O-scale Model Railroad El Station
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Ready-made el stations are very difficult to find, particularly in O scale. Commercial custom stations are available but only at confiscatory prices. Therefore, 3d printing to the rescue! This is a very simple, but convincing, el station that is very easy to print and assemble.

This particular station model is based upon the BMT elevated stations commonly constructed in the 19-teens through the 1930s. Liberties in authenticity were taken for simplicity, time, ease of design and construction.

The example station below was constructed in 1919 with almost continuous remodeling and updating to this day.



The included .stl files can be thought of as an ‘El Station Kit’, as opposed to a one-size-fits-all complete project. Sections can be added as needed to create the length of station desired. My particular project was for a station to accommodate an O-scale subway/el train of four cars.

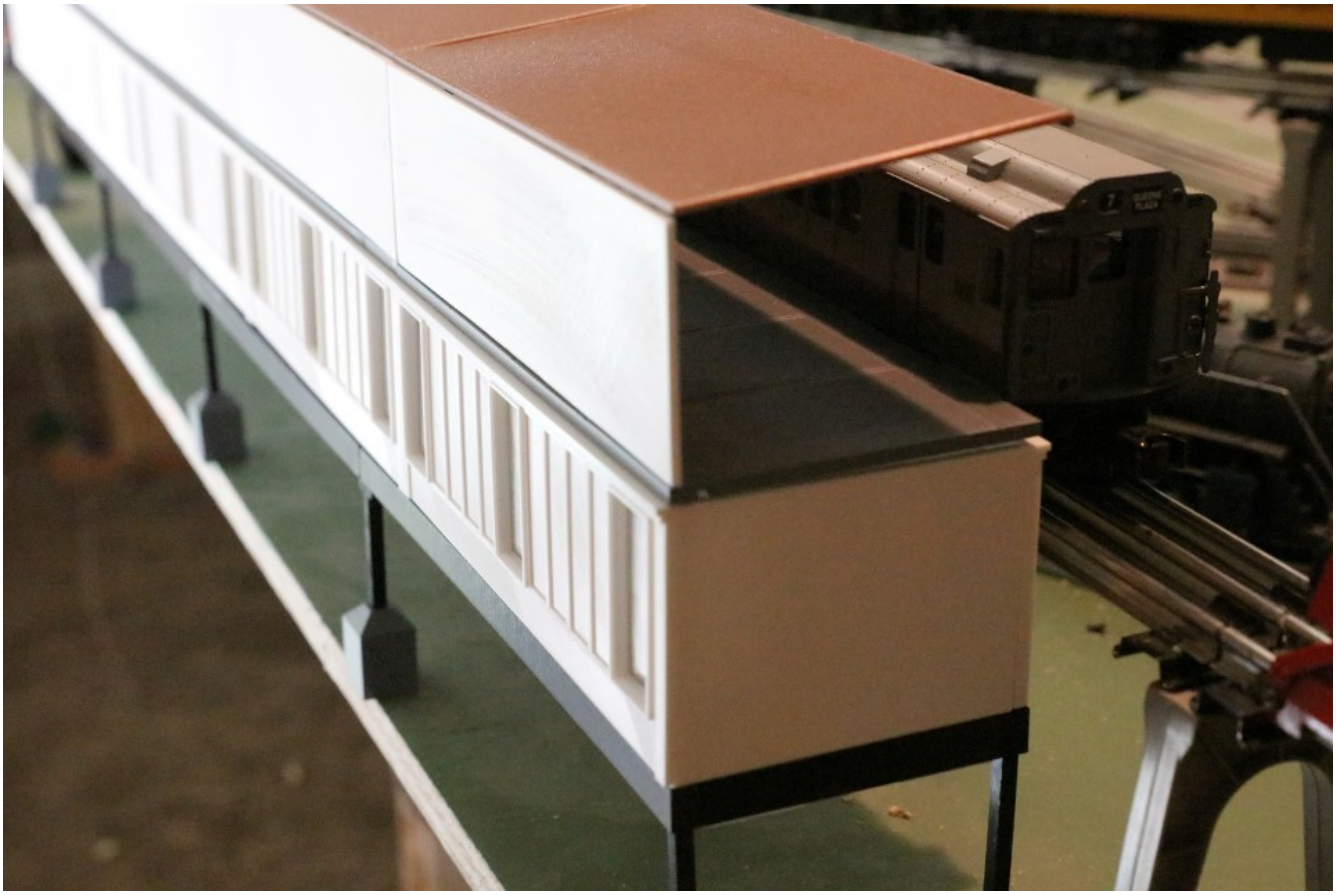
Likewise, the three layers can be used as needed to create the station that fits your purpose. For example, the top layer could be used by itself to make a ground-level platform station.

