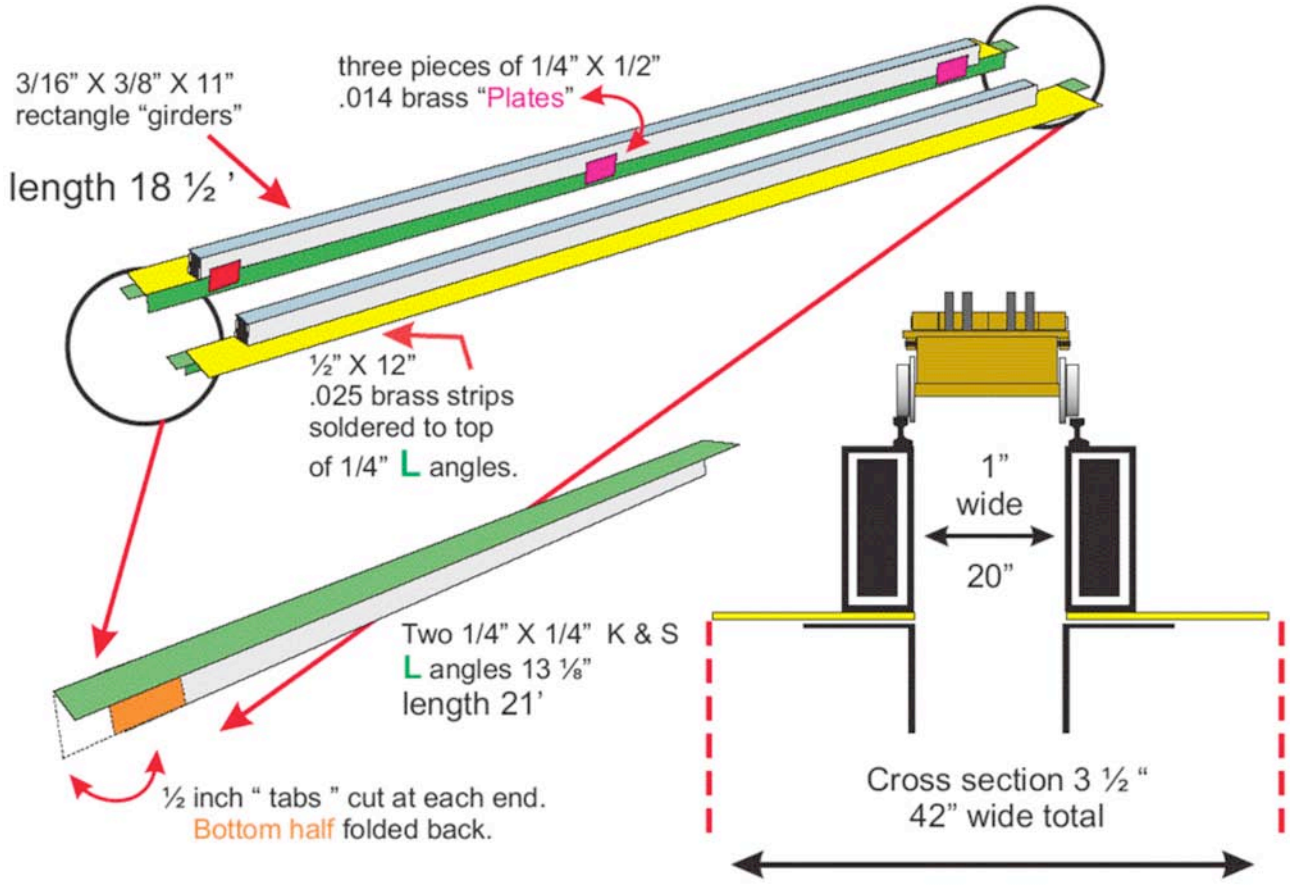
I set the legs up vertically then canted them inward slightly. Taped to wood blocks to hold them in place, I soldered the deck L “girder angles then. This is first step to forming the platform deck for the trolley to pass over.

Next I added 1/2” X 12” .025 brass strip to the top of these angles to make them a little wider and stiffer. (the L angle stock is only .014 and can be bent easily). These are spaced 1 inch apart, approximately 20” in 1:20.3 scale. Adequate enough space for the loading chains to go through.... as far as I could tell.

On top of this deck I placed two 3/16” X 3/8” X 11” rectangles to make the trolley track support beams. These are attached to the inside of the two L girder angles using three .014 1/4" x 1/2" rectangle “Plates” to anchor to the deck. On top of these I placed two code 100 HOn3 rails to a gauge of 20 inches for the trolley to travel over.

Loaded cars soon to be collected for the mill run. The 'Cane' is dried grass, a kind of native Blue Grass that makes long runners if not cut. These runners make decent looking cane. More is growing in the foreground.

Construction details for Jim's cane wagons can be found in **Modelling Cane Railways** #19, *Large Scale Cane Wagons*.



Above: Deck span details

Drag line chain is very fine brass necklace material. 40 links / inch, 18"' long. (Looks like cable and very flexible.)

Drill size I used:
61 - .039

Spreader Bar

Stabilizer Tail 2' 6" long
3/32 wide X .025 brass strip
soldered to bar.

