Safety Handrail

As we've gotten older, safely navigating this sloping, curved ramp became important. I designed a safety handrail for the left side of the ramp.

Completed handrail showing two of the braces used for strengthening and supporting the handrail.

Close up from top of the ramp.

Close up from the bottom of the ramp. All of the top bars of the handrail, where we grab the handrail for support, are wrapped in heat shrink. All vertical posts and bracing pieces are painted to match.

During the design phase it became obvious that I needed to provide access to the garden seen to the left of the handrail.

This access was provided by creating a vertical hinge for two adjacent sections of the top rail seen here in the open position.

One hinge swings up, and the other swings down. Both connect to the same reinforced vertical post.

To create the hinge for the section that swings up I used an adjustable 180-degree connector. Self-tapping screws through the connector permits leaving the 5 mm hex-head bolt slightly loose to allow for motion.

View of the rail in the up position.

Close-up of hinge in up position.

Here the rail is in the down position locked into the post.

Close-up of rail locked into the post. A subsequent image will show the hook assembly.

The “locking” mechanism is a rubber chair leg cap (pipe foot) with a hole drilled into it.

Here it is locked into place.

Since I wanted both hinged rails to lock onto the same post, I made the second hinge to fold down.

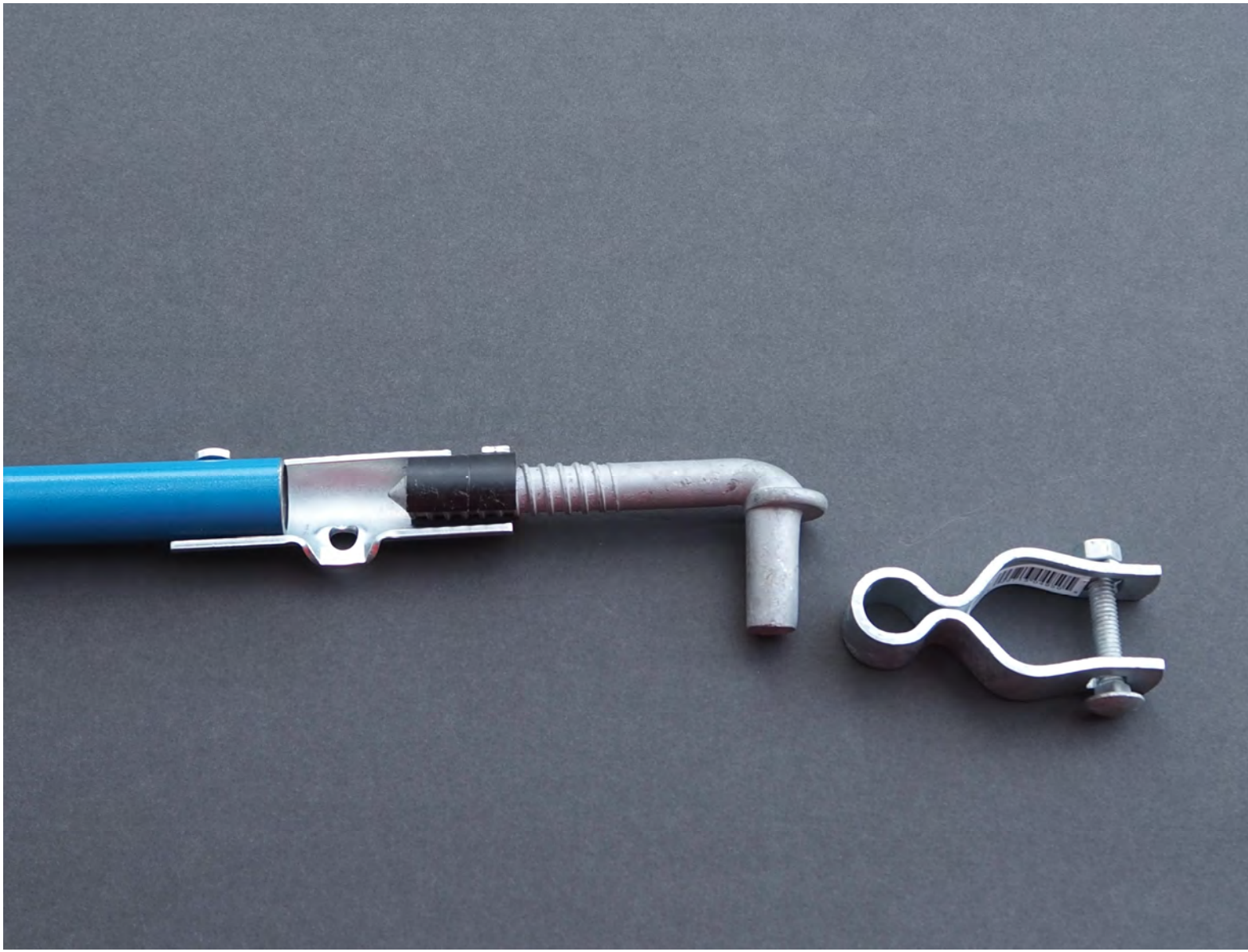
In this situation I used an adjustable angle hinge connector seen here in the closed position.

Same hinge, different perspective.

Hinge swings down to provide garden access.

I used a lag screw post hook and lag screw hinge for the receiver.

I used a ¾ to ½ shim and a straight connector to hold the lag screw hook. I also had to use one or two heat shrink friction bands over the shim for a tight fit (I sourced the lag screw hook from 2 different places, and they were not the exact same diameter).



Painted black and ready for final assembly.

Hinge receiver bolted in place below the pipe foot.

Both rails locked into their respective receptacles.

As both rails locked into the same vertical post, that post required extra support. I took the opportunity to make a 10-foot high, hopefully squirrel-proof, support, that allows attaching a bird feeder as seen in a previous image.

I used a 90-degree connector and T-connectors for this portion.

Flange connectors into concrete or a railroad tie supports the vertical sections. I drilled a 1-inch diameter hole into the railroad tie to slip the conduit down 8 inches for extra support.

Adjustable angle flanges and 45-degree connectors were used to support the vertical posts for the angled braces.