DIORAMA JOURNAL

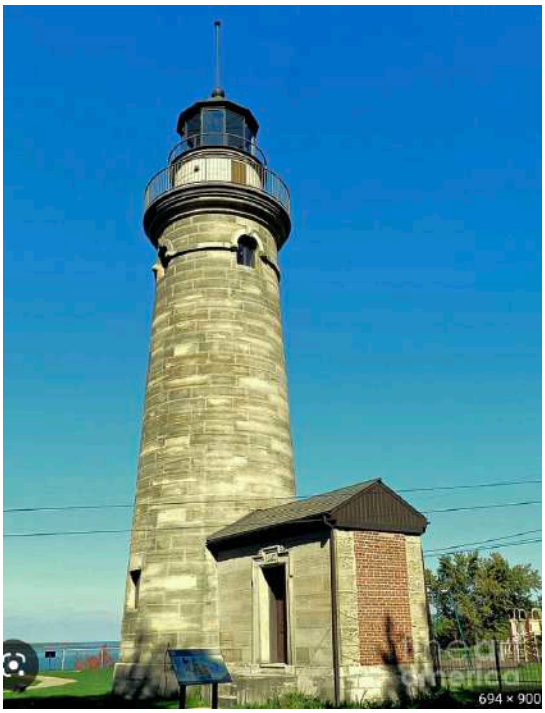
ERIE LAND LIGHTHOUSE

TOWER AND KEEPER'S RESIDENCE

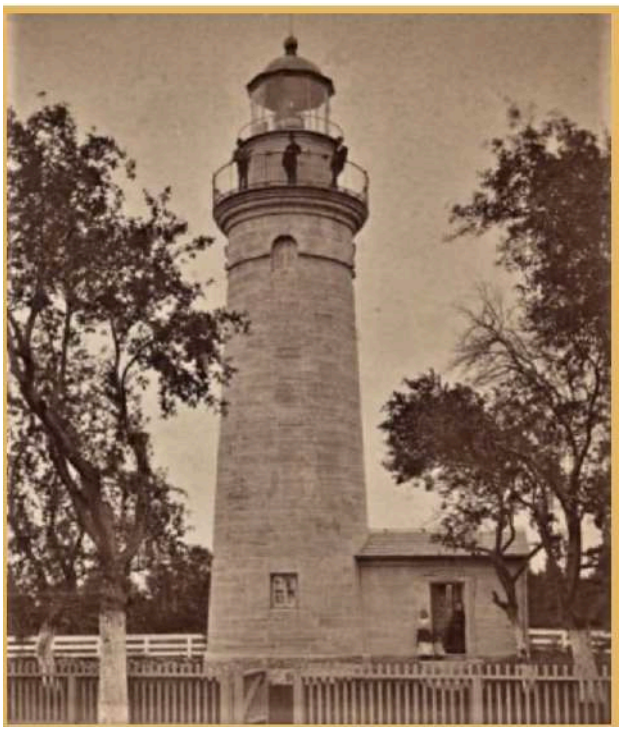
December 2023

Background:

The diorama is built to 1:87 scale and features the lighthouse tower with attached workroom/oil room and the lighthouse keeper's dwelling. The lighthouse tower with attached workroom/oil room is modeled as the current 2022 structure as originally constructed in 1867. The keeper's residence is modeled circa 1885.



Current tower structure

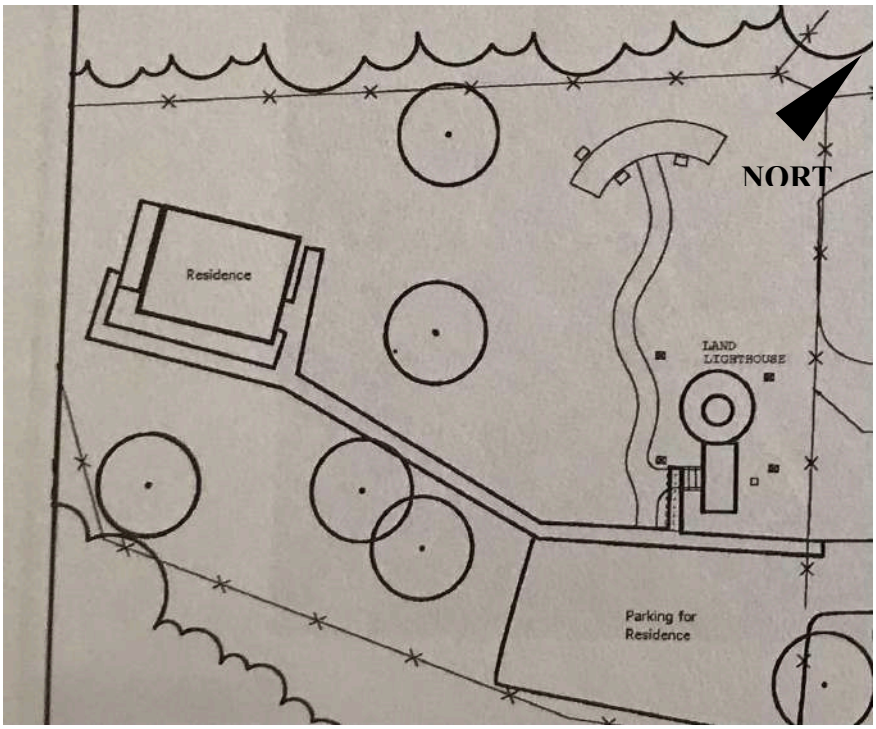


circa 1885

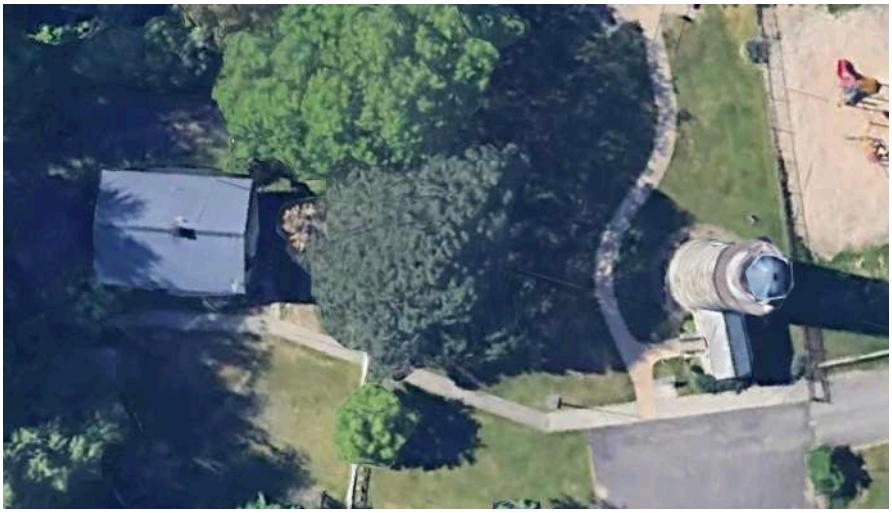
Keeper's residence circa 1885

circa 1885

Placement of the tower and keeper's residence in the diorama is circa 1885. Location of the tower and keeper's residence has not changed since 1885.



August 2007 drawing by Dahlkemper Landscaping



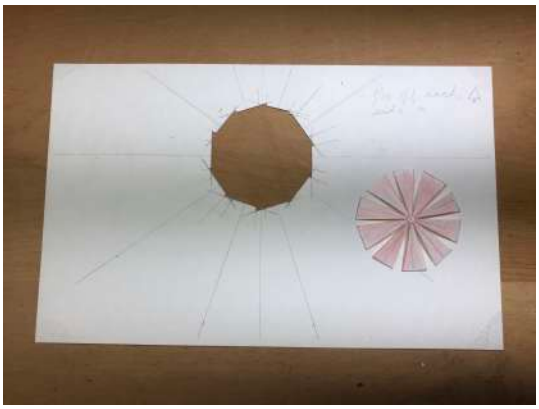
Google Earth view December 2023

TOWER

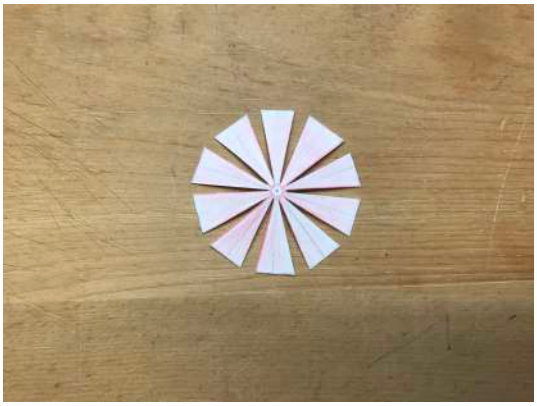
Lantern Dome

The actual lantern has a decagon dome. Template of triangular sections of a decagon cut from card stock is shown in the picture below. The triangular decagon sections are cut from 0.015 inch thick polystyrene as shown in the picture on the right below.

Each triangular section is formed to the wood dome template and bonded.