Stabilizer Details

Stabilizer Bar rides up / down in operation.
Note: Some were different then this, the one I modeled. Using a pipe rather then metal bars... Spreader Bars weren't all same "size" ?

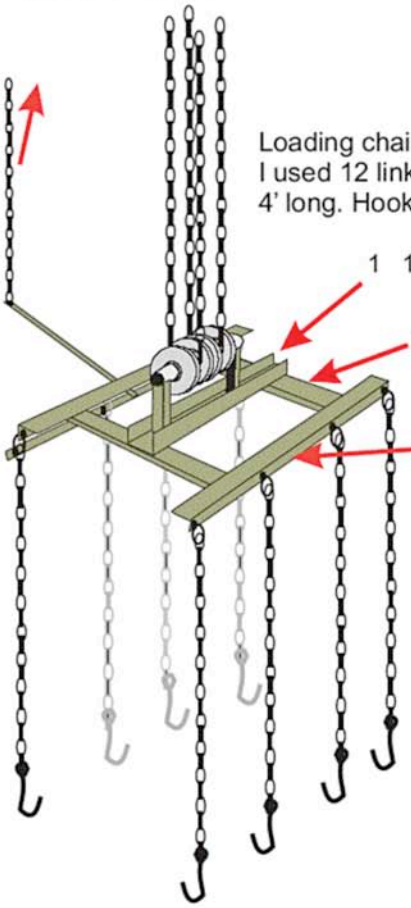
Hooks soldered to spreader bar.

Stabilizer Bar
6' long
3/32 wide X .032 brass strip
flexes up or down on ringed hooks.

'**Ring**' hook detail

Loading chains attach under Stabilizer Bar then ring is closed up.
NOTE: normal for chains on this side to hang down slightly more then on the non-stabilizer bar side.

Loading chains: Spaced 2' apart
I used 12 links / inch chain
4' long. Hooks formed from brass wire.

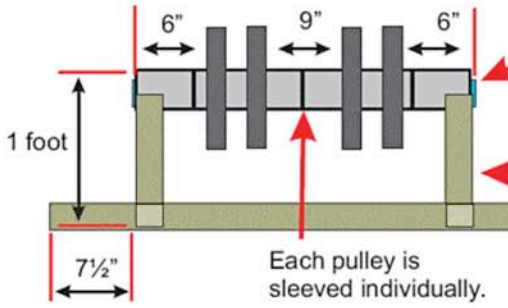


1 1/4 " **U** channel 3' length

2 1/4 " **U** channels 3' length placed up-side down.

