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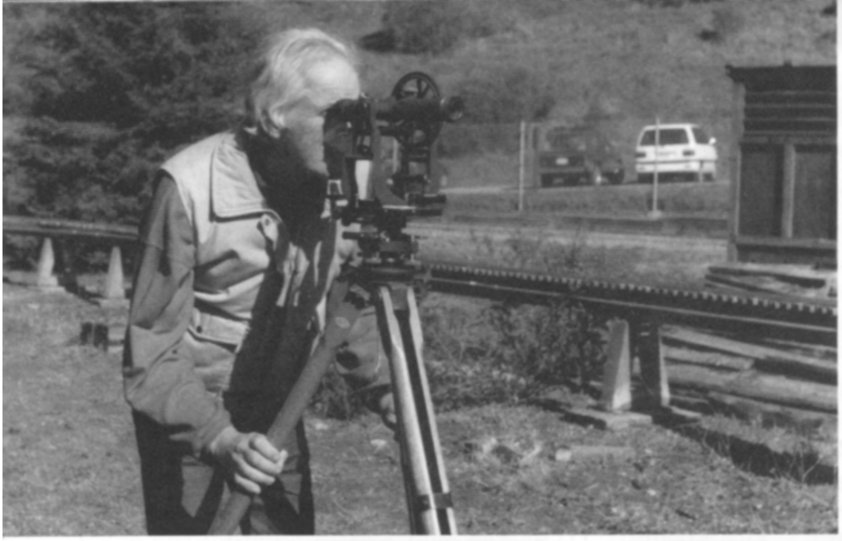
A new roundhouse for Golden Gate Live Steamers by Steve Booth



New at Berkeley:

GGLS Roundhouse

by Steve Booth

PHOTOS BY AUTHOR EXCEPT AS NOTED

Dalt Bergstedt photographed Steve Booth (**top**) as he shoots preliminary levels for the new roundhouse. With no way to get the ready-mix trucks close to the site, concrete was pumped (**center** and **below**) for the roundhouse floor and turntable pit. Short pieces of white PVC pipe are at the locations of the 44 columns to be grouted in later.

The new roundhouse at the Golden Gate Live Steamers' track near Berkeley, California, designed and built by members to provide storage for locomotives and rolling stock they own individually, is a 1200-square-foot building of traditional roundhouse appearance that was squeezed into the only available site — inside one end of the raised-track loop used by the $4^3/_4$" and smaller gauges. It is unusual because it is of composite construction, with scale-size aluminum columns and heavy aluminum connector plates replacing the normal wood posts and stud walls to give extra space and a prototype look to the interior. Doors, too, are aluminum plate and have no framing. This gives extra side clearance when they are open, allowing two $1^1/_2$" scale tracks in each bay.

The basic exterior shape and $2^1/_2$" scale of the building is from a plan by Stan James for a roundhouse of standard stick construction with the roof supported by stud walls between the bays and around the outside. When I took over the project eight years after it had first been discussed and then drawn up by Stan, I favored an all-metal building for simplicity and speed of construction and for durability, maximum use of available space and the fact that it would be more fireproof. The composite design was chosen so the building would more closely resemble other structures at the club as preferred by the majority of members and the governing park administration. It was worked out with the help of a licensed structural engineer who determined the materials and specifications for the job. This was necessary because of the club's location in a public park in a heavily populated metropolitan area. Plans and specs spent two months in design review and public hearings within the park administration. After their approval it took seven more weeks and several minor changes before the county issued a building permit.