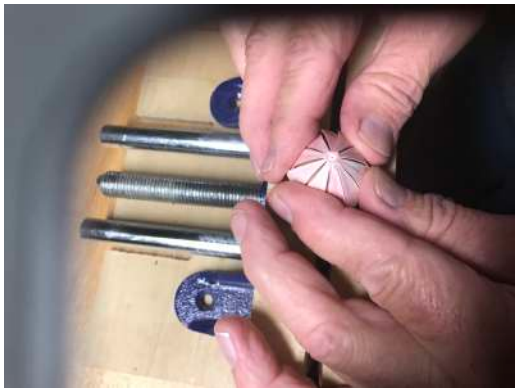


Decagon triangular template cut from card stock



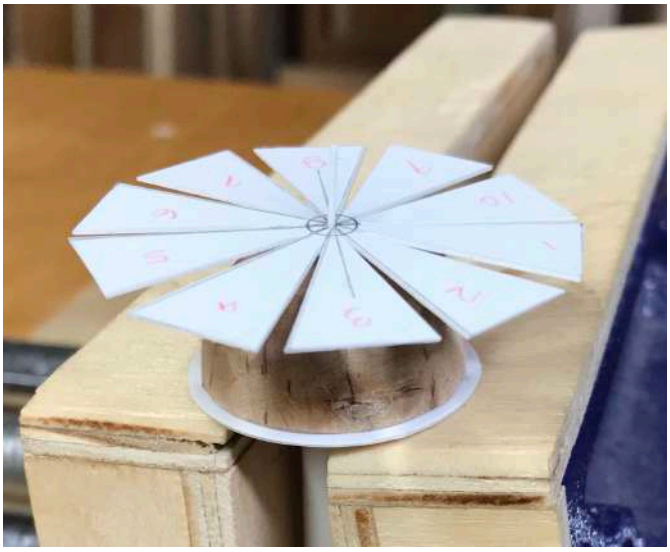
Decagon triangular template cut from card stock

Wood dome templates



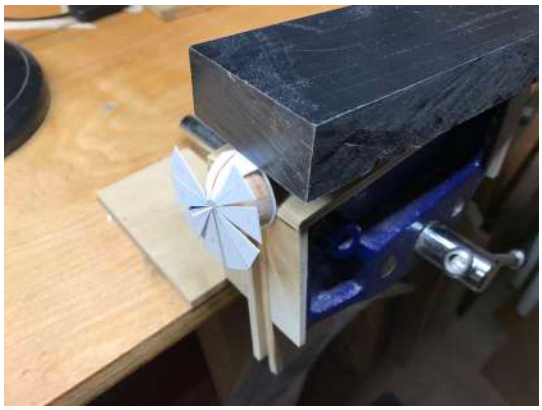
Test fit of the decagon card stock triangular sections on the dome

To achieve a contour to match the actual restoration dome by Fiske & Sons, a .02 inch polystyrene disc with a diameter 0.125 inch larger than the wood dome template was bonded to the bottom of the dome wood template as shown in the picture below. A polystyrene rod was bonded to the bottom of the dome for clamping in the vice.

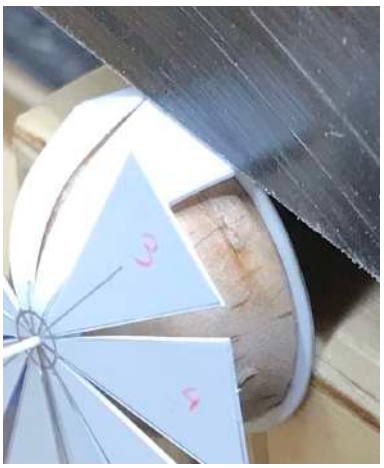


Decagon triangular sections formed and bonded to the wood dome template is shown below.

Triangular section bonded to disc on bottom of dome template creates a slight flair out which matches the actual lantern dome roof.



Weight used to hold triangular section down while glue cured

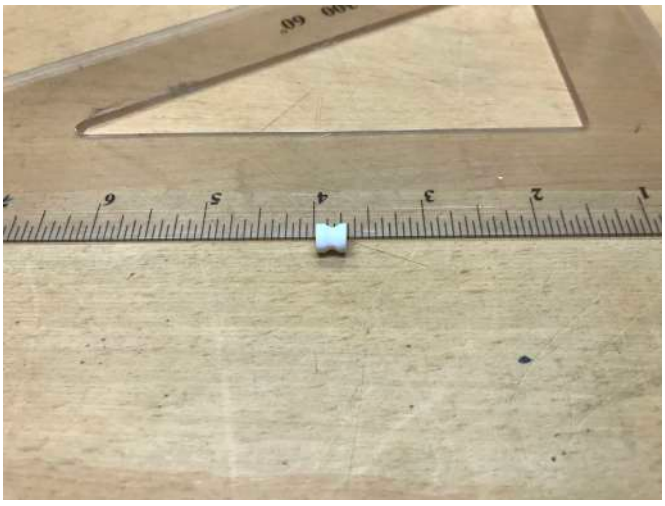


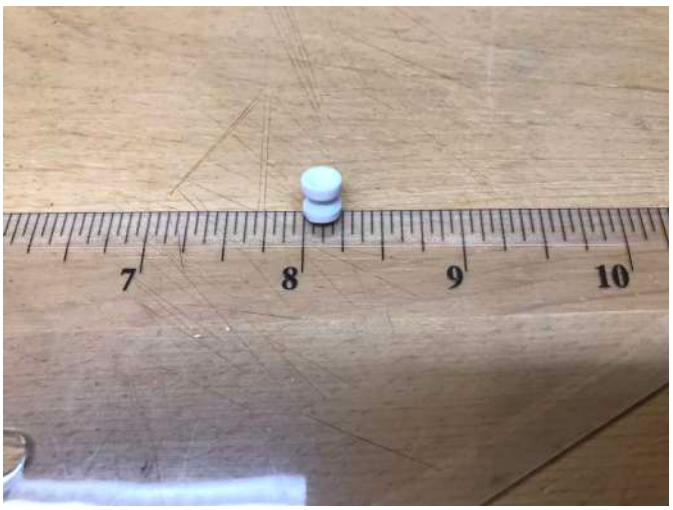
Triangular section bonded to disc on bottom of dome

A ventilator ball and lightning rod are mounted on top of the actual lantern dome as shown in the picture to the right.

The diorama ventilator ball support is made from 0.25 inch diameter polystyrene rod turned to a contour shape similar to the actual ventilator ball support. A drill press and miniature file were used to create contour shape.

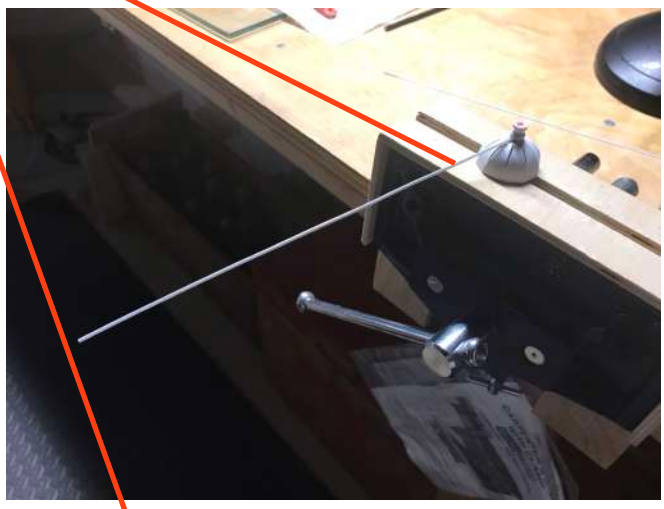
Finished ventilator ball support is shown below.