2 5/32 " **L** angles 6' long

Pulleys Set-up

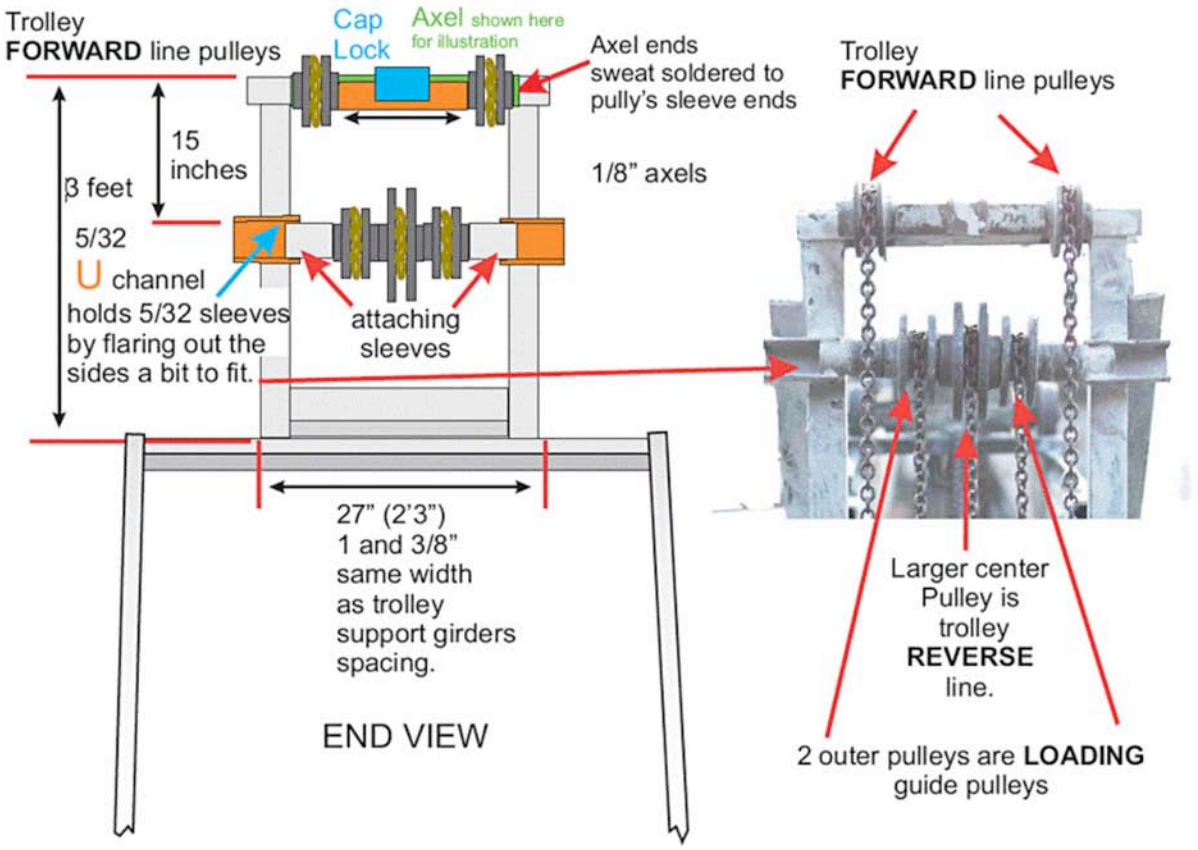


Axel ends (shown here) are sweat-soldered to sleeve pieces to attach to pedestals.

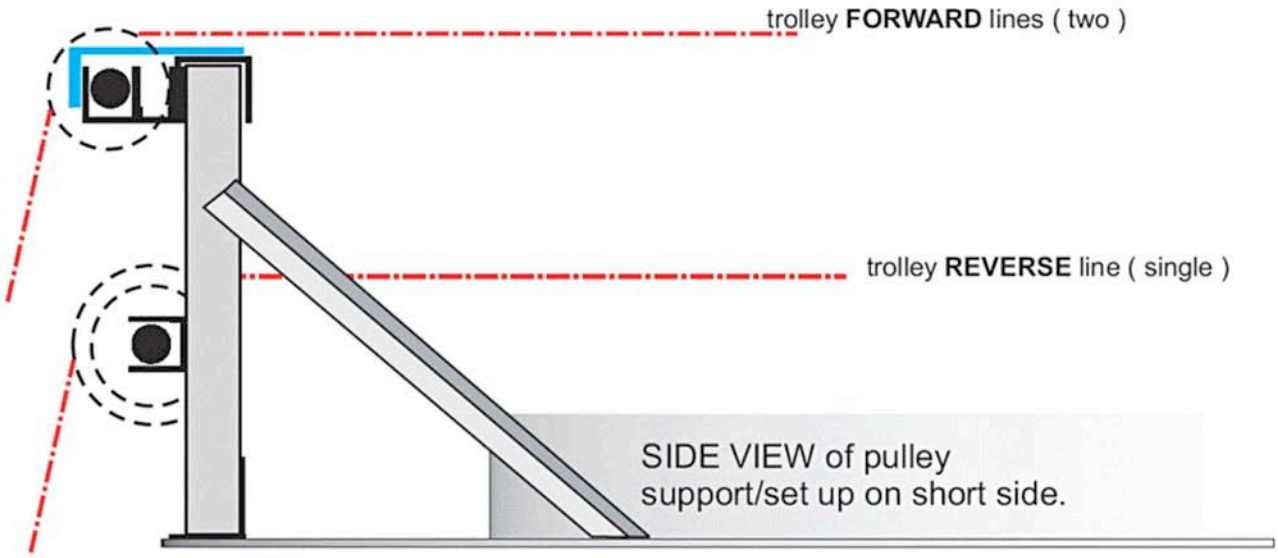
2 3/16 " **U** channels 9" tall Pedestals

Each pulley is sleeved individually.

1/4 U Channel 3' length



Pulleys Set up on short side



Manual Working Pulleys

Made with larger brass washers. to accommodate wrapping the chains.
Also easier to turn with my thumb and finger to operate.
FORWARD is larger washer set. LOAD and REVERSE are same size, smaller washers.

13/32 sleeves.
Axles 9/32 tube
on REV. and
Load washers

REVERSE

LOAD

FORWARD

Saddle made from next largest tube stock cut in half to attach 19/32 axle sleeves. Axle is 1/2"

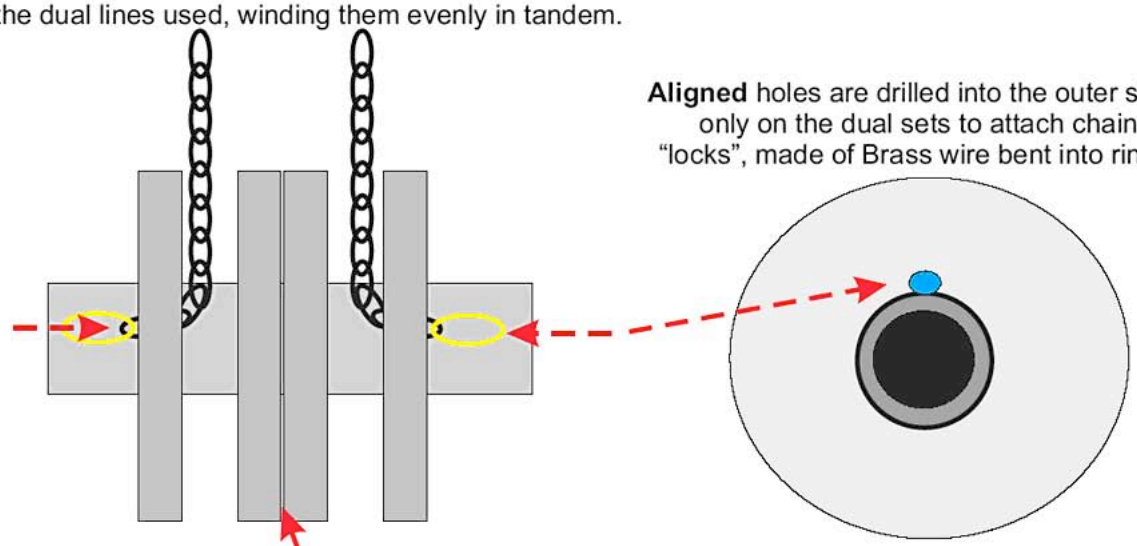
.032 brass
platform soldered
to legs footer made of
1/4" X 1/4" L angle
exaggerated here

