

# **Building a 28mm German Machine Gun/Observation Bunker**

**By Binhhan Lin**

## **Introduction**

### **Principles of Design**

German design and placement of fortifications in WW2 was influenced by the emphasis on offensive operations. Therefore, fortifications were seen as an extension of offensive capability and not just a defensible position. The German preference was for smaller, scattered fortifications in-depth rather than large extensive complexes. Bunkers such as observation posts, machine gun nests, anti-tank emplacements are common but usually small and rarely housed multiple installations. Bunkers and fortifications are viewed as opportunities to allow a minimum of personnel to defend a section or area, thus freeing others for offensive operations.

German emphasis on offensive power gives priority to fields of fire or observation. If the bunker is used for supply or merely housing personnel, the protective and camouflage aspects of the terrain are considered. To minimize vulnerability to attack from above (either high angle weapons such as mortars or howitzers, or bomb attacks from aircraft) the bunkers are kept to a minimum size, usually just one gun or squad.

### **Construction**

In general the preferred materials are concrete and steel. However, depending on availability, wood, brick, masonry or earth are used. When concrete and steel is used, the standard thickness of walls and roof are 6 feet 6 inches (2 meters), but may vary depending on bunker purpose and availability of materials. Concrete is usually reinforced with steel bars that form a latticework of cubes that are approximately 12" per side. The interior roof is generally supported by steel I-beams. Resting on the lower flange of the I-beams are steel plates that form a protective ceiling to prevent spall from the concrete from flying down when the top of the bunker receives a direct hit. More minimal structures will replace the steel I-beams with reinforced concrete beams and skip the steel plate ceiling altogether to save on critical materials.

### **Example of an Observation Bunker**

Figure 1 shows an example of a Type 636 Observation bunker. Overall dimensions are 60 feet deep, 49 feet wide and 27 feet tall. Wall and roof thickness are 6 feet 6 inches. It is built to house 9 enlisted men and 2 officers on duty and contains areas for radio direction finder equipment, communication and a plotting room. Close defense is covered with two loop-holed machine gun positions.