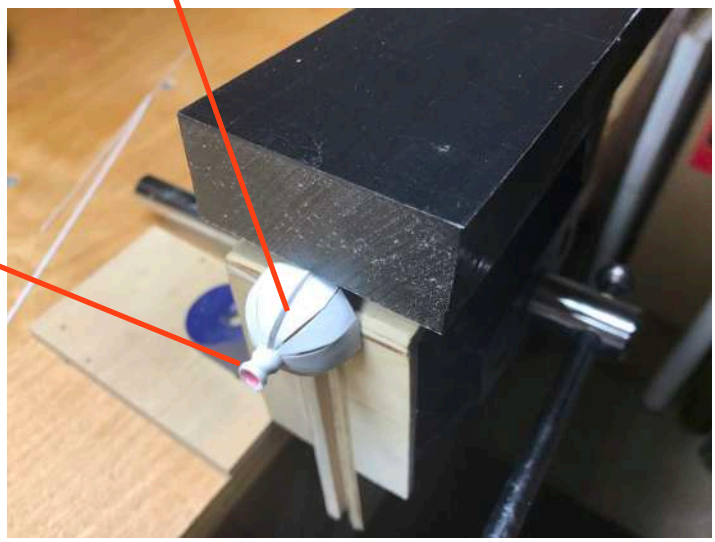


Polystyrene angle 3/64 inch x 3/64 inch is used as a decagon triangular section joiner. The angle is first bonded to the ventilator ball support as shown below in the picture on left. After the bond has cured, the angle is wrapped over the dome and bonded.

decagon section joiners



ventilator ball support



Weight (black) used to hold decagon web joiners in place during bonding

Completed Lantern Dome Assembly

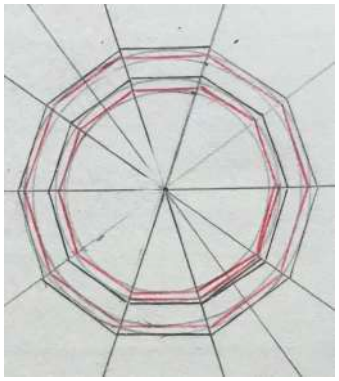
Completed lantern dome assembly

Lantern Assembly

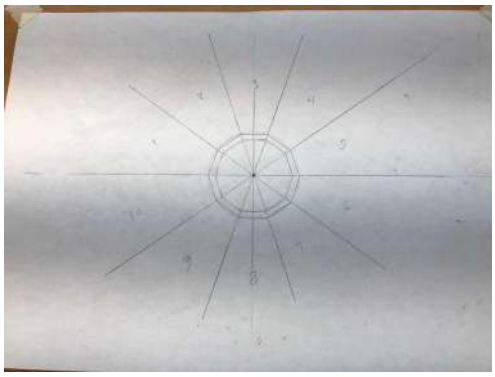
Polystyrene Clear Panel Assembly Decagon Top Frame

The clear panel assembly in the actual tower lantern assembly is made from glass. Clear polystyrene is used to make the clear panels for the diorama lantern assembly.

The decagon layout template shown below on the left was used to shape the top frame and roof of the lantern. The inside decagon is for the top frame; the outer decagon is for the lantern interior roof.

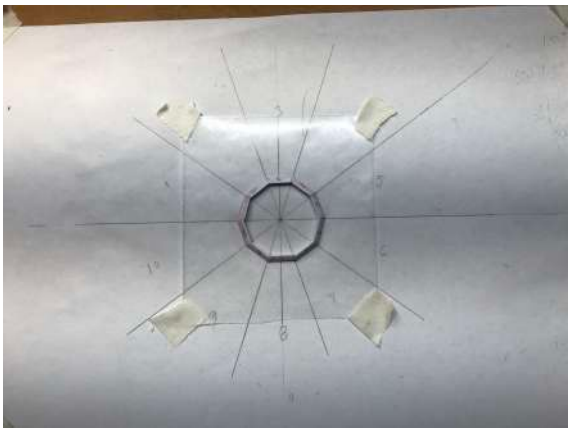


Decagon template

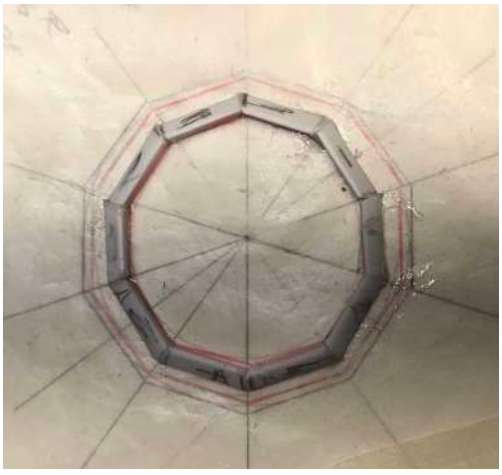


Decagon template for frame

The following pictures show how the decagon template was used to assemble the top frame. Polystyrene cove molding pieces were cut and sanded to fit the template.



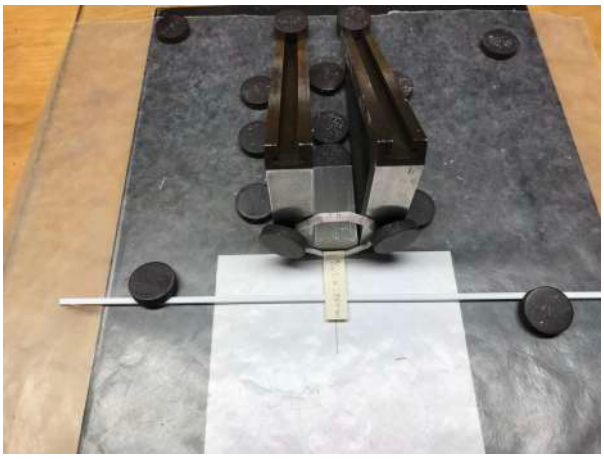
Top frame for polystyrene clear panel assembly

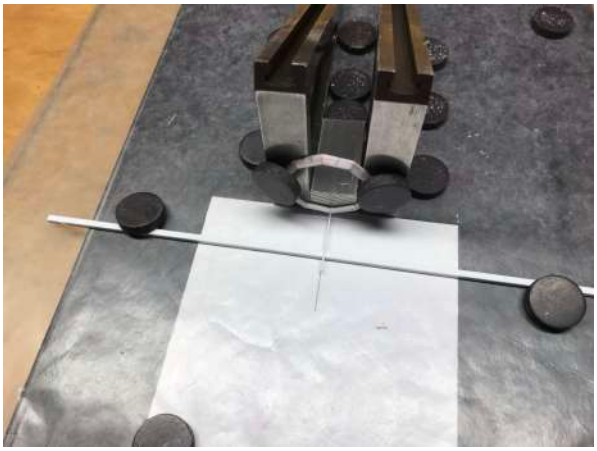


Top frame for polystyrene clear panel assembly in relation to roof decagon profile

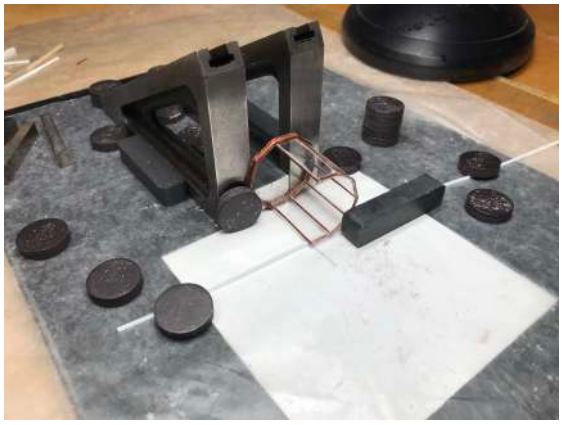
Lantern Glass Panel Assembly

A special jig with magnets as shown below was used to position and hold the decagon top frame in a vertical orientation. Vertical orientation made it easier to install the rods and glass panels.



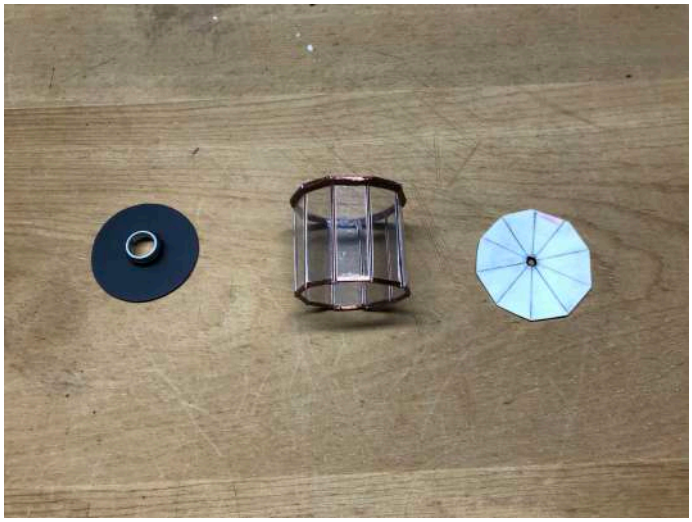


The same jig used above was also used to hold the decagon top frame as the rods and glass panels were bonded in place.



Lantern Assembly

Picture below shows the three components of the lantern glass assembly. The lines on the roof plate represent the stabilizer rods of the actual lantern glass assembly shown in the bottom picture.

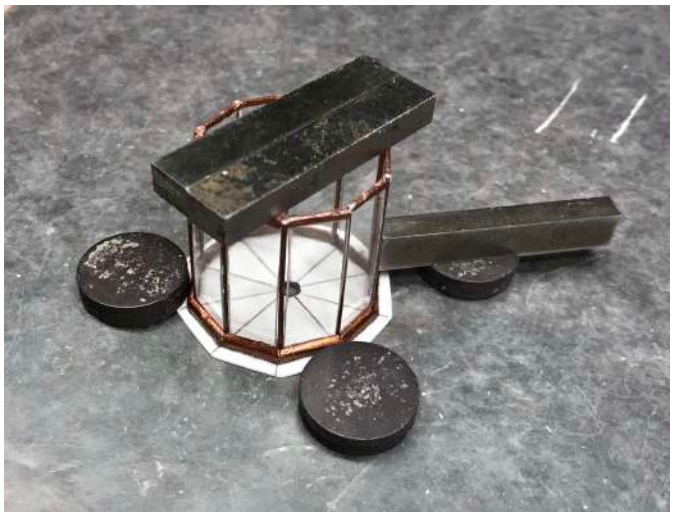


Lantern glass assembly components: roof plate on right & bottom plate on left

View of actual lantern roof plate looking up at the stabilizer bars

The base plate center hole slides over the beacon support tube which allows the complete lantern and dome assembly to be removed for access to the beacon and then easily replaced. The pencil lines represent stabilizer bars installed in the actual lantern shown in the picture below on the right.