The layers, from bottom to top, are as follows:

1. The base framework, the ironwork to hold the station. This consists of the mounting pedestals on the ground, the vertical shafts to hold the framework, and the actual frame supporting the station floor.

2. The mezzanine or station level. In this model it is a platform-length fare-control and waiting area for passengers.

3. The platform level, corrugated wind-break walls, roof support beams, and the roof itself.



The shaft height was selected for the proper platform height when using the standard Lionel trestle set pylons for the track. If other, perhaps more authentic, track supports are desired, these can easily be remixed and extended or reduced.



Lighting is optional.

If desired, small-gauge wires may be easily fished through the roof support beams to power ‘grain of wheat’ lamps. Incandescent lamps for platform illumination was used from the early 1900s through the 1950s and into the 1960s in many cases. For those who do not remember incandescent subway and el lighting, the light bulbs were usually slightly dimmer and warmer in cast than those in a household, due to slightly reduced voltage, the purpose of which was to make them last longer. Some incandescent lamps in BMT stations had a discernible flicker as well, as they were powered by the 25 Hz AC distribution supply used on the BMT system. Two 12 volt lamps may be connected in series and powered by 18-20 volt fixed voltage posts on any common transformer, if this effect is desired. (Tongue in cheek) No attempt was made to re-create the flicker.

The station house may also be illuminated using either small incandescent lamps or LEDs. The wiring for the station and platform may be run through one or more of the hollow vertical shafts.

In addition street lights may be placed on the supporting gridwork, but these were not used for my particular model.

To-Do:

Staircases, both from the street and from the mezzanine to the platform, were not done, strictly for time and simplicity. These may be added to a remix.

Detail on the lower level ironwork was omitted mainly because the position of the station in my layout obscured the view of the lower layer.

Detail of the ironwork on the roof was also omitted for time and simplicity.

Printing:

Almost any of the common filament types may be used for printing. I used PLA for most parts, with black ABS for the beams and shafts and 'transparent white' ABS for the windows.

No supports or rafts should be needed for any of the items.

All items except for the double-pronged shaft2 and the windows may be printed with minimal infill. I would suggest 100% infill for the shaft2 for strength, as with lower infill it is easy to break from the minor stresses in assembly. If you are using translucent/transparent filament for the windows, I suggest 100% infill.

Most of the flat pieces should be able to be printed 2-up on most full-size 3d printers. The beams, shafts, pedestals and windows can be printed several at a time.

I used black for the beams and shafts, white for the wall pieces, brown for the roof pieces, and gray for the platform floor pieces. It can be argued that a dark green would be more authentic for the beams and shafts.