1/4" X 1/4"
L angles
for mounting
(see Photo)

1/8"
square tube here

1/32" square tube
used for smaller step up plate to
fit between the legs on the footer

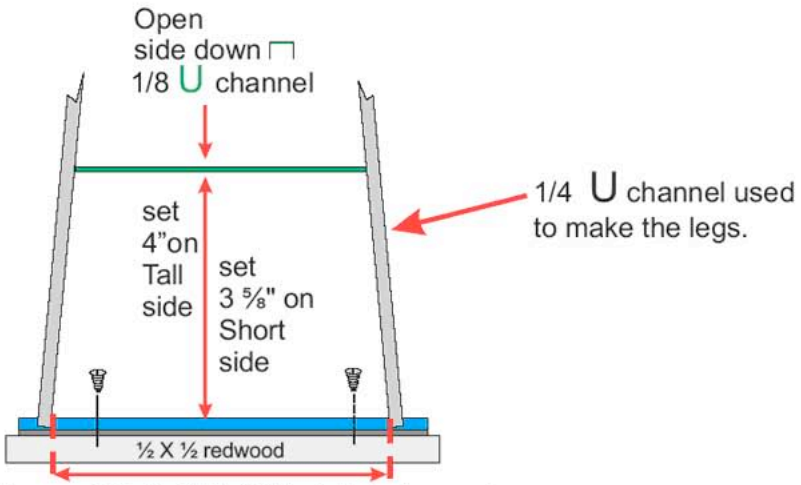
The FORWARD and LOAD pulleys
are double washer sets to accommodate
the dual lines used, winding them evenly in tandem.



Aligned holes are drilled into the outer sides
only on the dual sets to attach chain
"locks", made of Brass wire bent into rings.

LOAD and FORWARD are double
sets, soldered together first
before drilling holes
for better alignment so
both chains wrap evenly.

Frame detail page 1



Base width: is 8.5' (5") width between legs angled them to 3 inches apart (5 feet) at the top.

Used 1/4 L stock for footer plate 5 ½ " screwed to ½ X ½ redwood sub-footer.

Forming the Legs:

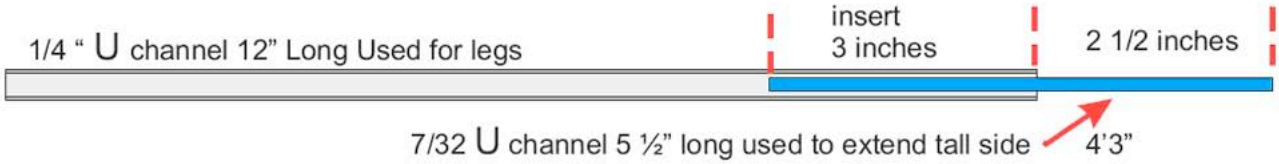
Solder a 7/32 U channel into a 1/4 " U channel. Slip in three inches deep for strength/stiffness. A pair needed to extend the tall side.

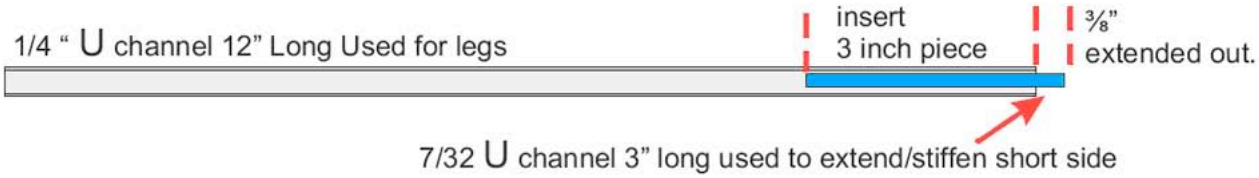
Short side uses a 3" 7/32 U channel to stiffen-and minor extension at top.

I lay ed out the two sets of legs on a piece of 3/4" thick plywood in pencil, and used this to solder each pair to a base of 1/4 inch angle stock used for the footer plate. The legs are angled inward towards each other to a 5' foot width (three inches) distance at the top. ("guesstimating" the actual width as best I could).

Locate and solder 1/8 U channels between the legs next before adding the X braces.