Picture on the left below shows the completed lantern glass panel assembly, base plate and dome bottom plate.



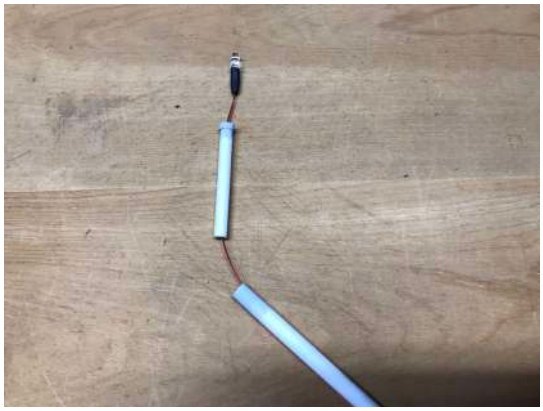
Lantern roof plate bonded to lantern glass panel assembly

Glass panel/dome bottom plate and dome prior to assembly

Lantern assembly

Lantern Beacon Assembly

Picture below on the left shows the lantern beacon (a white light LED), beacon support tube with bonded stop collar and wire pathway tube. The beacon slides into the support tube which slides into the wire pathway tube until the stop collar contacts the wire pathway tube as shown in the picture on the right.



A 0.25 inch diameter bead taken from a necklace shown in the following picture on the left is used as the ventilator ball. A stick pin trimmed to length and bonded to the ventilator ball is used as the lightning rod. A combination square shown below in the picture on the right was used for vertical alignment of the stick pin while the bonding adhesive cured.

¼ inch diameter bead from necklace used as ventilator ball

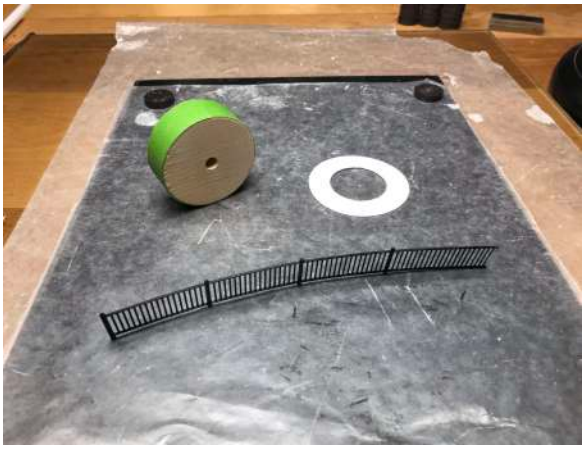
Bonding lightning rod to ventilator ball

Fit check of the beacon in the lantern, ventilator ball and lightning rod before the lantern and dome are cleaned and painted. Purpose of the fit check is to verify correct vertical placement of the beacon in the lantern at the horizontal centerline of the glass panels, as well as fit of the ventilator ball and lightening rod.

Completed dome assembly is a very close representation of the actual dome on the tower.

Lantern Lower Railing

Construction of lower railing shown below.



Lantern lower section railing, circular template form and base plate (white)

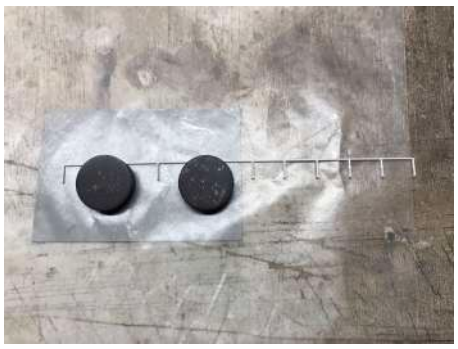
Fence wrapped around template for bonding

Rubber bands holding fence during bonding

Completed fence, painted and bonded to base plate

Lantern Upper Railing

Construction of upper railing shown below.



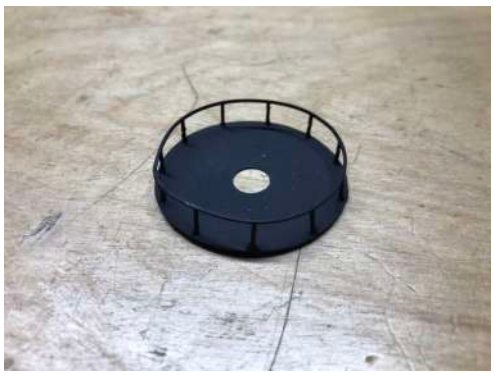
Railing Assembly

First post bonded to base plate

Second post bonded to base plate

Template modified to full circle for 360 deg positioning of rail for bonding

Full circle railing completed



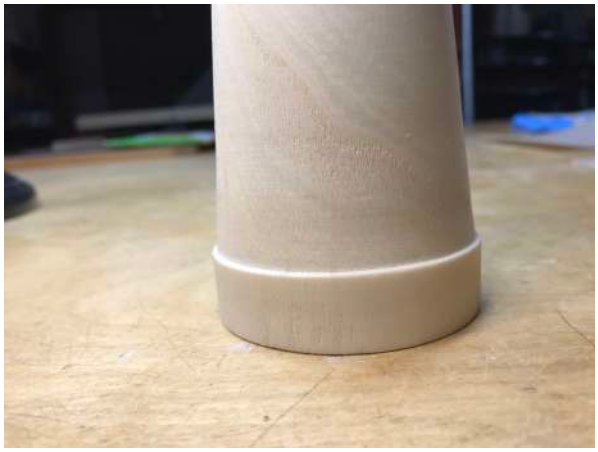
Finished painted railing bonded to lantern base plate

Tower

Diorama tower was turned out of beech tree wood harvested from Presque Isle State Park. The wood turning was done by Lorin Blakeslee.

Base of the actual Land Lighthouse Tower is tapered. Base of the wood turning shown below is straight so I made a wood band to wrap around the base then machined a taper contour to the base to match the actual tower.

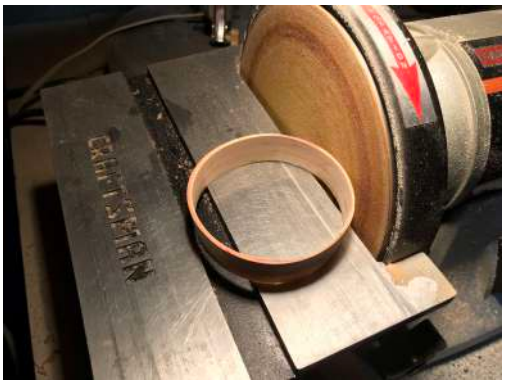
Wood turning by Lorin Blakeslee



Straight base

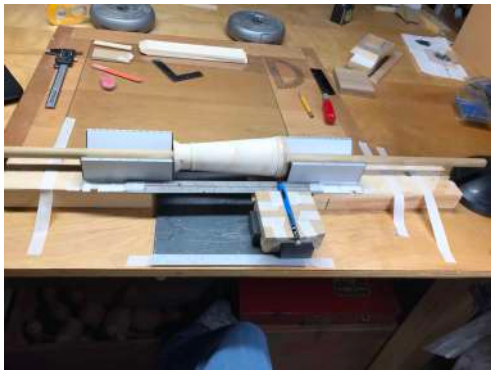
Form used to shape circular band

Bonding tapered ring after removal from form

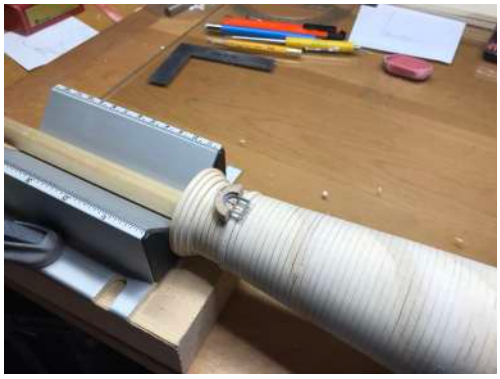


Grinding taper onto straight band

Tapered band bonded to tower base



Jig used to mark the circular grout lines



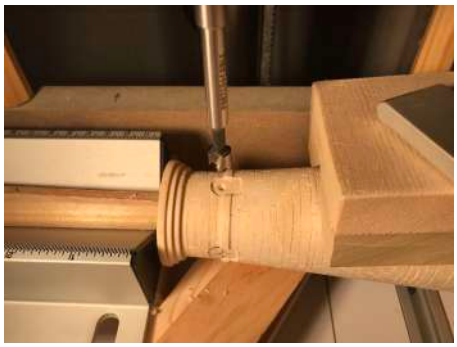
Grout lines marked and window layout marked. Special jig made to locate window round top feature

