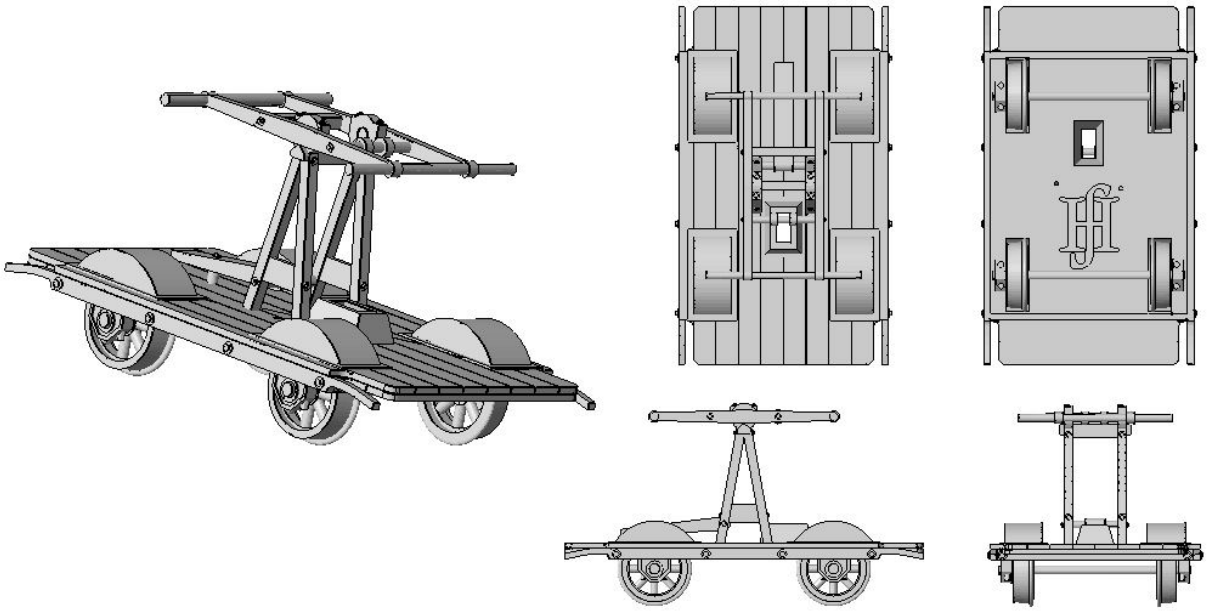
John Hall Design

Carter Bros. South Pacific Coast Railroad Handcar
HOn3 Kit
Assembly Instructions.



These instructions are for the HOn3 kit available at Shapeways.com:
www.shapeways.com/designer/r3feetr/creations

The model is based on the original 1880 Carter Bros. South Pacific Coast Handcar at Wrights. A photo of the handcar can be found here: https://calisphere.org/item/ark:/13030/tf5r29p22m/

After cleaning, the handle oscillates and the wheels revolve. The frame bracing and connector rod are not included. They can be made from 0.015" wire and installed as shown below.

The model is made of an acrylic plastic and is somewhat brittle. Handle with care. Broken pieces can be repaired with CA.

Cleaning the Model.

Prior to the cleaning process GENTLY revolve wheels and oscillate the handle to free up the movement. This will also break up excess wax and allow a better result after cleaning.
The parts received from Shapeways must be cleaned before painting. The printing process uses a wax to support the openings and overhangs of the model. Shapeways runs the model

through a cleaning process that includes a hot oil bath followed by a water and detergent bath. However the models still have a wax and oil residue that needs to be removed prior to painting.

A search of the internet will reveal numerous methods for cleaning Shapeways Frosted Ultra Detail (FUD) plastic. Everyone seems to have their favorite method and favorite solvent for removing the wax and oil residue left over from the initial Shapeways cleaning.

The wax is soluble in oil and melts at a temperature near 165°F (74°C). The plastic begins to soften above 176°F (80°C). I use a complex method of hot vegetable oil in an ultrasonic cleaner followed by hot water and detergent in an ultrasonic cleaner. Using this method I have gotten the best results. However simpler methods work almost as well.