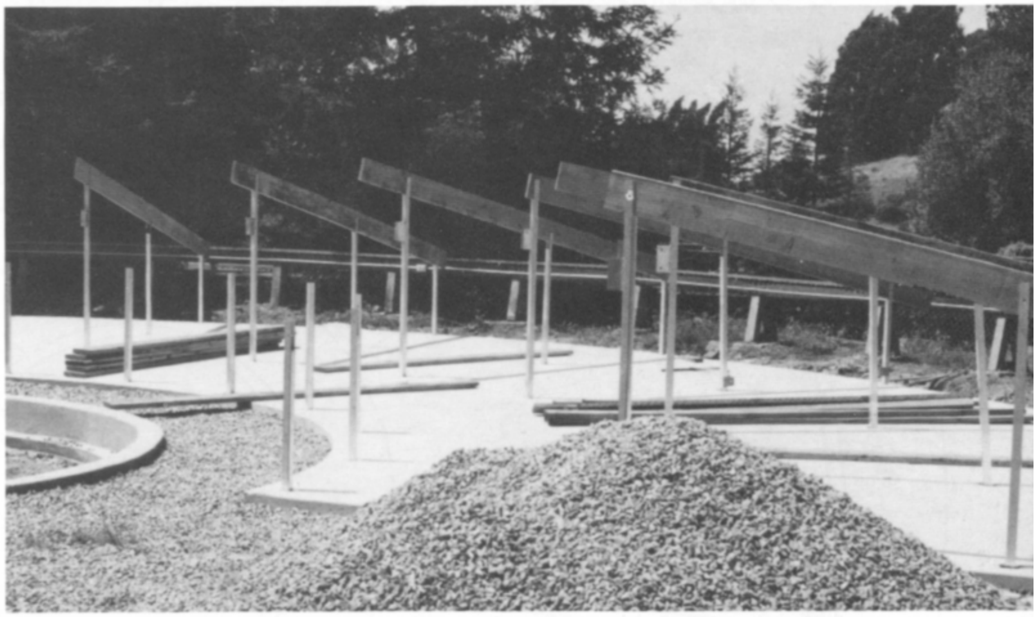
The Golden Gate roundhouse is built on a 4-inch concrete slab with No. 4 rebar on 12-inch centers running both ways. At the location of each of the 44 columns, the concrete is deepened to 9 inches in a 16x16 square. Because of the work in-

volved in preparing for the pour, the concrete work was done by an outside contractor after we had surveyed the site and staked out the building. The contractor graded and excavated the site for both the roundhouse and turntable pit, built the forms, cut and tied together the rebar, set pieces of 4-inch PVC pipe at the exact location of each column and filled these with sand. A total of 24 yards of concrete were pumped to the site for the pour, and the seven-man crew did the fine job we expected.

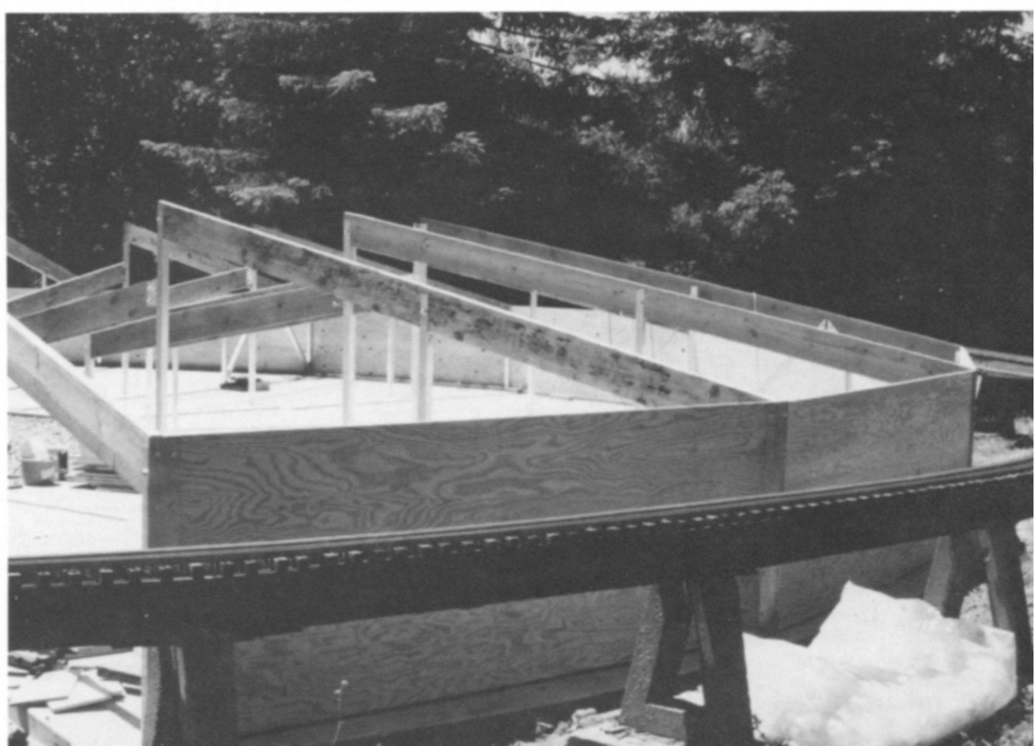
Grouting of the columns came next. Using a tape fastened to the round steel bar marking the center of the turntable pit, the exact location of each column was marked, and the thin layer of concrete over each sand-filled piece of PVC pipe was chipped away. The sand was scooped and vacuumed from each pipe. Small A-frames helped hold the columns vertical as each was grouted with a material called PourStone that is fast setting and very strong.