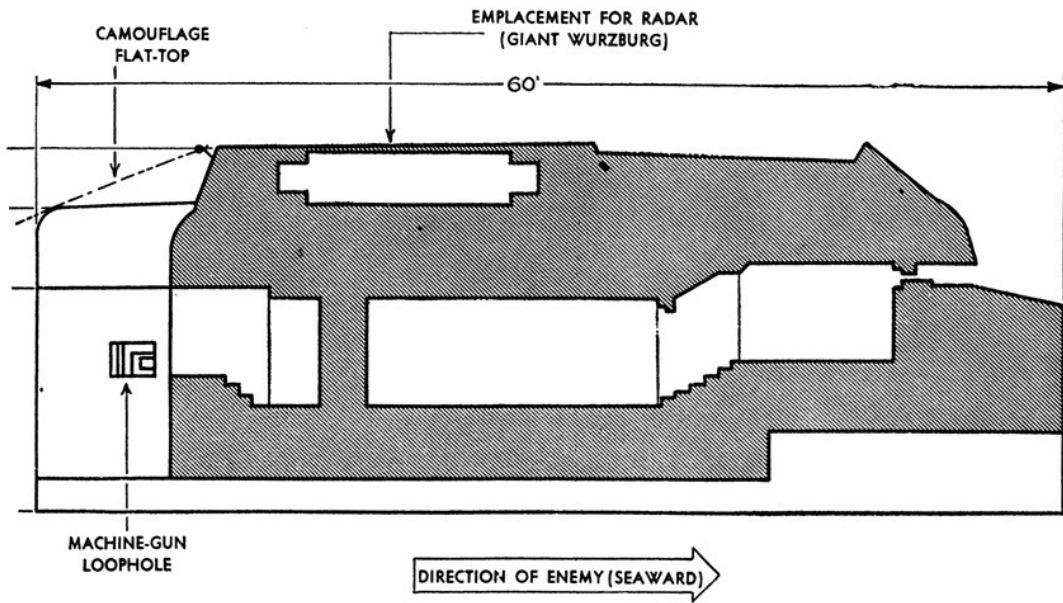
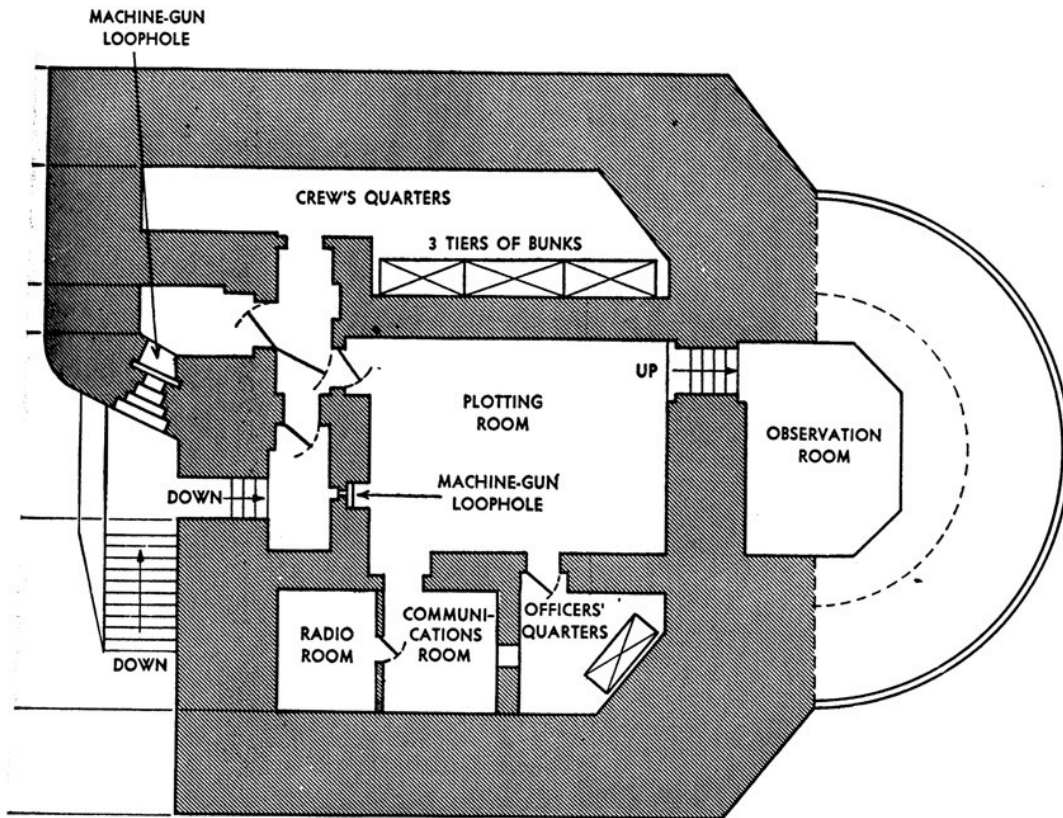


Figure 15.—Typical observation post, Type 636.

Figure 1 – Observation Bunker Diagram (US War Department)

## **Building the Machine Gun/Observation Bunker**

### **Design**

Using the Type 636 bunker as a starting point, the design of the bunker tried to follow the German general design principles. The size was kept to a minimum, with the bunker capable of housing two MG-42 crews, observation personnel plus defensive personnel and supplies – roughly 16 officers and men. The design was made to be true 28mm scale and sized appropriately. The scale size is 92 feet wide, 87 feet deep and 21 feet high. The roof was scaled to be 6 feet thick and the walls 3 feet thick.

From the front, the observation/MG area was a half-circle area on a platform raised above the floor of the rest of the bunker. Immediately behind was the bunks/storage area. To the right is a plotting room/storage area with a defensive loop-hole and finally a small cubby for a second MG loop-hole. (Figure 2)

The base size would be 2” larger in each dimension than the bunker to allow for sloping terrain to be added to “bury” the bunker.

### **Materials**

The base of the bunker is Medium Density Fiberboard (MDF) with a thickness of 1/8”. The base of the roof is made of a similar material.

The walls are composed of foam core poster board of various thicknesses, from 3/16” to 1/2”. The observation platform and slits are made from corrugated cardboard. Doorframes and supports are made from balsa wood strips. Manila folder and thin cardstock is used to cover some portions of the corrugated cardboard.

The top of the bunker and the terrain ground is formed from 1” or 2” blue or pink Styrofoam building insulation. The surfaces are covered with wall spackle to provide a concrete or earth texture. Gray and black spray paint were used for the primer and main coats while Brown, beige green, and gray acrylic paints were used to finish off the details. Texture paint and gravel was used to texture the exterior terrain, while a mixture of green and brown flock was used for grass patches. Printed details such as propaganda posters and loop-holes were printed from a color laser printer.

Door are made from balsa, plastic strip and 1” metal washers as a base.