Fine tooth Zona saw used to cut grout lines

Tower rotated by hand while cutting grout lines

Small hammer and small screwdriver used to cut vertical grout lines

Drill press with Forstner bit used to cut window round top feature

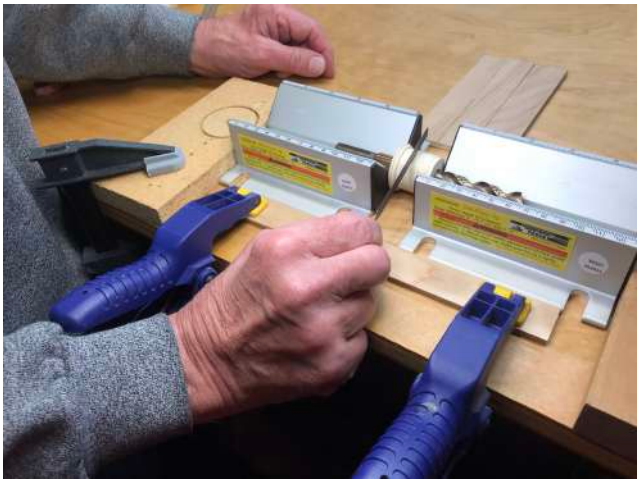


Window round top feature cut in. Hammer & small chisel used cut rectangular section of window

Round top window profile cut out

Window installation fit check

Jig to mark circular grout lines

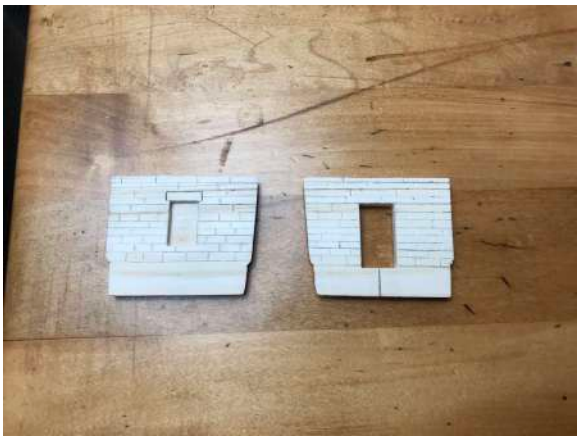


Ultra fine fine file used to cut circular grout lines

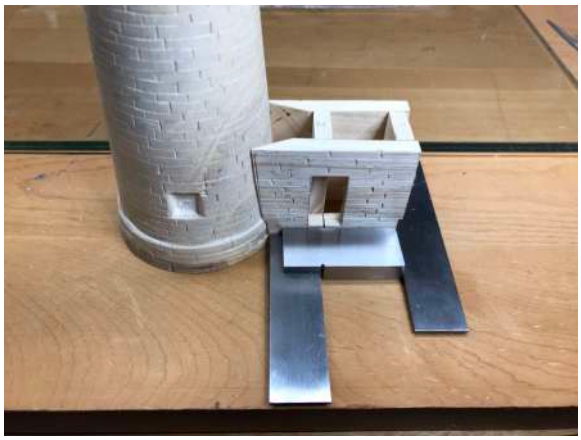
Small screwdriver used to cut vertical grout lines

Tower Oil Room/Work Room Walls

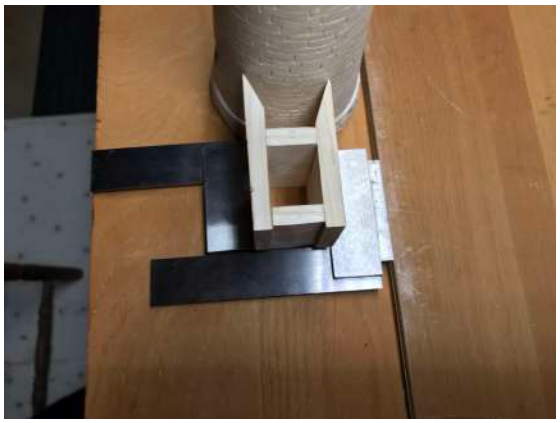
Beech wood harvested from Presque Isle State Park is used to make the Tower Oil Room / Work Room. This is the same species of wood used for the tower.



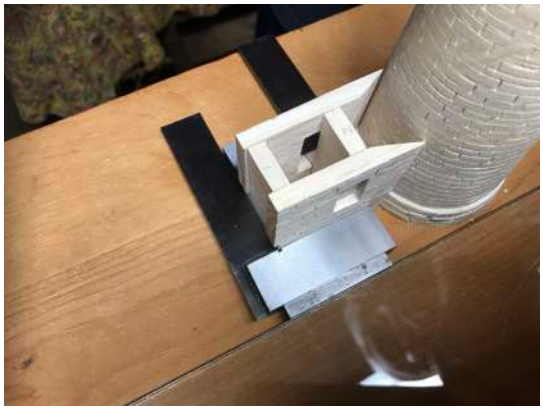
Wall panels



Wall panel fit check with Tower



Fit check with Tower



Fit check with Tower

Tower Oil Room/Work Room Roof

Beech wood harvested from Presque Isle State Park is used to make the Tower Oil Room / Work Room roof. This is the same species of wood used for the Tower and Tower Oil Room / Work Room walls.

Profile gage used to obtain contour shape of Tower where roof will fit on

Template to cut roof contour to fit Tower

Roof contour was hand cut and sanded to fit Tower contour

Roof profile fit check

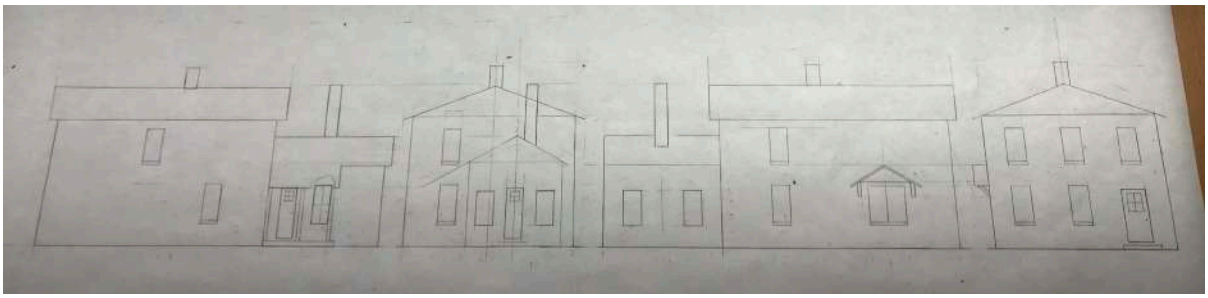
Roof profile fit check

Roof profile fit check

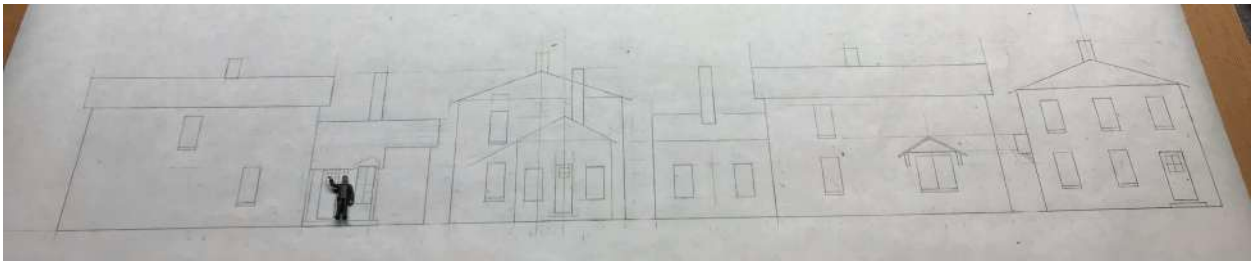
Keeper's Residence Design Layout

Keeper's residence design is circa 1885. Proportional measurements based on an 1885 picture of the Keeper's residence were used to scale the building structure.

A 1:87 scale layout shown below was drawn to measurements and size relationships of the structure where appropriate. A 1:87 scale figure shown on the layout was used to help confirm structure feature measurements.



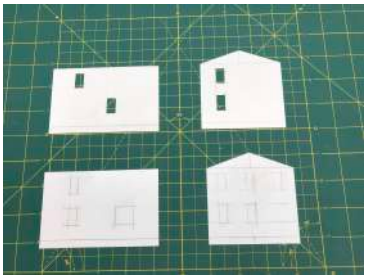
1:87 scale sketch … small roof over window was an option not used



1:87 scale figure added for verification of size relationship

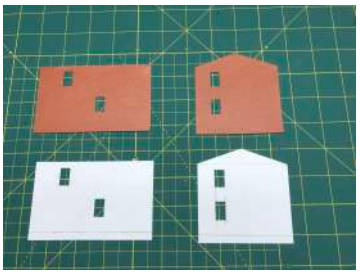
Keeper's Residence Construction

White polystyrene is used for the structural walls. Brick red patterned polystyrene is used for exterior finish of the walls.