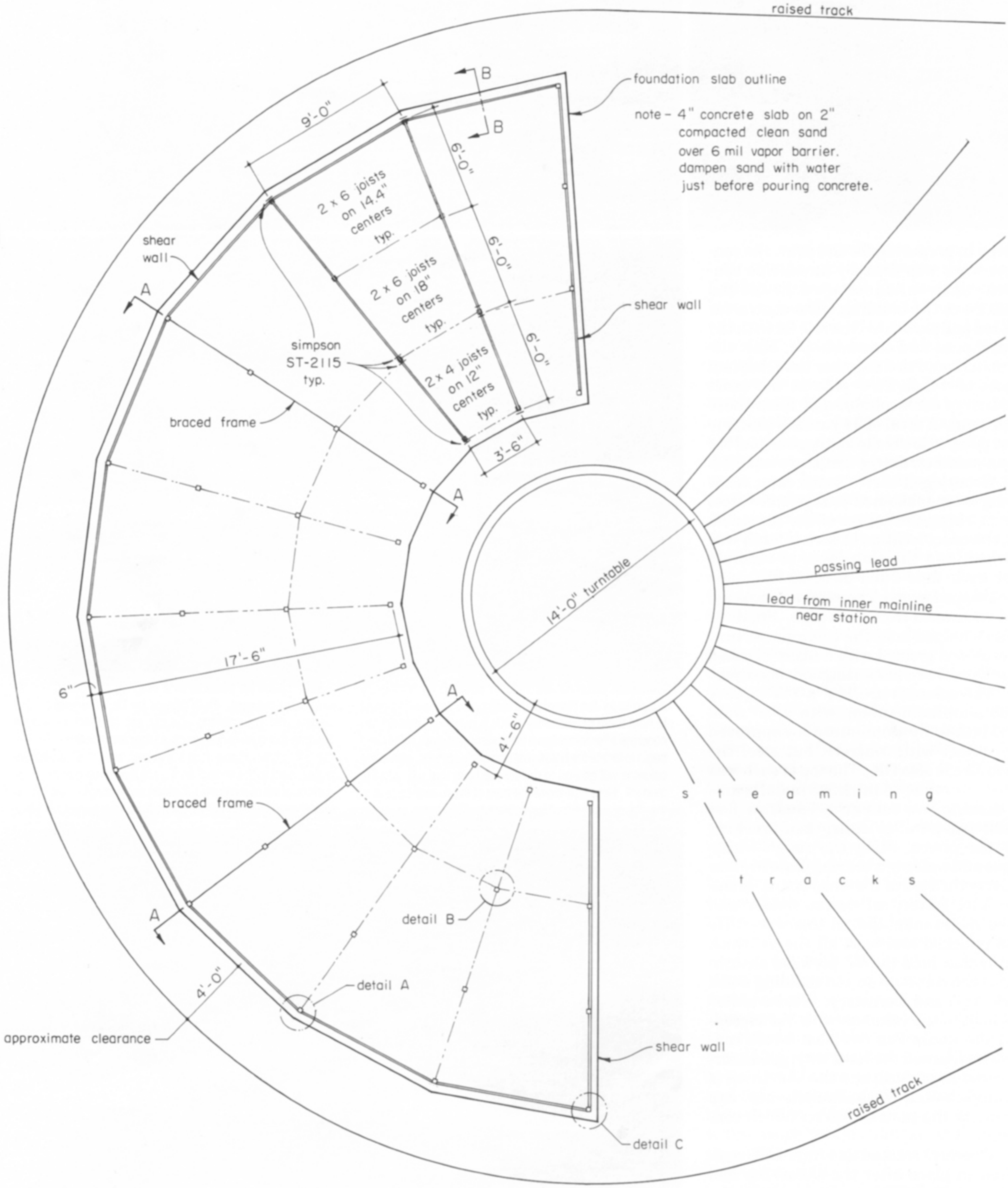
The columns are 1¾" x 1¾" square 6063 aluminum tubing with a ⅛" wall. 6063 is the only aluminum alloy approved for contact with concrete, but steel the same size is also OK. The top of each was notched for the 1½" thick 2x8 radial beams by making two cuts on a bandsaw just inside two parallel walls, then breaking out the pieces, filing the rough inside edges and welding a bearing plate in place to carry the load of the wood beam. Member Curt Silver, an expert welder and sheet metal man, did all this work. He also punched and bent all the ⅛" thick plates that hold the ¾" plywood sheathing to the columns on the building ends, back wall and clerestory. These plates are held to the columns with 3/16" closed-end aluminum Pop rivets on 6-inch centers (we learned the hard way; get an air-powered rivet gun), and the sheathing is through-bolted with ⅜-inch hex cap screws to the plates, also on 6-inch centers.