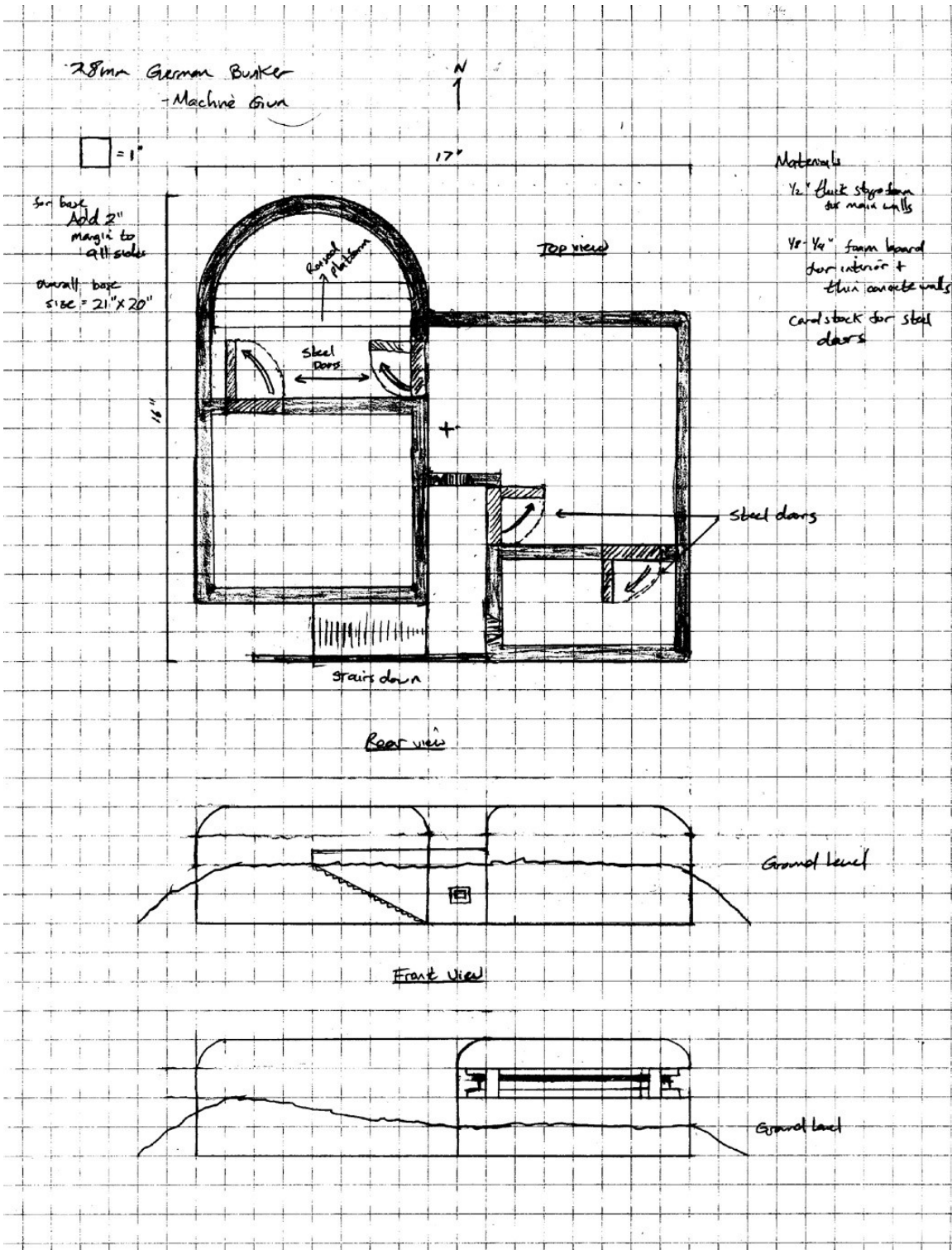


Figure 2 – Design drawing of the machine gun bunker.

## Construction

A base of 20" x 21" was cut from MDF. Main wall sections were made from 1/2" thick foam core were cut to 3" height and various lengths and glued to the base, 1" wide paper strips were used to reinforce interior corners and to help attach the base of the exterior walls (Figure 3). A raised platform and wall were made using corrugated cardboard (Figure 4). The demi-circles and arcs were made using a compass to draw full circles, which were then cut and stacked. The arcs are circles with a smaller circle cut out from the inside.