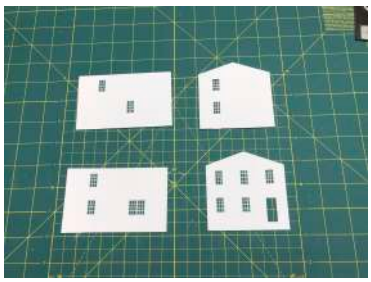


Window rough openings

Windows painted prior to installation



Walls with window rough openings



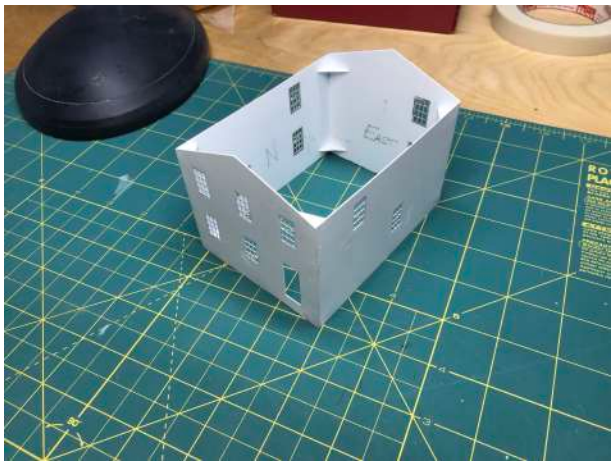
Windows installed

Keeper's residence wall assembly

Right angle jig to hold wall perpendicular while bonding

Right angle jig to hold wall perpendicular while bonding

Right angle jig to hold wall perpendicular while bonding



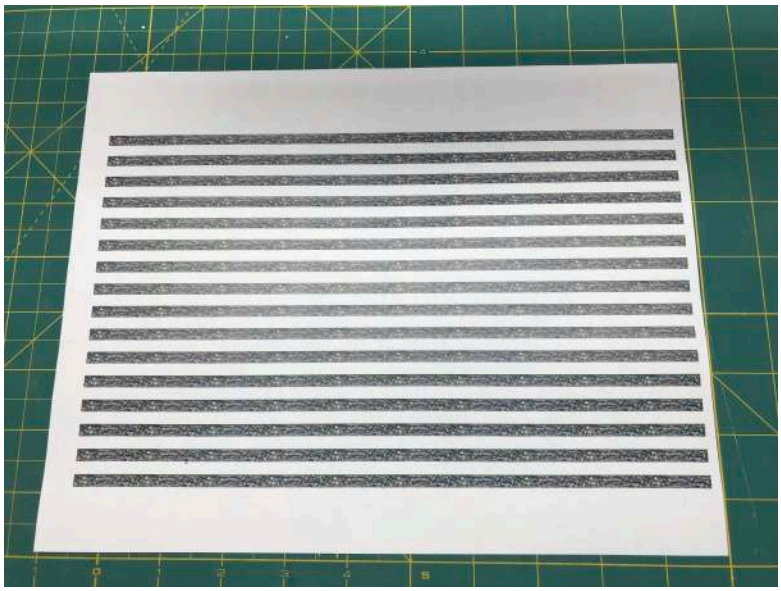
Completed wall assembly

Foundation

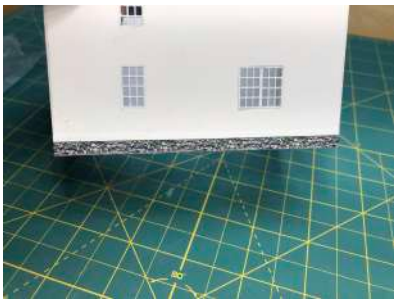
Short pieces of polystyrene were bonded to the inside bottom of each wall to create the foundation.

Caption

Stone wall pattern paper, copied from the Internet is used for the foundation.

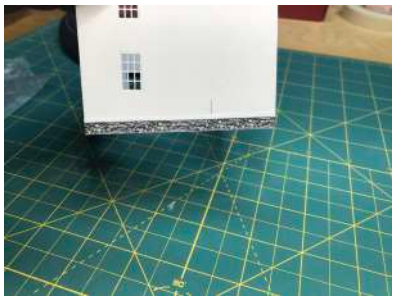


Foundation installation completed.



North wall

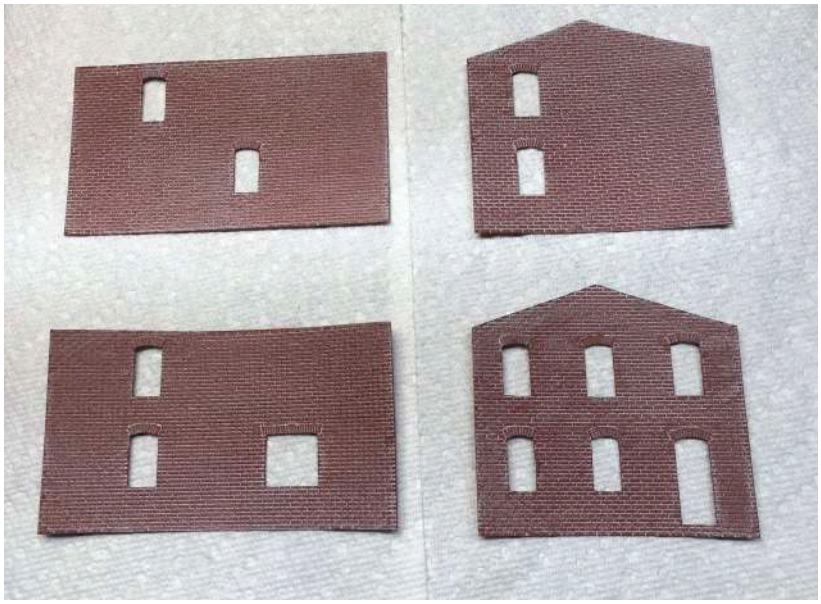
West wall



East wall

South wall

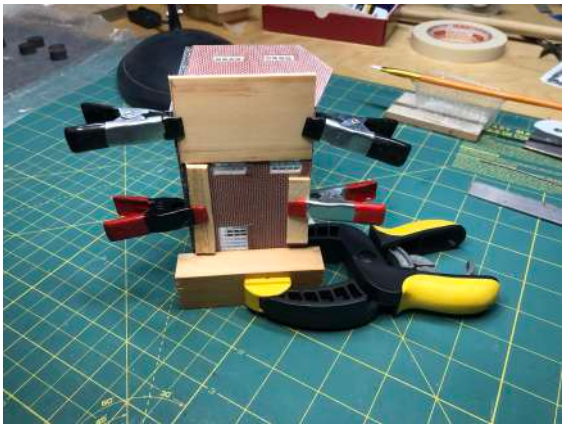
Red brick pattern exterior wall veneer with window and door top brick arch. A light gray paint wash was applied to accent the brick mortar joints. Walls were then painted with a clear matte sealer.

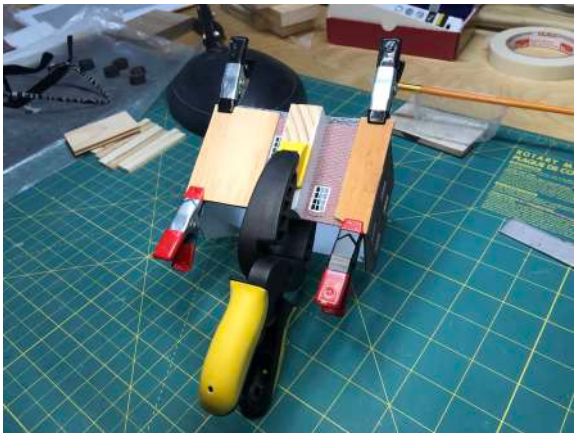


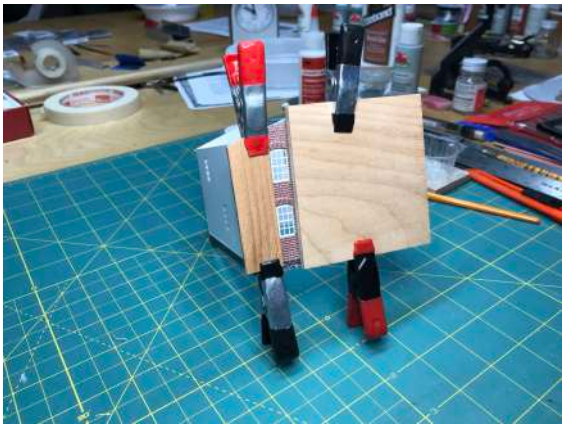
Brick veneer with window & door top brick arch

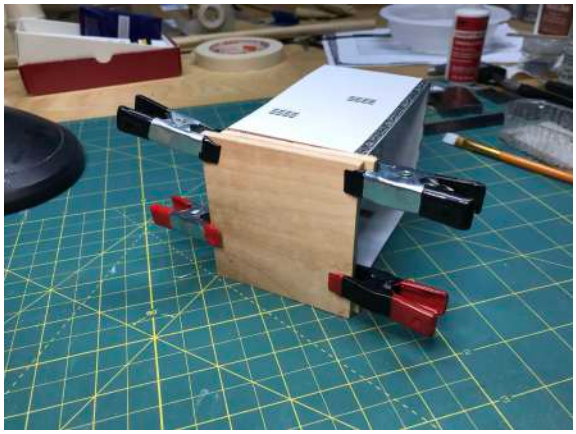
Installation of red brick veneer on walls

Clamps, as shown in the pictures below, were used to hold the red brick veneer flat during the bonding process to assure the walls remain flat after bonding.