Pressure treated 2x4 mud sills were bolted in place after the sheathing had been installed. Water seepage under the sills later made us realize that the mud sills must fit tight at the ends and to the concrete and should be sealed or bedded in place. The problem arises because, with columns set into the concrete slab,

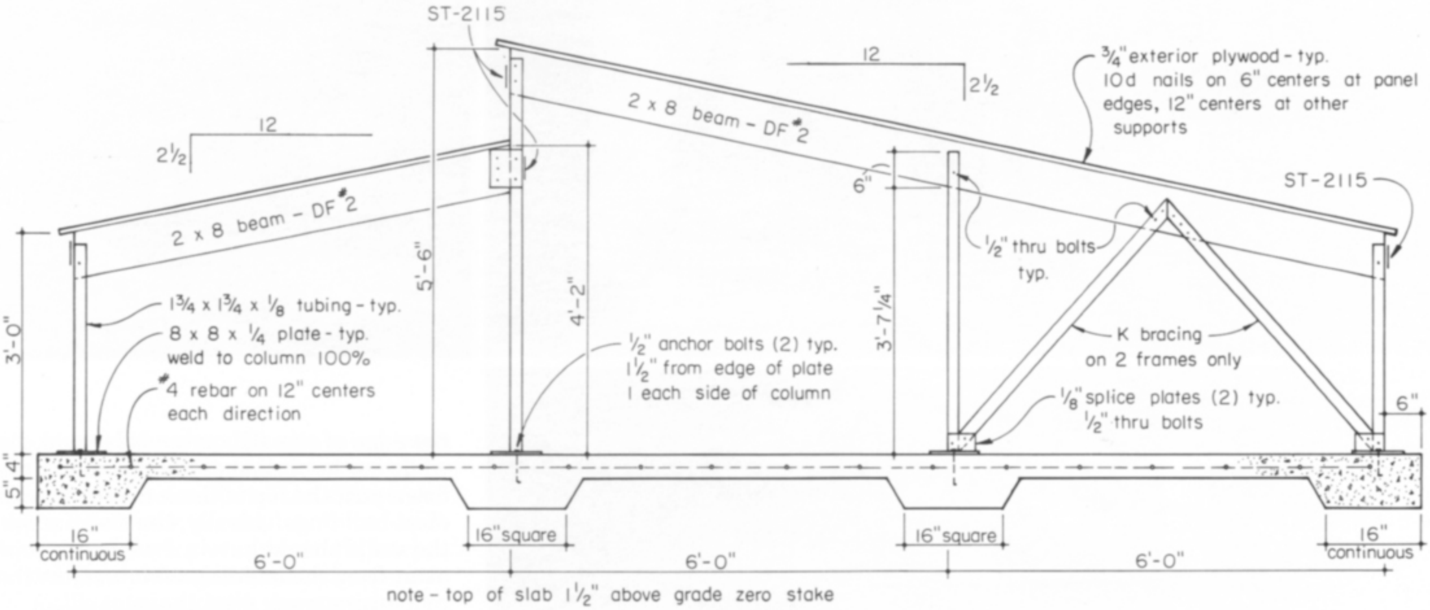


Aluminum columns are held in position by temporary supports as Jon Nagel (**top, left**) pours fast-setting grout to hold them permanently. GGLS members inspect the concrete after forms have been removed (**top, right**) and begin to locate the holes, just under the surface, where the columns will go and to drill for the bolts that will hold the mud sill. Note how close the front of the roundhouse is to the rim of the 14-foot turntable pit. This gives as much interior space as possible in a building that could not be expanded outward. Both photos by Dalt Bergstedt. 2x8 beams rest on columns already set (**center**) to assure alignment of intermediate posts as they are grouted. To hold the 3/4" plywood that forms the rear wall, 1/8" aluminum plates, bent to the correct angle, are Pop riveted to the back surface of the rear columns (**below**) and through-bolted to the sheathing. There's 1/2" between the plywood and the slab.