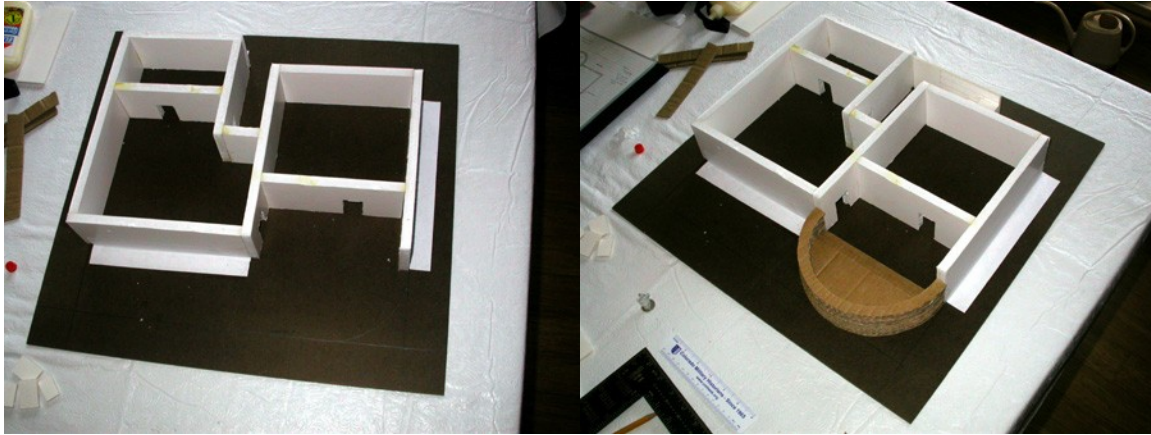


Figure 3&4 – base with main wall sections and observation platform.

The access staircase was made by stacking 3/16" steps of foam core, then gluing the together with the retaining wall made from 3/16" foam core. The stair steps are 1" deep to allow a figure on a base to stand cleanly on the step (Figure 5). The retaining wall is flush with the back of the bunker. (Figure 6)



Figure 5 &6 – Entry stairs and their placement at the back of the bunker.

The observation platform is covered with strips of manila folder (blue) on the inside (Figure 7) and thin cardstock on the outside (Figure 8).

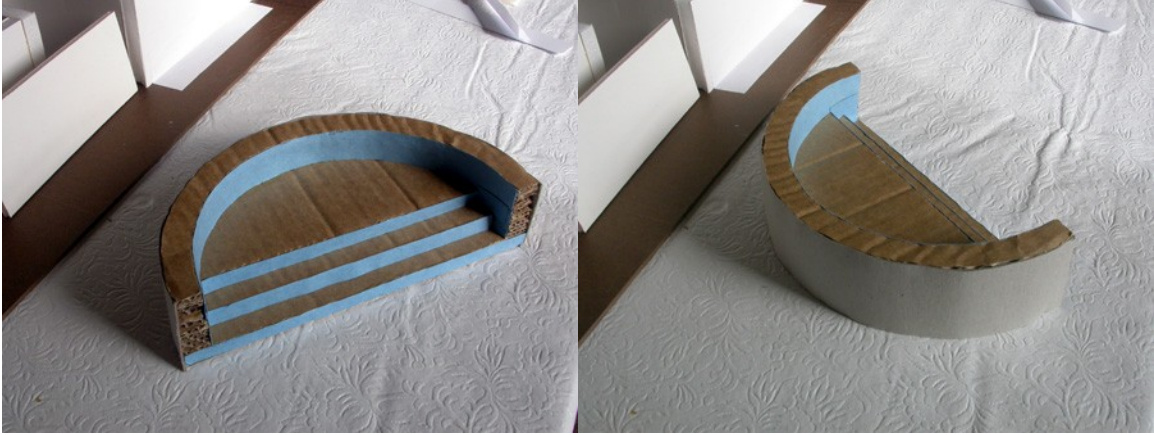


Figure 7&8 – Covering the observation platform.