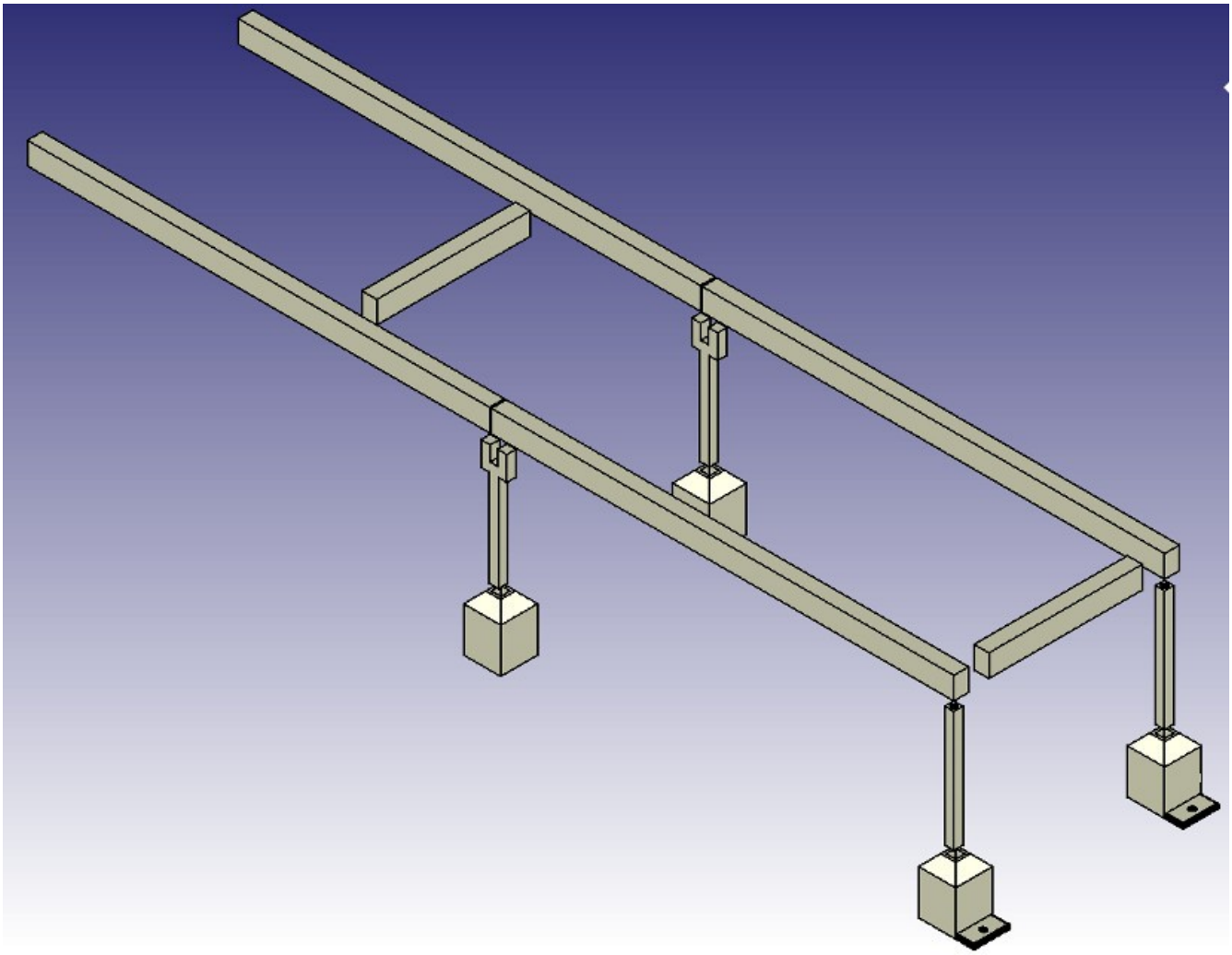
I used the Prusa 'powder-coated' textured sheet for the roof pieces, to give the top a little texture, and a flat steel sheet for the rest.

Assembly:

The following exploded diagrams show how the three layers are assembled.

Glue will be required. I suggest that you use a more forgiving solvent-based glue instead of a super glue. I used Aleen's The Ultimate Multi-Surface Adhesive, available at Michael's or elsewhere.

