A GAZEBO OBSERVATORY

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Abstract

Building an observatory in a suburban housing development can meet resistance. The city and neighborhood can restrict design and use. The solution is a backyard gazebo for leisure sitting, meals, and observing.

We probably all find that there just is not enough time to do all that we would like to do. The process of carrying all the parts of a telescope in and out of the house onto wet grass or snow is treacherous and time-consuming. I was not using my 5-inch refractor much and only occasionally using my 6-inch f/5 reflector. I would also get more observing done in my suburban home location than a dark sky area one hour away. So I set out to establish an observatory site at home.

In the past, I have used a permanent pier and left the mounting out under a plastic bag when weather promised to be good for a few days. But at this new location my options were to build an observatory near the house for the refractor or to have the reflector on casters and stored in the garage. The warm pavement, street lights, and porch lights in the front yards restricted all but casual observing with the reflector. A rectangular building with a dome or roll-off roof did not fit esthetically into our suburban neighborhood. Some communities restrict structure style and finish. In addition, I wanted easy access from the house. My wife, Evelyn, and I were also considering a screened-in porch. So we decided to combine ideas and have a ten-foot gazebo incorporated into the deck, with windows, screens, and a roll-off roof. I drew up the plans, built a scale balsa wood model of the back of the house, the deck, and the gazebo with the slide-off roof to demonstrate to contractors and avoid misunderstandings. They considered my idea rather bizarre and did not call me back! A gazebo roof is difficult enough to build on stable walls and not very conducive to rolling down a track. I spoke to an Amish builder who said he could do it. His "can do" attitude along with the quality of his work sold us.

In my drawings and on my model, I used a rectangular frame to contain the rollers and support the gazebo roof. Typically a gazebo is an octagon, but an eight-sided roof is not independently stable as the rollers would have too short a wheel base. I used a hexagon in order to have a longer wheel base and less structural overhang beyond the rollers. The deck and the gazebo floor are treated lumber and two feet off the ground. All posts are three feet into the ground and set in concrete. The telescope pier location is in the center of the gazebo floor. A hole, four feet deep by two-and-a-half feet wide, is filled with concrete around a steel pipe four feet long and four inches across with a flange on each end. The top flange is six inches above the ground and 12 inches below the floor joists. Another flange is mated to that top-of-the-pier flange with eight 5/8-inch threaded rods. The four-inch steel-pipe pier continues through the floor to 6-1/2 feet above the floor. The pier is filled with sand to add mass and to dampen vibrations. On the pier is a Cleveland Instrument equatorial mount with 1-1/2 inch steel shafts and drives on both axis. The timber above the deck floor is all cedar. Cedar shake shingles were used for the roof to keep the weight down to about 650 pounds. An asphalt shingle roof would have added about 250 pounds to the weight of the roof. The 16-inch area above the windows is

where the telescope is stored horizontally and is basically out of sight with a dust cover around it. The roof locks down along each track to prevent undesired movement. When closed, the exterior molding effectively seals out weather and insects. We have had some strong weather this past fall and winter with 60 mph winds with no ill effects. The two tracks are each 25-foot long, one inch aluminum angle, and are designed into the trellis structure over the deck. The track is not noticeable to the casual visitor. There are three 2-wheel sets of grooved rollers on the north and south sides of the roof. The roof rolls easily via rope and pulley west along the track. Each of these patio door roller sets has a capacity rating of 200 pounds. The roof sofit clears the track and walls by about 1/4 inch. A wood preservative and sealer with UV protection was applied to all exposed surfaces.

In the past I would spend 20 minutes to set up the telescope and again to dismantle it. Now, I unlock the door, unlatch and roll off the roof, remove the dust cover from the telescope, and the polar alignment is already set. I spend the saved 35 minutes observing. The roof rolls easily, even with six inches of snow on it. The exposed track stays clear of snow and ice. In order to utilize the facility for its other intentions, I have cut a patio table in half and enlarged the center umbrella hole to fit around the pier for meals or games in the screened-in gazebo. It is also used to support my accessories. The trellis shades the deck and the gazebo from the afternoon sun. The cedar roof remains cool on hot days and the building cools quickly in the evening.

The project took several years for day-dreaming and two months for the actual work, from site preparation to applying wood preservative. The contractors' work, however, was done in four days. The gazebo roof was built in their shop so measurements were true and wheels were parallel. It was a real chore to get it 10 feet up a ramp and onto the walls and track. I have just completed the electrical work and landscaping. I am looking forward to re-establishing my observing program and making use of this facility.

Figure 1. The Gazebo Observatory under construction.

Figure 2. The completed Gazebo Observatory with roof rolled off. Instrument not installed.

Figure 3. The Gazebo Observatory equipped with 5" refractor.