A thin layer of spackle (wall compound) is applied to all the concrete surfaces except the main floor– the walls, the floor of the observation platform and the stairs. (Figures 9 -11)

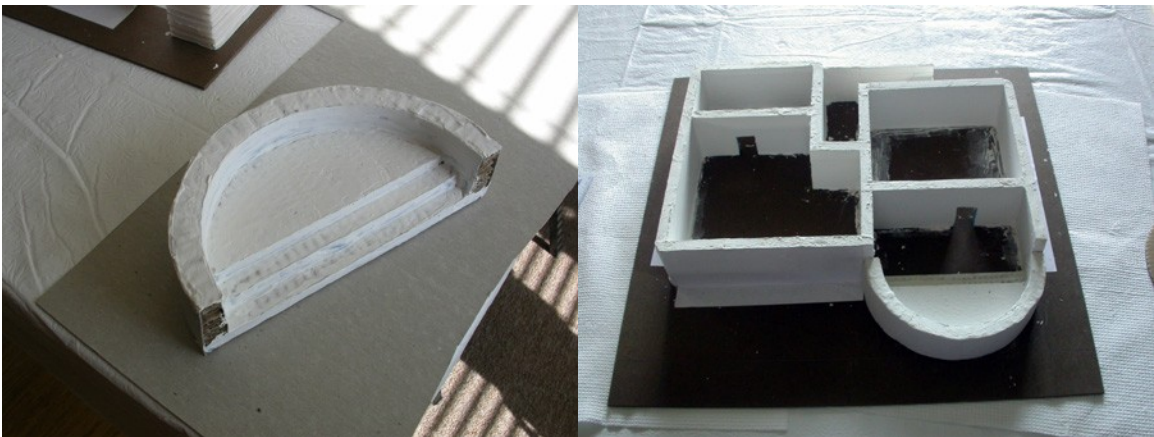


Figure 9 & 10 – Observation platform and walls covered with spackling.

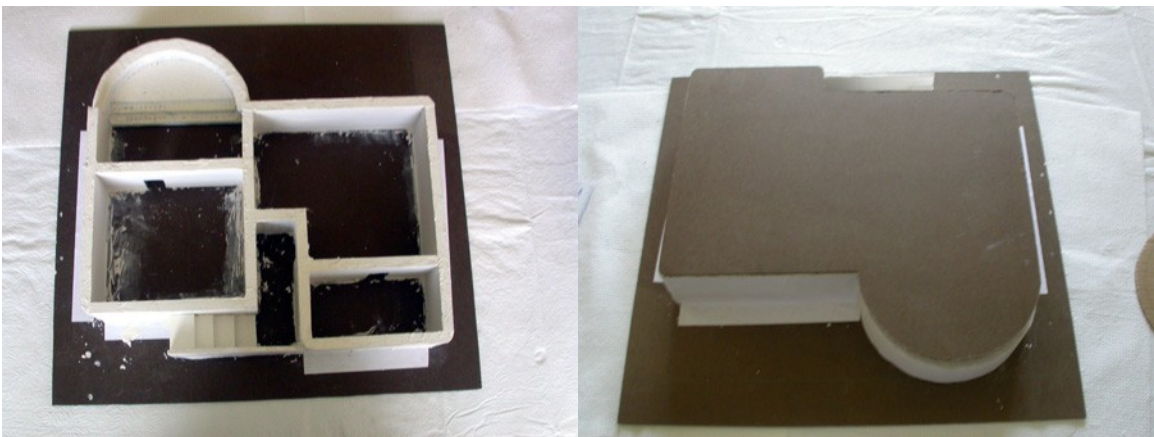


Figure 11 – Another view of the spackled walls. Figure 12 – base of the roof

The base of the roof was made from another piece of 1/8" MDF. The pattern was traced by placing the bunker upside down on the roof piece and tracing around the edge of the walls to ensure a good matching fit (Figure 12).

The roof base was then used as a template to cut out a piece of pink 1" house insulating foam (Figure 13). A 1" border was marked around the edge of the rooftop to mark where the roof curves down (Figure 14).