Installation of window shutters

East wall

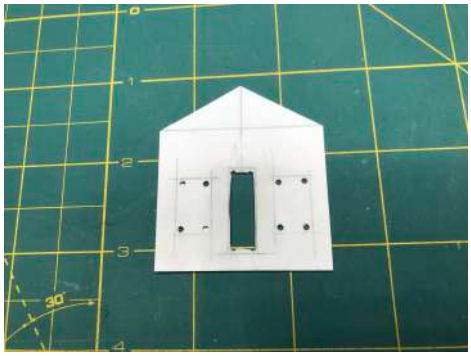
West wall

South wall

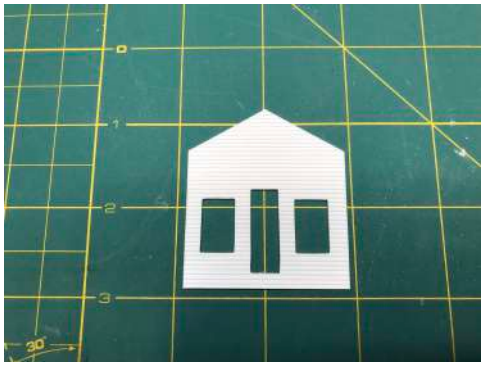
North wall

Summer Kitchen Construction

Walls are traditional clapboard, painted medium gray. Foundation design and construction is same as Keeper's residence.



West wall door & window layout



West wall door & window rough opening

Foundation

Wall assembly

Summer kitchen completed

Roof Installation

Roof shingles were strips of paper cut like real shingles. The shingle strips were individually layed and bonded on the roof in staggered pattern similar to actual shingles.

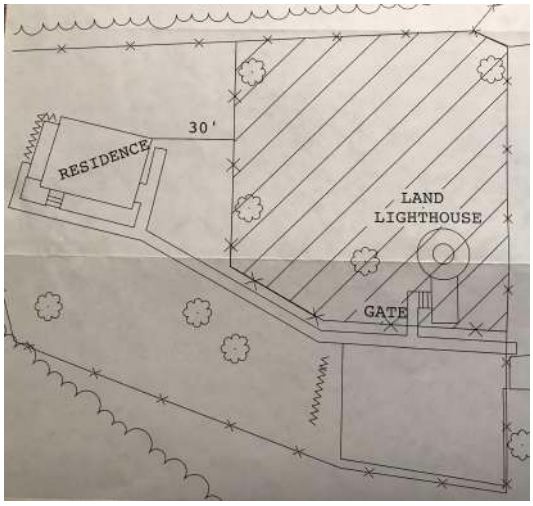
Weights were used to eliminate warping while the adhesive cured. This construction approach is used for the Keeper's residence and summer kitchen.

Installation of roof shingles

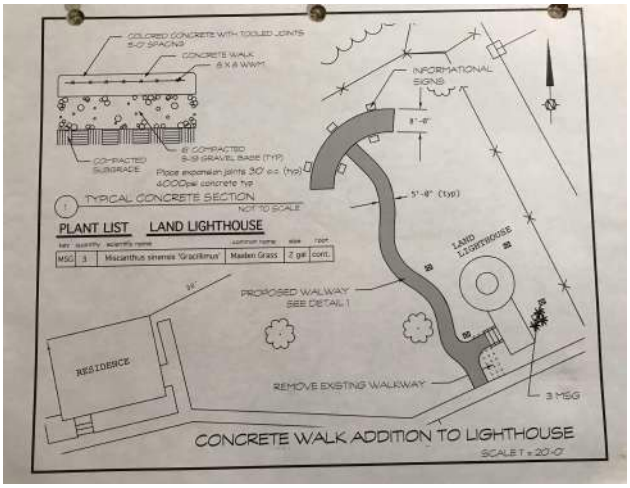
Structures Placement Layout

Placement of Keeper's residence and Tower in the diorama are exactly the same as it was in 1885.

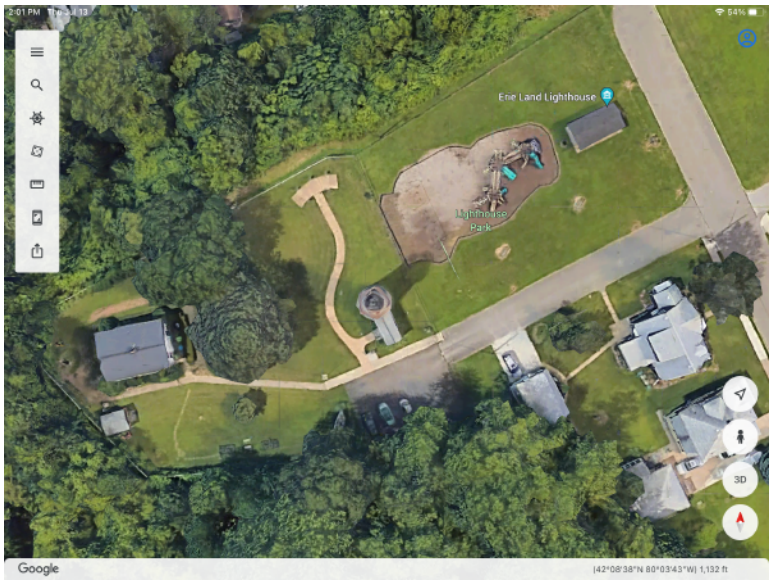
Landscaping drawings provided by Dahlkemper Landscaping show the current layout of the structures which is identical to that in 1885



Landscape drawing provided by Dahlkemper Lanscaping



Current landscape in drawing provided by Dahlkemper Lanscaping

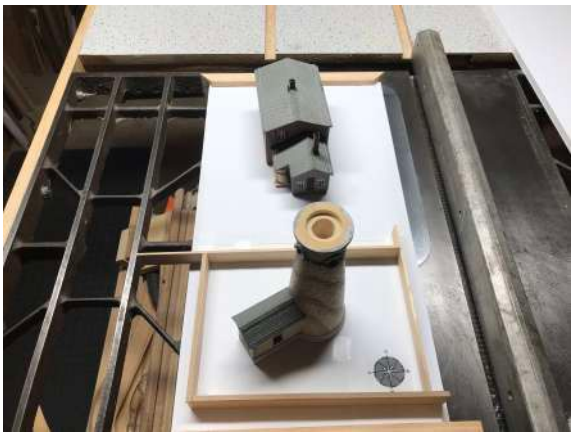


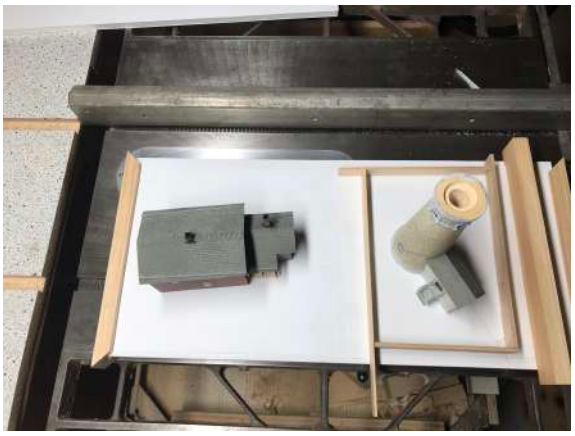
2023 Google Earth satellite view

Placement of Structures in Diorama

Location of the structures in the diorama, as shown in the pictures below, is established before the diorama frame is assembled. The placement of each structure is based on the landscape drawings above and the 1885 picture which shows the tower with surrounding picket fence.

The wood strips around the tower represent location of the picket fence in 1885.





Control Panel Layout and Wiring

Control panel consists of battery box, switch box, nameplate and tower history.