The key to the simpler methods is to first go over the model with a dental pick removing any noticeable wax. Then use one for the following processes that will leave a finish clean enough to paint:

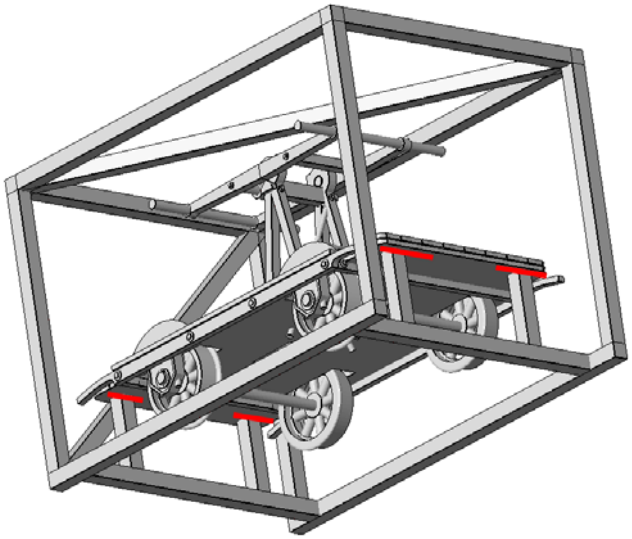
1) Soaking the model in a bath of acetone and gently scrubbing.
or
2) Soaking the model in a hot water/dish detergent bath and gently scrubbing, then rinse.

After using a water method it is essential to get all of the water out of the model. The 3D printing process creates a porous surface which retains water. It will take a long time to air dry. I use an airbrush (just air) to rapidly dry the model. Rapid drying can also be done by a brief bath in acetone.

After drying you will notice two surface textures. One smooth and the other frosted white. The frosted white is where the supporting wax touched the plastic. If the frosted white surface has spots that look damp it probably still has some absorbed oil.

Remove Cage

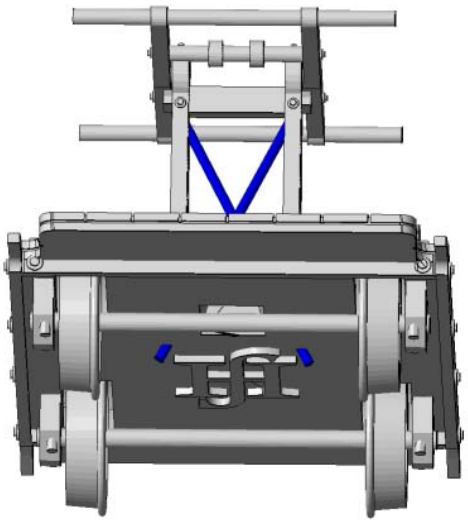
The cage is included to protect the handcar from damage during shipment and cleaning. After cleaning it should be removed. Using small flush cut nippers cut at the four connections shown below in red.

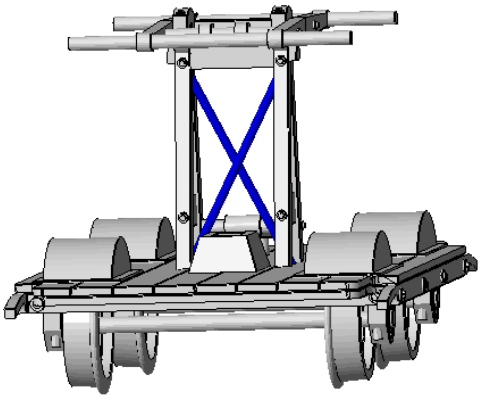


Assembly

Frame Braces

Add two pieces of 0.015" or smaller wire (not included) through the holes in the floor and up to the holes in the frame just below the crossbar as shown in blue in the image below. Secure with CA. Cut excess wire flush with the bottom of the handcar floor.





Connector Rod

Add a piece of 0.015" or smaller wire (not included) to represent the connector rod between the handle and wheel gearing (not modeled). Bend the wire to fit over the handle crossbar. Drop the wire over the handle crossbar between the two ridges and through the opening in the floor. Squeeze the loop closed around the crossbar. See images below. Lower the handle on the connector rod side and clip the wire almost flush with the handcar floor bottom. It needs to be

long enough so that when the handle is push down on the side opposite the connector rod the rod does not come out of the hole in the floor.