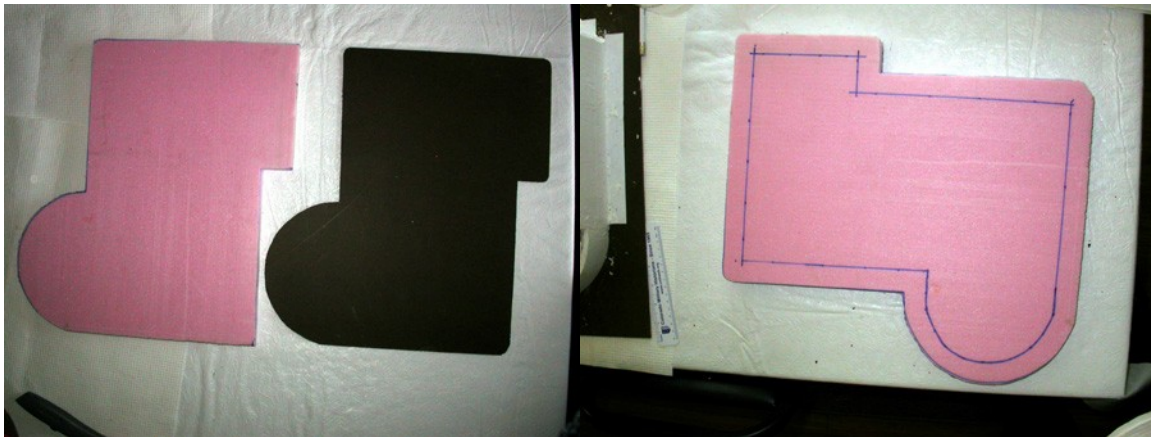


Figure 13 & 14 – Roof base and roof foam parts.

The roof edge was cut down in a rounded shape using a belt sander, hand sander and some hand sanding (Figure 15). The roof piece was primed with black spray paint. Extra care was used in applying the paint in very thin coats, as the solvent in spray paint will dissolve the foam. Alternatively a coat of latex paint would work as a base layer (Figure 16).

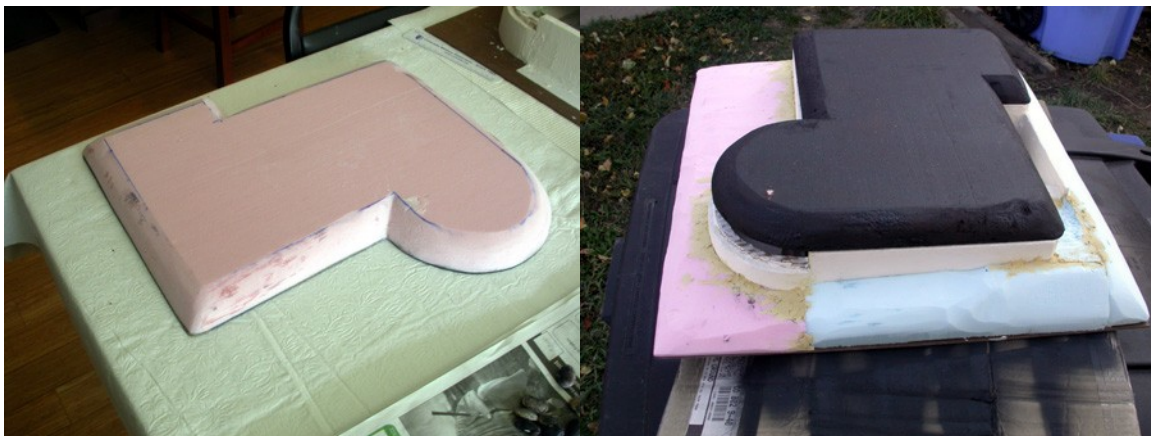


Figure 15 & 16– The roof piece with the edges shaped and primed black.

The terrain on the outside of the bunker was built up using pieces of 2" thick house insulation (pink and blue) and tapering the edges to meet the edge of the bunker base (Figure 16-18). Putty was used to fill the gaps between the sections.



Figure 17 & 18 – Addition of the exterior terrain pieces.

The base was primed with black spray primer. The bunker portions were then painted gray. The exterior terrain was painted with brown texture paint, and then highlighted with beige. Accents such as gravel and grass patches were then added. The original opening of the observation platform was too tall, so it was narrowed by the addition of two vertical supports (made from balsa) and an additional two-layer rim to bring the top of the opening down (Figures 19 and 20).



Figure 19 & 20 – Addition of supports and top rims to decrease opening size.

The additions were glued in, spackled and painted to match the rest of the bunker. Additional details such as propaganda posters, MG loopholes and steel doors were added at the end (Figures 21-27).



Figure 21 & 22 – Completed bunker, roof removed.



Figure 23 & 24 – Completed bunker, roof in place.



Figure 25 & 26 – Detail of observation slots and propaganda posters.



Figure 27 – Detail of a door and loophole.

### **Conclusion**

While this was a major project, taking several weeks to complete, the basic techniques for design and building are relatively simple. Although relatively easy to construct, this terrain piece is rather large and will dominate any tabletop that it sits on and so I don't anticipate creating another like it. Additional details such as camouflage paint, netting or furniture and equipment to fill out the interior will also increase the visual appeal.

### **Bibliography**

US War Department. *Handbook on German Military Forces (1945)*. Baton Rouge. Louisiana State University Press 1990.