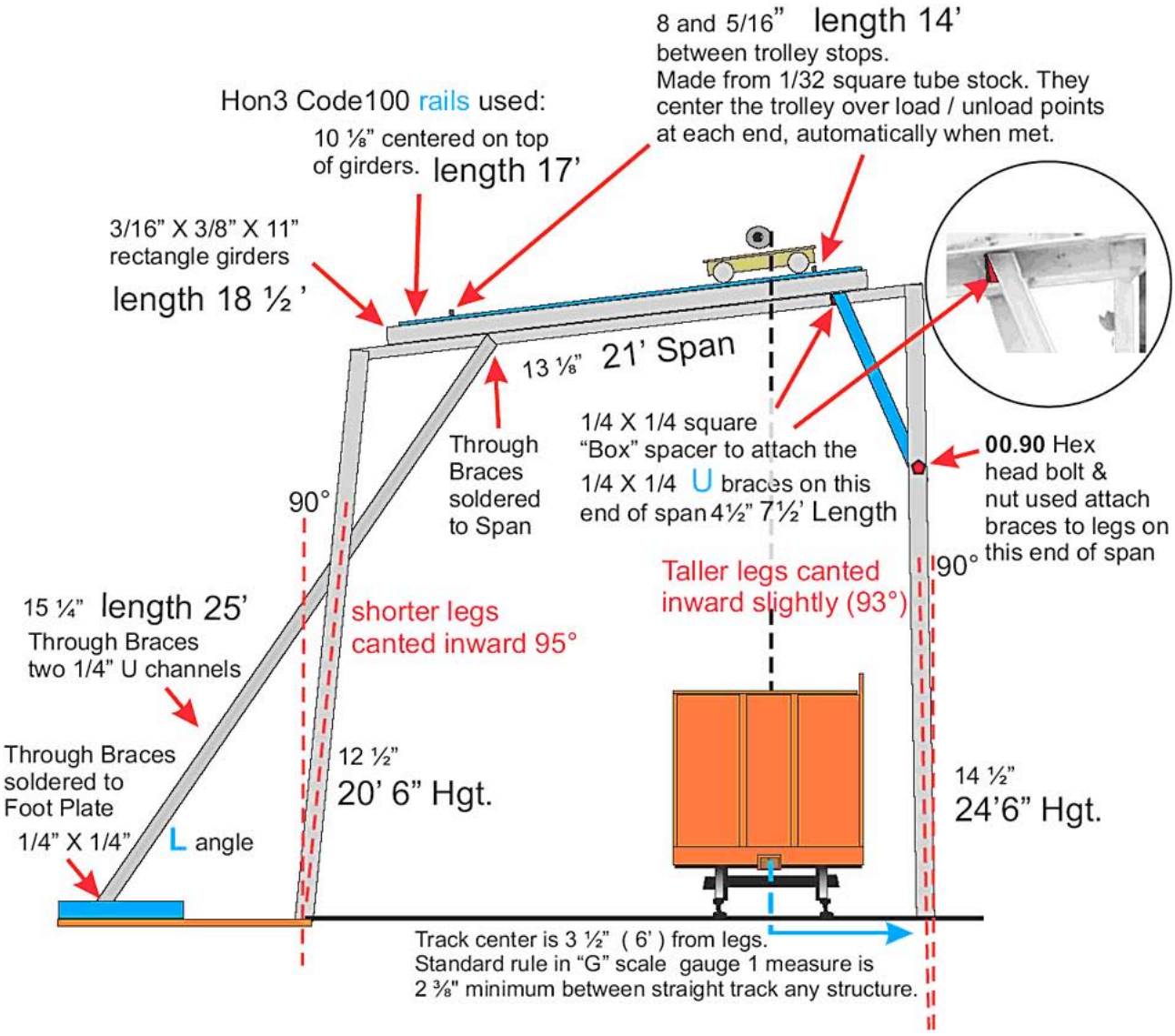
I used code 100 Hon3 rail for the X braces as they looked in my opinion about right for this detail.