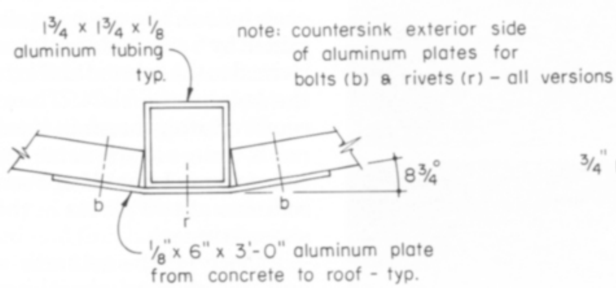




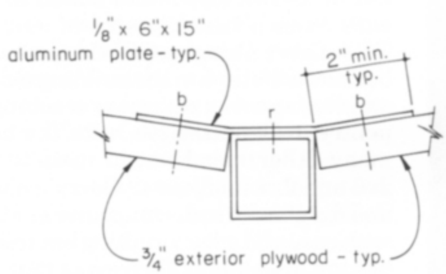
raised track
foundation slab outline
note - 4" concrete slab on 2" compacted clean sand over 6 mil vapor barrier. dampen sand with water just before pouring concrete.
B
B
9'-0"
6'-0"
6'-0"
6'-0"
2 x 6 joists on 14.4" centers typ.
2 x 6 joists on 18" centers typ.
2 x 4 joists on 12" centers typ.
shear wall
shear wall
simpson ST-2115 typ.
braced frame
3'-6"
A
A
14'-0" turntable
passing lead
lead from inner mainline near station
17'-6"
6"
A
4'-6"
braced frame
steaming tracks
A
detail B
4'-0"
detail A
approximate clearance
shear wall
raised track
detail C