Control panel battery box (left) switch box (center) nameplate block (right)

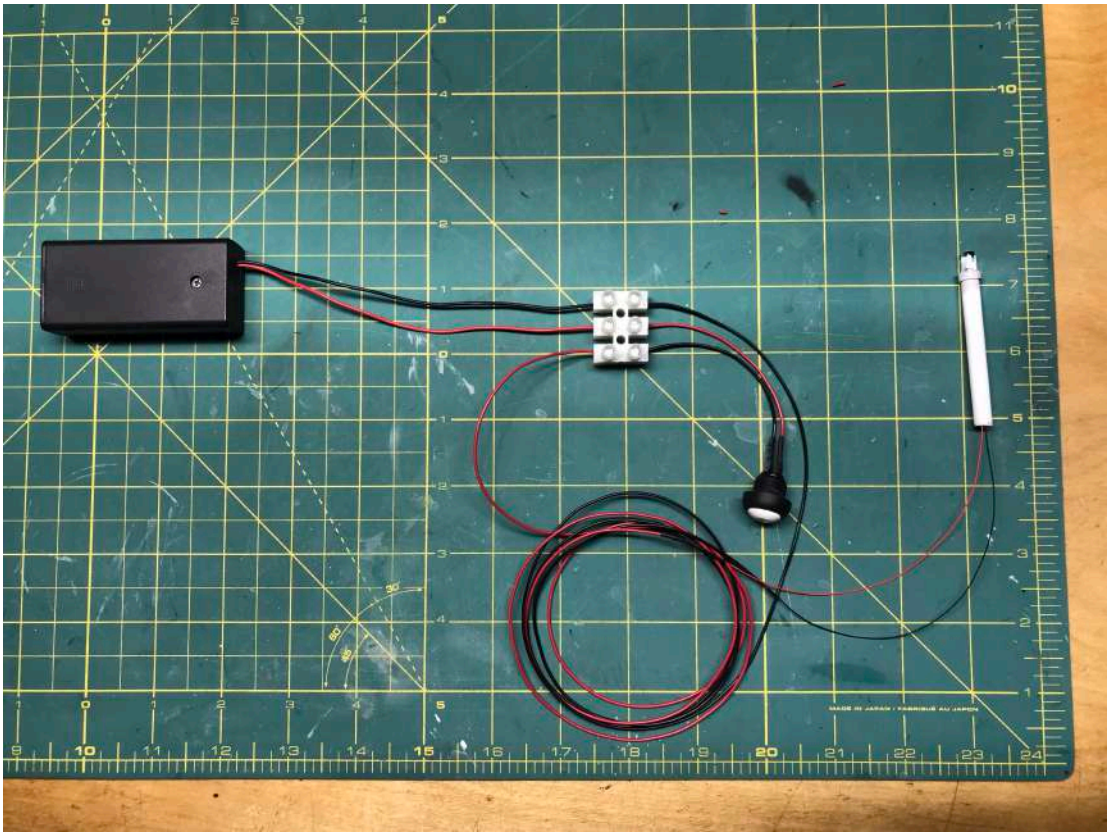
Nameplate block with tower history

Drill jig for switch box wires

Drilling wire pass through hole

Wiring

Battery box (left). White terminal strip will be located inside a switch control box (not shown). Switch is mounted on top of switch box. LED will be in tower, wires will pass under the diorama and into the switch box.

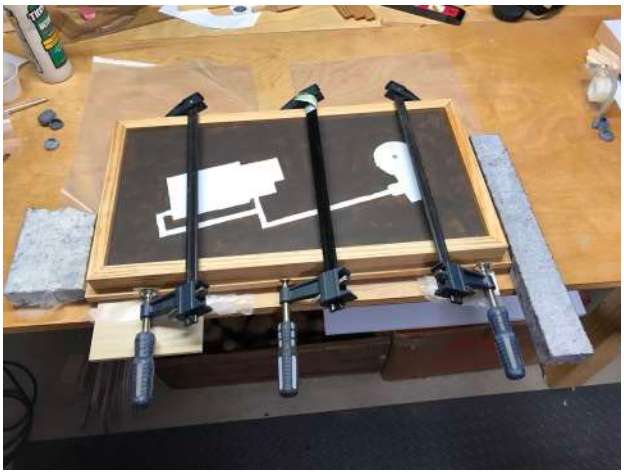


Diorama Layout and Frame Assembly

After location of the Keeper's residence and tower were finalized, the brick walkway around the house from the tower to the house was layed out.

The residence, tower and brick walkways were outlined to mark their locations on the Gatorboard which is used for the base of the diorama. The structures were then removed and the surrounding areas of the Gatorboard were painted a dark brown to simulate dirt.

Clamps were used as shown below to hold the frame together while the bonding adhesive cured.



Bonding of frame corner and acrylic cover front support

Bonding of frame corner and acrylic cover corner supports

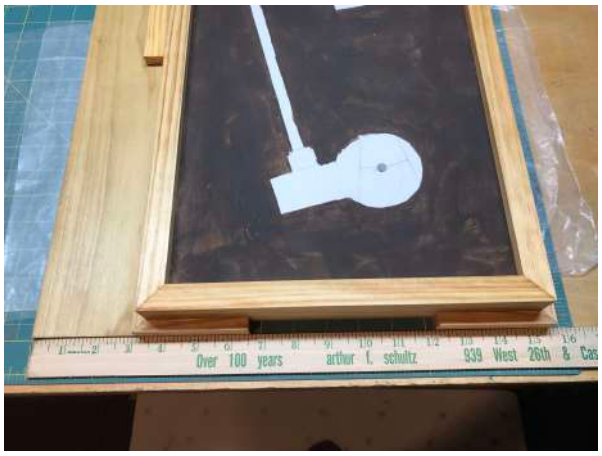
Bonding of frame corner and acrylic cover corner supports

Diorama Layout

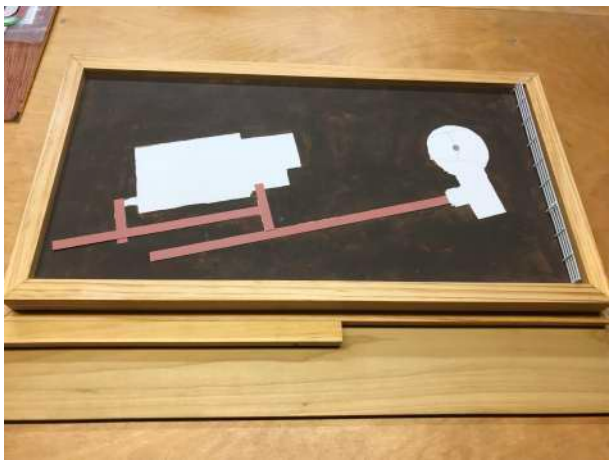
After location of the Keeper's residence and tower were finalized, the brick walkway around the house from the tower to the house was layed out as shown in the picture on the right. This layout was used to determine length measurements for each section of the walkway.

Diorama layout showing location of the structures and control panel

Outlines of the house, tower with workroom and walkways



Outline of tower and workroom with steps and walkway



Brick walkway layout and West section of picket fence location

Lantern Assembled to Tower

The lower railing was bonded to the tower, followed by the lantern stone support. The upper railing was then bonded to the top of the lantern stone support.

First step in the assembly process is to assure the top surface of tower is level. Once this was accomplished, the following pictures show how the lower and upper railings were leveled during the bonding process.

Bonding of Lantern stone base and lower railing to top of tower

Leveling process to bond upper railing to top of lantern stone base

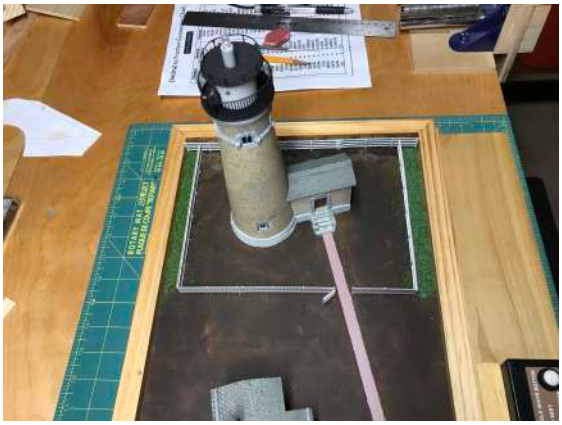
The pictures below show how the lantern is installed on the tower. The lantern is designed to be removable for access to the LED beacon.

Height measurement for acrylic cover

Acrylic cover made by Erie Industrial Plastics

Landscaping

Brick walkway, battery box, switch box and picket fence installed with some grass planted



Installation of picket fence surrounding tower completed

Lighthouse Inspector and old man on rocking chair reading newspaper

Close up of Inspector and old man on rocking chair

Grass planted around tower

Grass planting completed

Aerial view of diorama layout

Women washing and hanging clothes

Woman beating rug

Eagle nest, log pile, log in saw buck and Keeper splitting wood

Keeper splitting wood

Eagle in nest

Nameplate and tower history attached

Completed Diorama

Jerry Longo with Diorama at the Presque Isle Lighthouse

About the modeler …..

Jerry Longo, a retired Mechanical Engineer has an interest in antique and classic automobiles and model railroading. Jerry has built a countless number of model airplanes, model cars, as well as an HO scale model railroad. In addition to the Presque Isle Boathouse and Pier diorama, he built a Presque Isle Fog Signal Station diorama and made additions to the Presque Isle Lighthouse diorama. Jerry was born and raised in Erie, Pa and resides in Fairview, Pa.

END