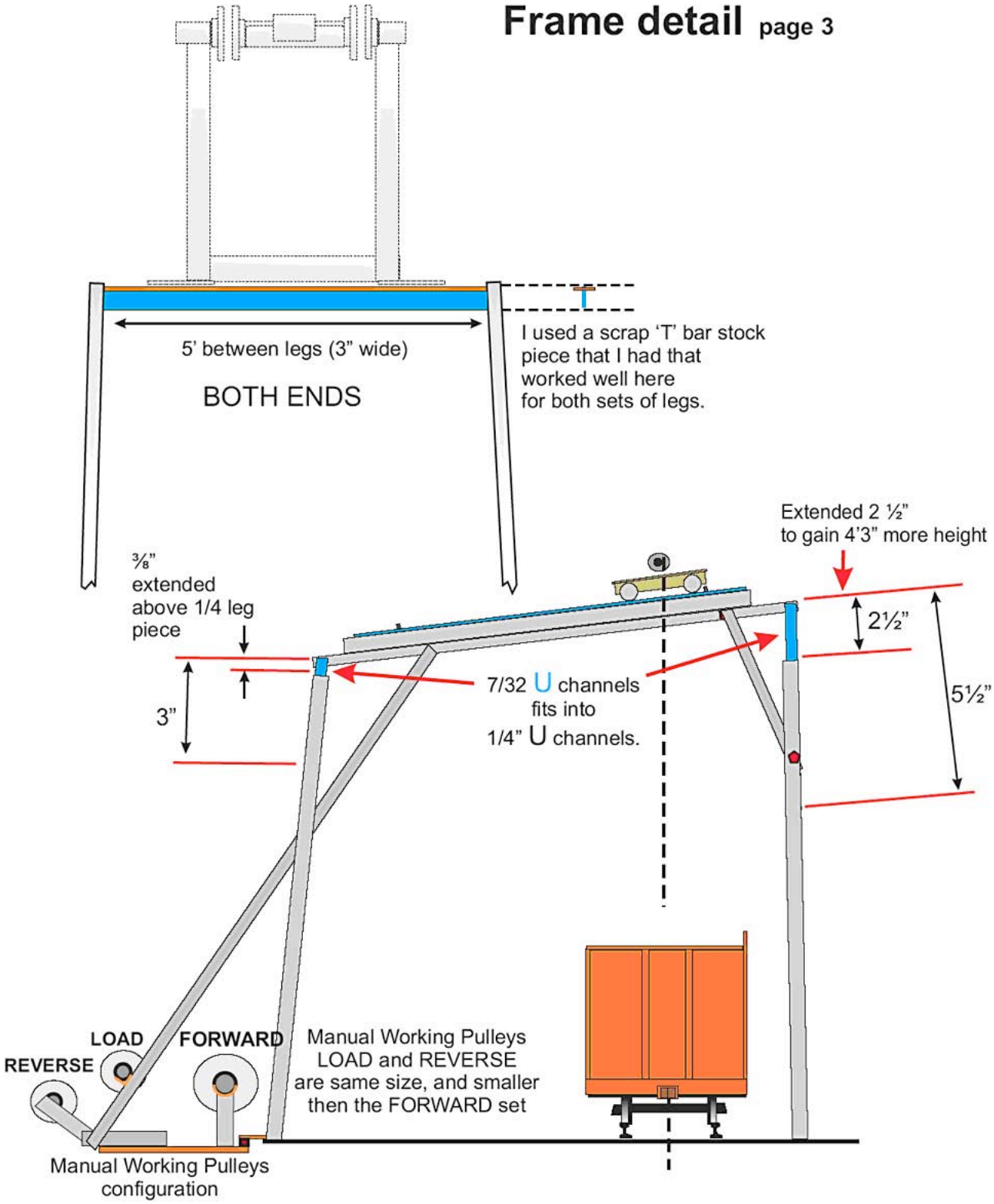


Frame detail page 2

24'.6" height. taller side, 20'6" height. shorter side.
width: 21' span.
Trolley Span support beams: 5' wide.
All pulleys made out of # 6 Brass washers except Trolley reverse pulley was made with # 10 washers.
Washers fitted to 5/32 dia. K & S brass tubing then sleeved into 1/8" brass tubing used for axles.
Sleeved axles fitted into a 5/32 U channels (already attached), by flaring one end out to fit 5/32 dia. tube sleeves.
Brass chain used: (20 Links to the inch) used in leu of actual cables on model.
Legs appeared to be canted inward slightly rather then being 90° vertical. I canted mine to what looked "about right ".