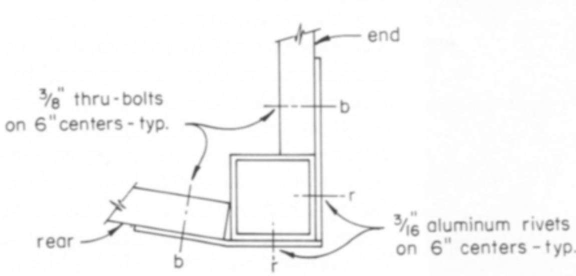
section A-A

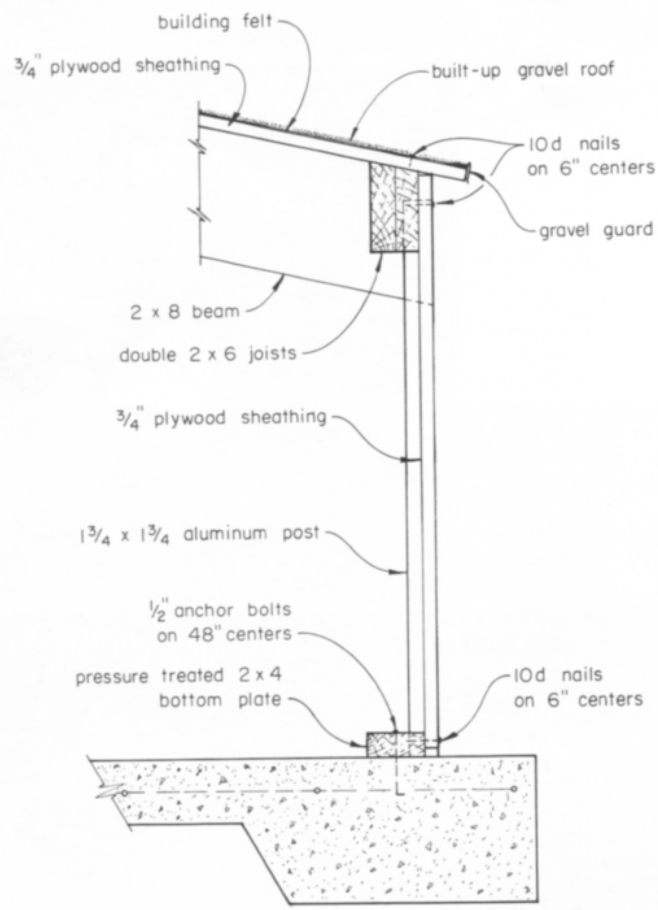


detail A



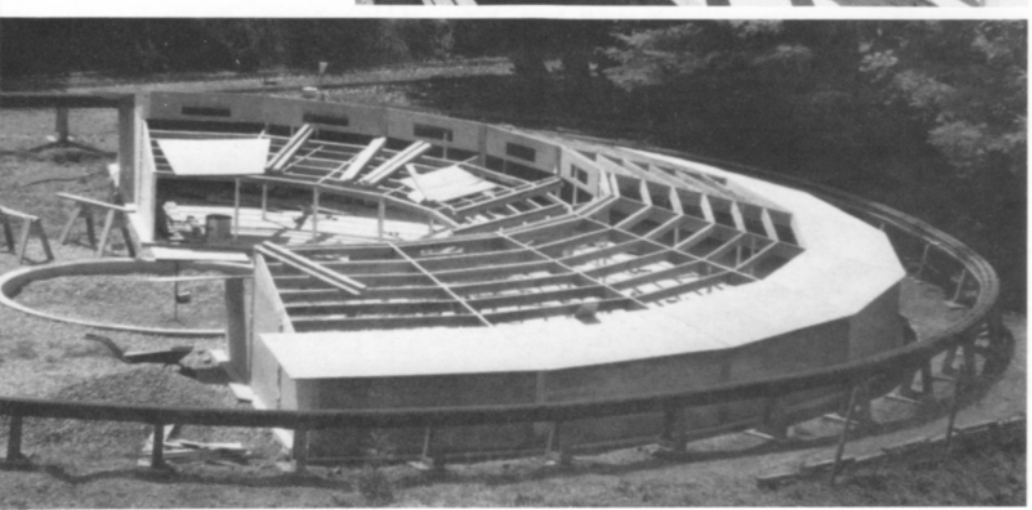
detail B





Gerry Coats (**top, left**) found a free supply of lumber for the roof joists, and then did all the difficult double-angle cuts at each end and, with Bob Newquist (right), nailed them in place. Steve Vitkovits and Stan James (**top, center**) fastened the mud sills in place (This photo by Steve Booth, balance of photos on this page by Dalt Bergstedt). John Lisherness (**top, right**) helped nail in the metal joist hangers along each beam. The low roof height made this job easier. Steve Booth and Dick Thomas (**right**) install a clerestory window panel at the highest part of the roundhouse roof, 65 inches above the floor at the top.

The man who really built the roof was expert carpenter Gerry Coats (**right**), a long-time GGLS member. The Golden Gate LiveSteamers' Roundhouse (**below**), five months after construction began.



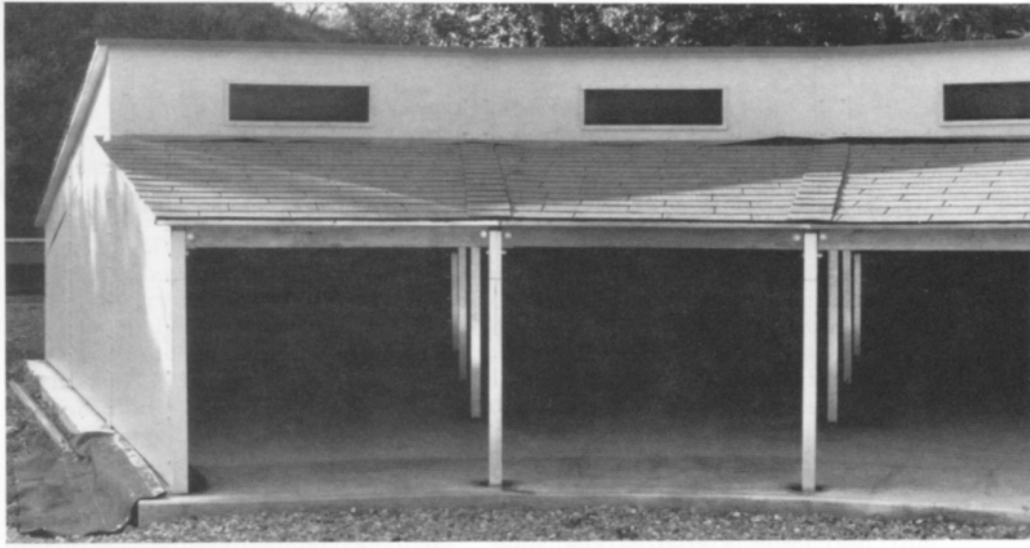
the edge of the slab extends beyond the walls so the wall sheathing cannot drop down past the top of the concrete as with most buildings. Ideally, the slab outside the walls should have a downward slope away from the building so water from the roof drains away from the mud sill.

