Minnesota Historical Society

CONSERVATION TREATMENT OF THE USS WARD FORWARD GUN, MINNESOTA STATE CAPITOL MALL

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The USS Ward forward gun (built in 1918) fired the first shot in World War II in the defense of Pearl Harbor, Hawaii on December 7, 1941. It was installed in its current position on the State Capitol Mall in 1958 by the Minnesota State Centennial Committee, after being presented to the State by the US Navy. The gun is made of steel with brass components. A bronze and a nickel-plated plaque were installed on the gun in 1958.

Figure 1. Overall view, PR side, before treatment.

Figure 3. The PR side of the gun after treatment.

The gun was surveyed by conservators over the years beginning in 1989. The before treatment conditions were observed during the 2005 survey, when the photographs were taken. State Plant Management painters have been touching up the gray enamel paint over the years in attempts to keep the metal from rusting. There were large areas of paint on the barrel that have failed completely (Figure 2). The mounting base of the gun is bolted to a raised concrete base, and the concrete had become stained by rust from the bolts (Figure 4). There were small amounts of paint loss and corrosion around the muzzle area (Figure 7). The interior of the barrel was coated with a thin layer of stable corrosion. Trash, plant material, and remnants of birds nests were found inside the barrel.

Figure 2. Failed paint and rusting on underside of the barrel.

Figure 4. The front underside area of the gun before treatment. Note the rust stains near the bolts on the concrete support base.

Figure 5. The PL side of the gun before treatment. Note the corrosion on the nickel plated dedication plaque.

Figure 7. The muzzle before treatment showing minor paint loss and corrosion on the exposed metal surfaces.

Figure 6. The PL side of the gun after treatment. Note the dedication plaque after cleaning and stabilization and the elevation gauge.

Figure 8. The muzzle end of the gun after treatment showing the modified pipe plug. The plug is removable and will prevent water intrusion and trash accumulation.

Both fire control operator seats had failed paint coatings and metal losses with corrosion seeping out in the central areas (Figure 9). The areas of most prevalent paint failure and subsequent rust staining were the undersides of the swivel mount and recoil tubes (Figures 11-13). These areas had some paint layers on them from previous painting campaigns, but have limited accessibility by brush application, therefore the paint was not applied sufficiently enough to prevent corrosion.

Figure 9. The PR fire control operator's seat before treatment showing paint and metal losses.

Figure 10. The PR fire control operator's seat after treatment showing epoxy fills and current paint.

Figure 11. Underside of the swivel mount showing paint loss and corrosion.

Figure 12. Underside of the swivel mount showing rust stabilizer application.

Figure 13. PR side recoil tube springs exposed due to loss from corrosion.

Figure 15. PL underside of recoil tubes; before treatment.

Figure 14. PR recoil tube area after epoxy fills and paint.

The copper alloys components had not been cleaned or coated prior to this treatment. The extant brass parts had been painted over, with the exception of one handle on the PR side. The nickel-plated dedication plate (PL side) was corroded through the plating, and was bent at the upper PL corner (Figure 10). The bronze State Centennial dedication plaque mounted on the PR side is tarnished, corroded, and stained. Any original lacquer had weathered off, allowing the metal to darken and turn green. Several of the letters had surface losses (Figure18). The brass elevation gauge on the PL side of the breech was obscured by corrosion and paint (Figure 16). The brass manufacturer's plates on the PR and PL sides were obscured by oxidation. The plate on the PL swivel mount area was missing the left side screws (Figure 22).

Figure 20. The PL side nickel-plated dedication plaque showing corrosion and scratches.

Figure 22. The manufacturer's tag on the PL swivel mount during treatment showing left side screws missing.

Figure 21. The PL side nickel-plated dedication plaque after cleaning and clear coating with a corrosion.

Figure 23. The PL side tag after treatment showing replacement screws.

Conservation Treatment

During July of 2006, the Society's Senior Objects Conservator coordinated the re-painting with the Plant Management Paint Shop. The painters removed scratches and graffiti with mild abrasion, than applied a flat primer to those areas and rust spots. When dry, they applied a semi-gloss gray enamel overall. The interior of the swivel mount and areas on top of the recoil tubes were coated with Rust-X corrosion stabilizer. The Rust-X primed surfaces were painted by the Paint Shop with enamel paint.

The conservator filled in missing areas in the metal components where accessible with a two-part epoxy putty (Abatron Corp.). After sanding, those areas were primed and painted by the Paint Shop. The two operator seats and the forward PR recoil tube were filled and painted (Figure 14).

The two copper manufacturer's plates were cleaned to stable metal surfaces with 10% w/v disodium EDTA in deionized water and clear coated with spray Incralac. Incralac is an acrylic lacquer resin that contains a copper corrosion inhibitor. The missing fasteners were replaced. The brass elevation gauge was also treated as described above (Figures 17 and 23).

Figure 16. PL side rear of the gun showing the brass elevation gauge. The gauge had copper alloy corrosion on the surface and spots of over-paint.

Figure 17. The gauge after cleaning and clear coating with a corrosion-inhibited acrylic lacquer.

The Centennial dedication plaque was cleaned with the disodium EDTA solution to remove tarnish and staining. The raised lettering was cleaned with 180-grade sandpaper to remove tarnish and brighten the metal. The lower background was coated with carnauba wax tinted with burnt umber pigment and buffed. The entire plaque face was spray coated with two coats of Incralac (Figure 19).

The debris was removed from the barrel and the interior was cleaned. The barrel was closed with a removable 4" pipe plug. The pipe plug consists of two galvanized metal plates on either side of a rubber gasket. A bolt goes through the center of the plug and fastens on the exterior plate with a locking bolt. The circumference of the rubber plug was widened with adhesive backed Volara cross-linked polyethylene foam to fill in a 1/8" gap between the plug and the inner diameter of the barrel. The exterior plug plate was coated with flat black spray paint (Figure 18).

Figure 18. The PR side 1958 bronze dedication plaque before treatment showing staining and corrosion accumulation.

Figure 19. The 1958 bronze dedication plaque after cleaning to remove corrosion and clear coating with a corrosion-inhibited acrylic lacquer.

Annual Maintenance

In order to preserve the gun in a stabilized condition, it is essential to have an annual maintenance plan in place. The following is a proposed annual maintenance scheme:

Responsible party	Maintenance Action	Frequency
Plant Management Grounds Crew	Water-spray wash the gun to remove bird-droppings, plant matter, and other accretions.	Fall before November 11 ceremonies; Spring; clean additionally as needed.
Plant Management Paint Shop	Inspect before Nov. 11 at end of summer; touch up scratches and incipient rust spots	Late summer and early Spring
MHS Conservation	Inspect overall, report problems to Plant Management; inspect lacquered parts and epoxy fills; stabilize as needed; re-clean brass as needed and re-coat	Late summer and early Spring

Conclusion

The USS Ward Forward Gun is one of the many monuments on the State Capitol Mall grounds that are being preserved and maintained by the Society and the State Plant Management Department. Continued inspections, annual preventive maintenance, and conservation treatments as needed will keep the gun in stable condition as we approach the 50th anniversary of it's dedication on the Mall, and Minnesota's Sesquicentennial in 2008.

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