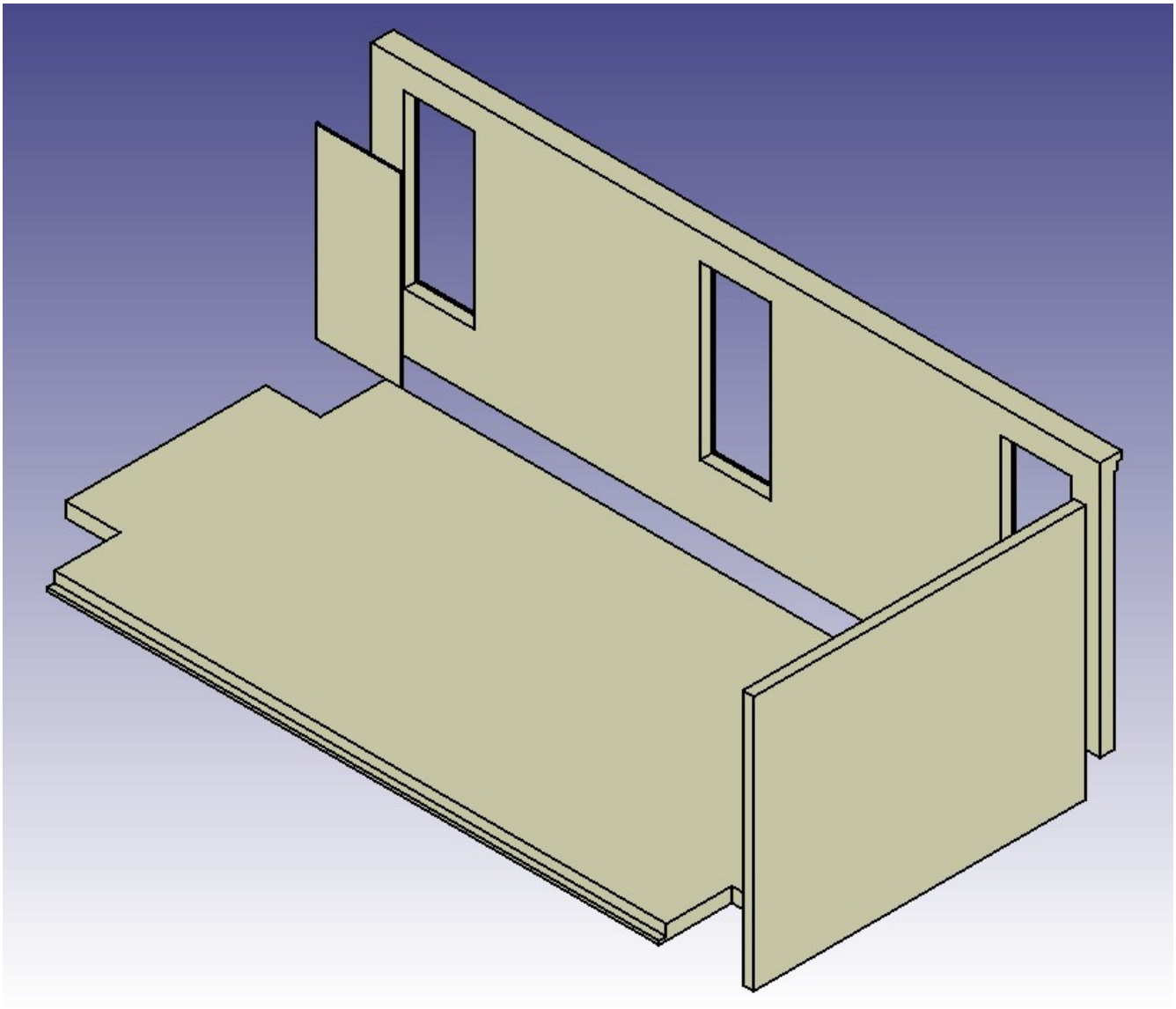
The three layers should be assembled separately and then combined, and optionally glued together for the final assembly.