The main 2x8 beams were set in place temporarily on the columns as the columns were grouted so the alignment of each row of four columns would be perfect. The amount each column extended into each hole in the concrete slab was determined by a small plate of scrap aluminum riveted to the column and extending across the hole in the slab. These plates were removed after the grout hardened. Diagonal K-braces of the same material as the columns are located between the two rear columns at two places in the building for shear strength.

Once all the columns were in place and the plywood sheathing attached to them and to the mud sills, the beams were cut to exact length and end angle (for the $2^1/_2$ in 12 roof slope) and bolted in place with $^1/_2$-inch hex cap screws and nuts. Then Gerry Coats, a GGLS member who has had a lifetime in the building industry and has spent many years teaching carpentry, took on the job, with the help of many other members, of installing the 2x6 and 2x4 roof joists. Gerry measured and did the difficult compound angle cuts with ease and got everything toe-nailed in place. Later, less skilled carpenters nailed in the joist hangers that really carry the load. Then Gerry and his crew installed the plywood sheathing on the 20 pie-shaped sections of roof and tied them together with metal scraps.

One detail I hadn't worked out in the plans was the door headers and how they fasten to the front columns. The other was the detail of the connection between the bottom of the clerestory window panels and the edge of the lower roof. With Gerry's help we worked it out on site, and these connections are strong and secure.

While the roof was being flashed and shingled and all the joints caulked, Stan James finalized the turntable design and John Nicholson had it fabricated in his



structural steel shop. The $^3/_{16}$" aluminum plate for the roundhouse doors was purchased cut-to-size, but Curt Silver still had a lot of work to complete them — T-hinges and jamb plates to install, latches to design and fabricate and adjustments in door size to match the door openings on the building. John Lisherness made the parts and installed the wheels on the turntable and then made up over 450 feet of storage and entrance track from steel channel. Hal Sparks made the switches for the passing siding and lead track, built track and made the window frame parts and installed those on the exterior. Stan James and Steve Vitkovits put in the $^1/_4$" thick pebbled *Lexan* glazing. Herm Volz, Clarke Simm and some other members painted and painted again over the whole building. Curt Silver and Jim Carroll primed and finish-coated the aluminum doors. Jim Lowe supervised raising the high track to increase clearance underneath as Hal Sparks designed and built the trestle overcrossing that increased the clearance further. Jim Dameron, Bruce and John Eaton and lots of others laid the new track and got it ballasted.

Fifteen months after construction began, the roundhouse was ready for occupancy. Those Golden Gate Live Steamers who had financed most of the construction cost by paying for long-term leases in advance, started moving in their engines and rolling stock. The last two unleased storage tracks were rented quickly to fill the 20-track building.

What the club has is a soundly-engineered storage building (no electricity, gas, water or sewer inside) that is earthquake-proof, uncluttered and spacious. Each track is $17^1/_2$-feet long inside the building, plenty for even the largest $1^1/_2$-inch scale engine or smaller engines and two or three freight cars. Eventually, a complete engine servicing yard will be built, with steaming tracks, water, compressed air and electricity at trackside.

As other clubs have found, such a facility makes it easier for members to steam up more often, without the hassle of unloading and loading heavy engines and cars each day before and after a run.

Using an air rivet gun, Steve Paluso (**top, left**) sets the 3/16" Pop rivets that hold the doors in place. The use of aluminum columns and wall-fastening plates keeps the interior space open and uncluttered (**top, right**) and gives more room. Aluminum plate doors 3/16" thick (**center**), built by Curt Silver, are installed by Curt with the help of Steve Paluso in this photo by Hal Sparks. Hal Sparks brings the first rolling stock to the new storage building (**below**) with his Baldwin-Westinghouse electric. Hal built four dual-gauge switches and most of the track for the facility, as well as engineering and constructing the skewed trestle undercrossing for the lead track entrance to the area. Someday, a lift or swing bridge may eliminate the bottleneck caused by the elevated small-gauge tracks.