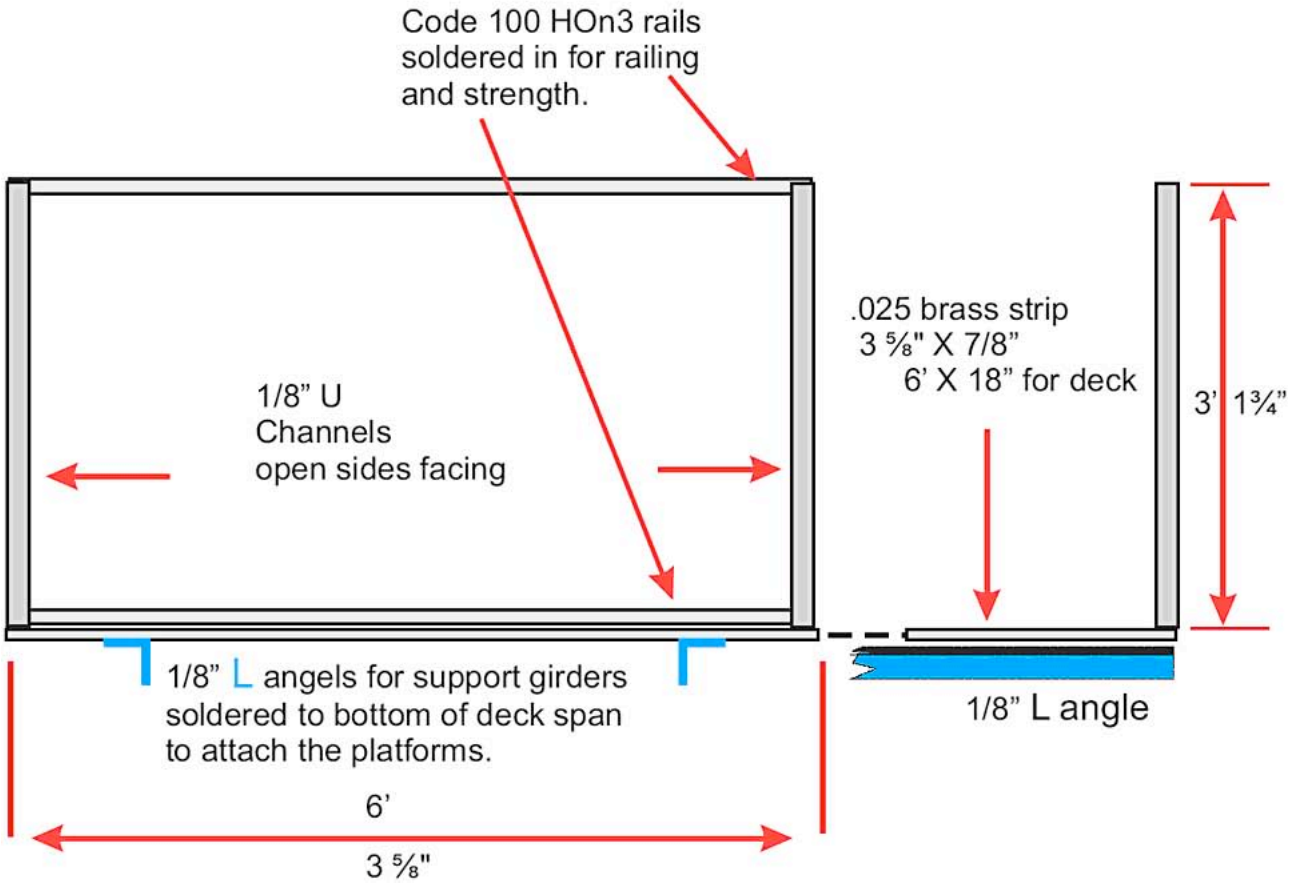
Frame detail page 3



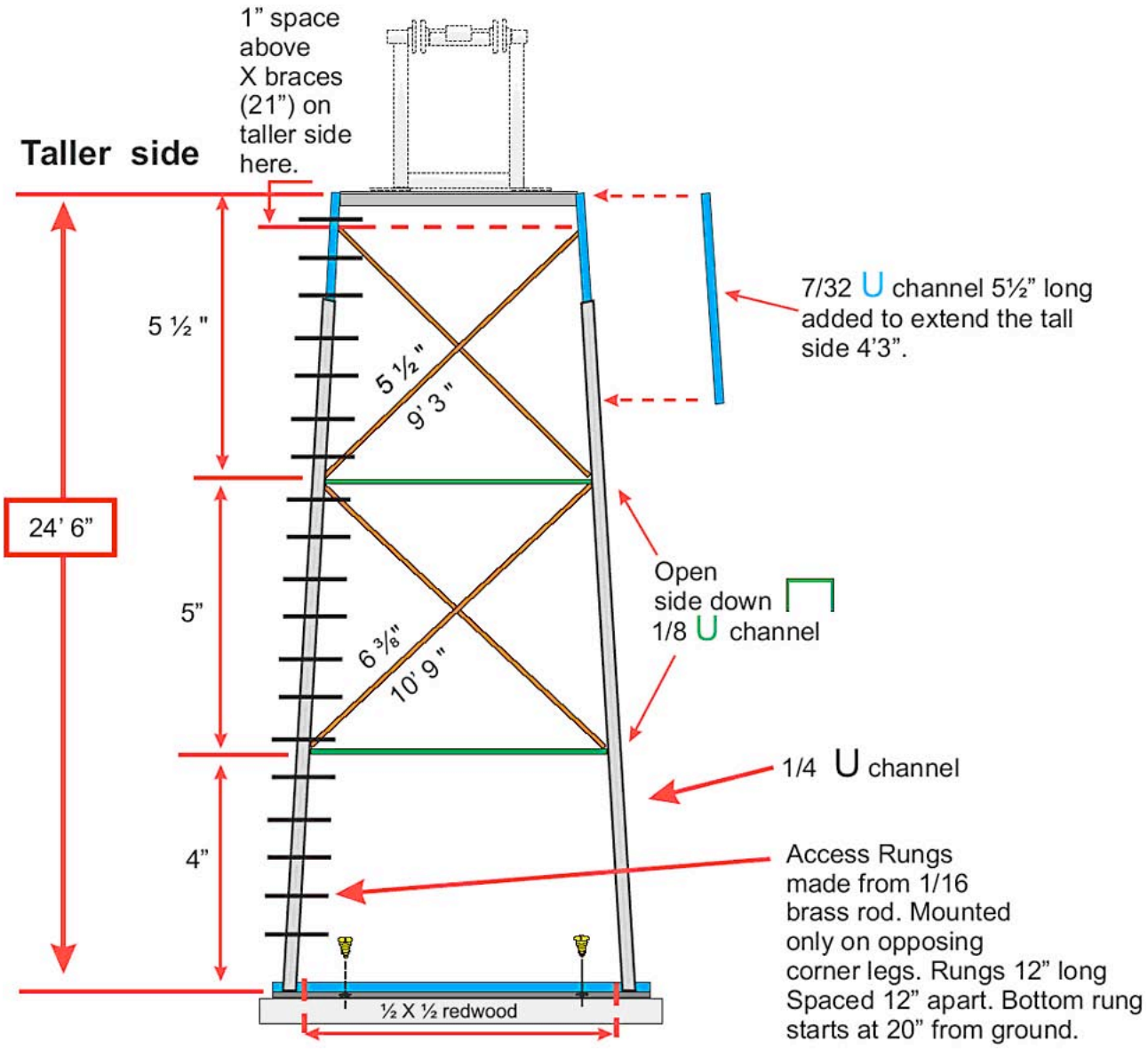
Frame detail page 4

Access Platforms

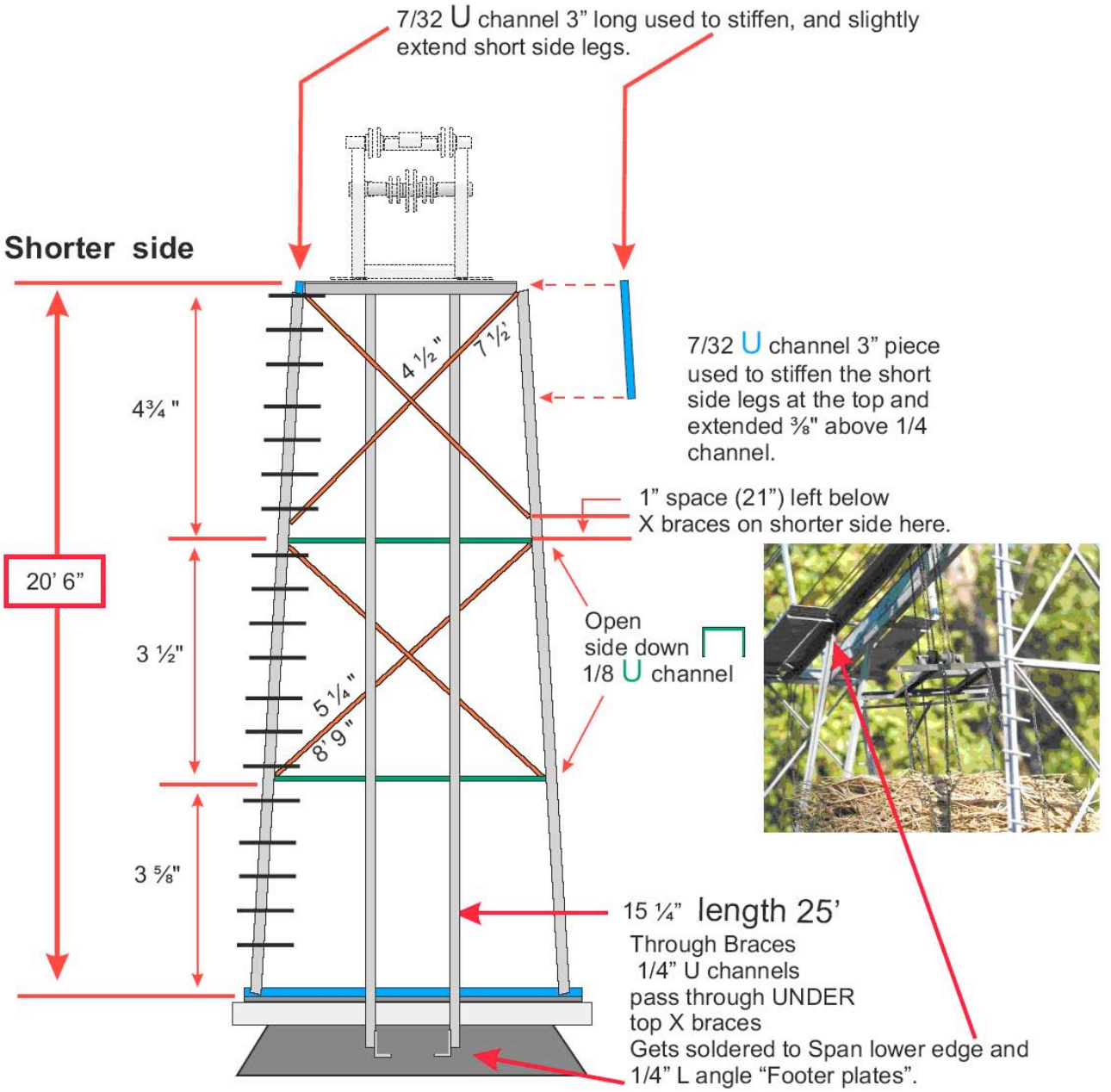
Note: some had short platforms, some were full length of the span.



Frame detail page 5



Frame detail page 6



Editor's Note

Jim's modelling demonstrates what can be done with ingenuity and the use of commercially available resource materials. His drawings use a combination of scale and actual dimensions; conversion to another scale would require a close look at the dimensions of available structural shapes but should otherwise be quite simple.

Similar loaders were/are common in other cane growing countries. The transloader (right), photographed by John Browning in Java during July 2008, only raises/lowers the load, thus the truck must be moved out before rolling a rail truck under the load.