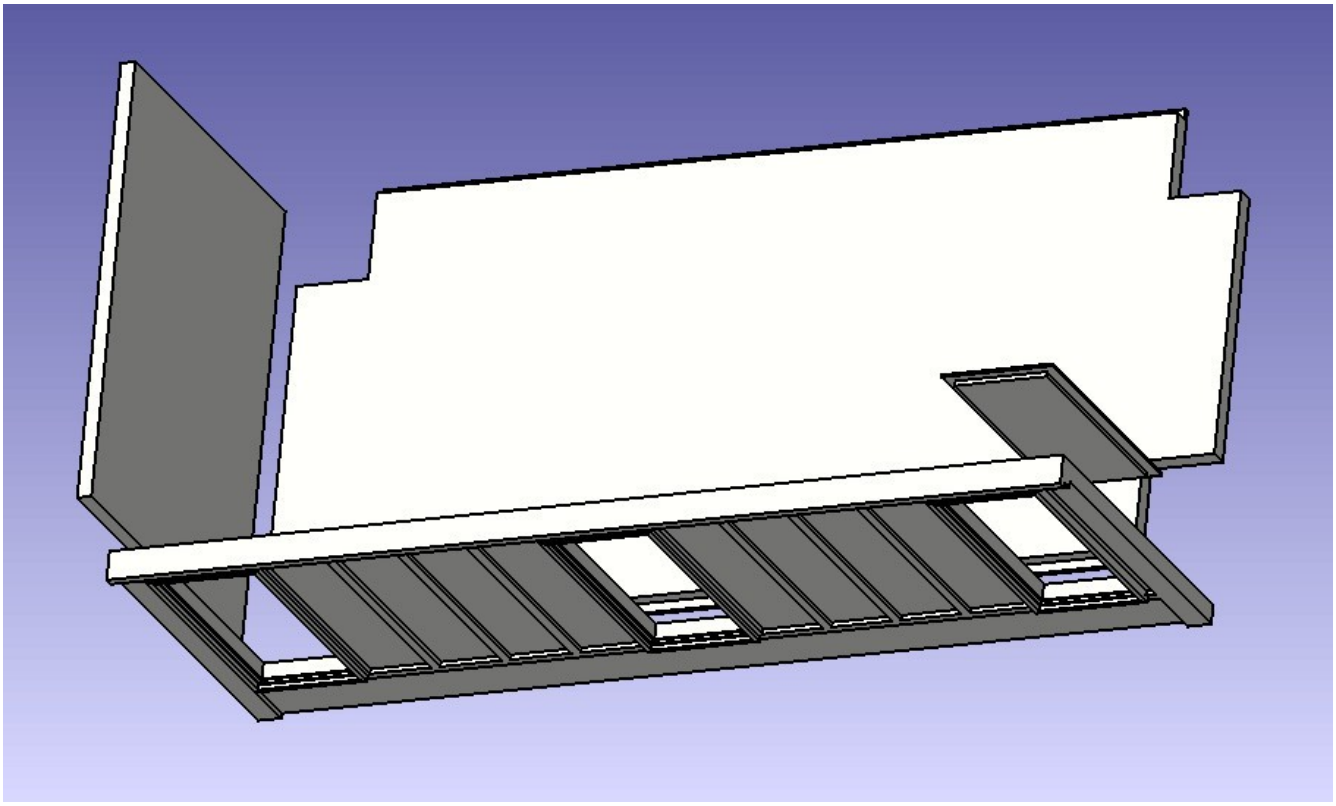
For the lowest layer, beam1 is the longer beam with two holes for the vertical shafts. Beam2 is the shorter beam that will need to be glued on the ends of the frame and, optionally, as needed throughout the frame.

Shaft4 is the smaller vertical shaft with a hole for the electrical wire. If lighting is desired, simply drill a small hole in the longer beam1 opposite the square hole to allow the wires to pass. Shaft2 is the two-pronged shaft used to join two of the longer beams.

Two versions of the pedestal are included, one with a tab and screw mounting hole and one without. The tab may be placed in any orientation as you desire.

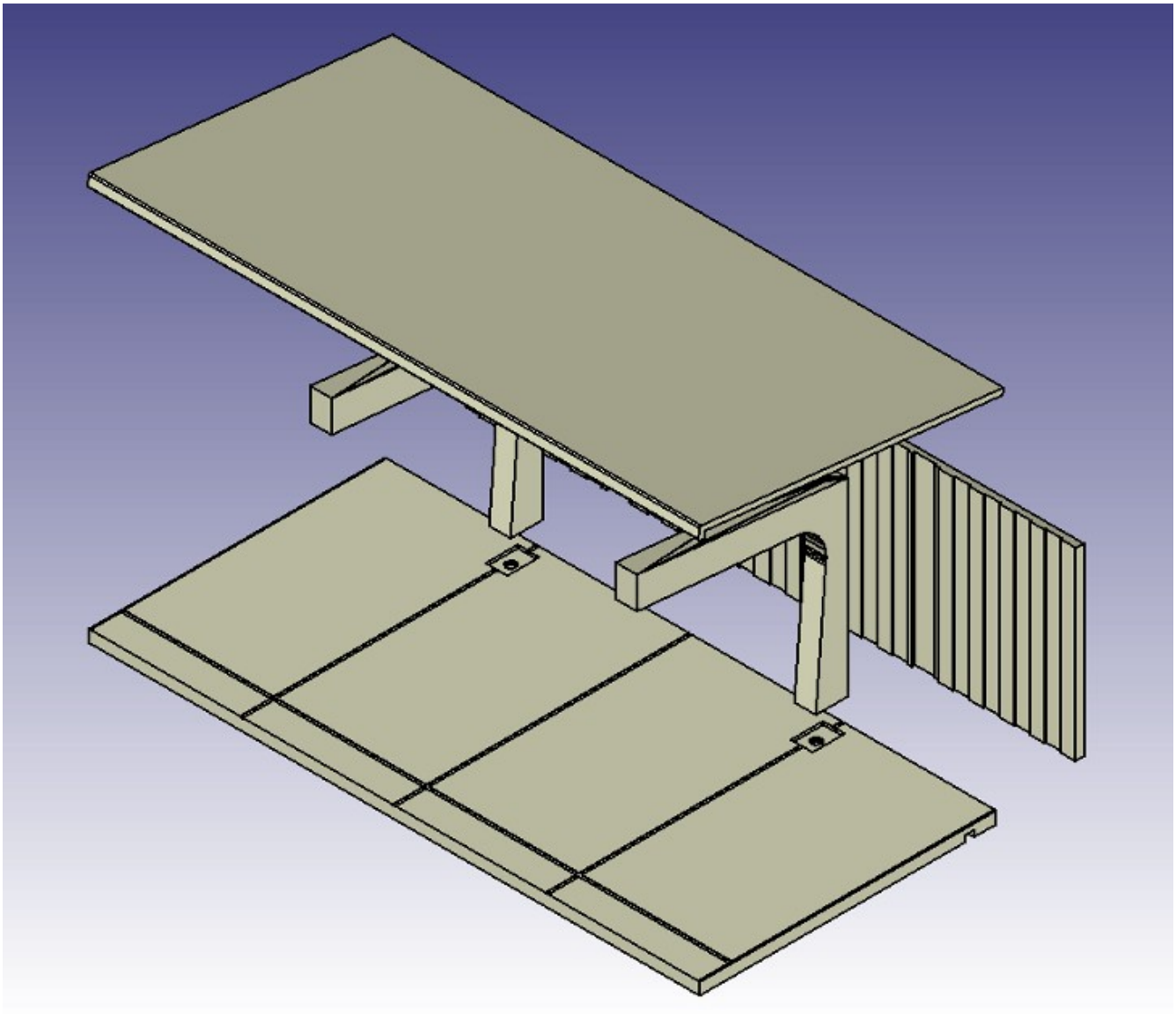


I would suggest beginning the second level assembly by making two end sections. The floor piece has a lip onto which the side wall sections may be glued. The end sections are assembled with two side wall pieces, one floor piece, and one end wall section. These can be easily assembled and glued and allowed to dry.



The middle sections, without end wall supports, can then be assembled with two wall pieces and one floor piece, using the completed end sections for orientation and stability.

The windows are carefully glued in place as the final assembly step for the center layer.



The top layer is the most tricky to assemble, but the pieces interlock somewhat for correct placement.

The platform beams have corresponding pockets into which they are inserted, on both the platform floor pieces and the platform wall pieces.

I would suggest first assembling the platform pieces by gluing the platform beams onto the platform floor, then gluing the platform wall in place, and allowing this sub-assembly to dry before installing the optional wiring and the roof.

If lighting is desired, fish small wires through the platform beams before adding the roof section. Any small-gauge wire may be used. I used the Striveday ‘super flex’ 30 gauge wire, the same as is used for repair on powered rolling stock trucks, but wire-wrap or ‘rework’ wire can be used as well. The grain of wheat lamps can be soldered to the exposed end of the wires, carefully insulated with VERY small sleeving or shrink tube, and carefully pushed back into the beams so they are flush with the beam hole edges.

After the floor-beam-wall assembly is complete, the roof piece can be added, using the small pads on the beams and pockets in the roof piece for correct orientation.

Electrical wiring:

If interior lighting of the passenger waiting area is desired, small incandescent lamps or LEDs may be easily tack-glued to the bottom of the platform floor pieces and then wired in parallel with the electrical feed from the transformer and the platform lighting. If LEDs are used, the appropriate resistors should be placed in series with the LEDs, and either a DC power supply should be used or else a diode (such as a common 4001) should be inserted in series with the LED supply. One diode can be used for all LEDs in the assembly.

Wiring can be fished through the hollow support shafts. Depending on the gauge you use, either two wires can be fished through one shaft, or one wire each in two shafts.

Putting it all together:

When the three layers are complete and all wiring is in place, simply stack the layers one on top of each other and, if desired, tack-glue the three layers together. The above-suggested glue is forgiving enough so that the joints may be carefully pried apart if needed, without any permanent damage (for lamp replacement or reorientation) and re-glued.

Please, feel free to adapt, remix and redistribute, all in the open-source spirit of course.