



MINNESOTA HISTORICAL SOCIETY

## THE CONSERVATION OF AN 1879 HASKELL AND BARKER WOODEN BOX CAR

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### Introduction

In 1962 the Minnesota Historical Society acquired an 1879 wooden box car, Serial Number 1320. The box car was donated by the Great Northern Railway. It was made in Michigan City, Indiana by the Haskell and Barker Company. The car was used by the St. Paul, Minnesota and Manitoba Railway, which was acquired by the Great Northern Railway in 1879. After acquisition by the Society, the box car was displayed in the Transportation Museum in Duluth, MN. The boxcar was inspected by a railroad stock engineer in 2001 and suggestions were made on how to secure it for the move to the Mill City Museum (MCM). It was moved down to Minneapolis and placed in the Rail Corridor area of the refurbished Washburn-Crosby A Mill in 2002 as part of the MCM permanent exhibits. The intent of the Loading Dock and Rail Corridor exhibit is to show an original late 19<sup>th</sup> century boxcar in position at the loading dock where finished grain products were loaded onto the trains for transportation to various markets. After it's safe arrival and placement on the loading dock tracks, treatment commenced.

### Object Condition

The goal of the treatment was to clean and stabilize the existing components and materials of the boxcar and to return the box car to an as-used, well-maintained condition. Restoration of missing or deteriorated parts was kept to a minimum.



Figure 1: Lifting the car at the Transportation Museum prior to the move to Minneapolis.



Figure 2: Moving the box car into the Mill City Museum Rail Corridor area.

Until being placed indoors in MCM, the box car had been stored outdoors. The overall condition of the boxcar was fair when received for treatment. Most of the paint remained on the body, and on the iron trucks and wooden undercarriage parts as well. The interior was very dusty and there was debris from years of use as a storage room for



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museum equipment and building supplies at the Transportation Museum.

During display at the Transportation Museum, water and weather damage to the roof necessitated replacement of the entire roof structure sometime during the 1980's. There were areas of recent water damage to a section of the roof boards and underlayment and to lower areas of the exterior siding boards.

### Conservation Treatment

The first step in the treatment was to clean the exterior with a dilute soap solution to remove grime and dust. The interior was vacuumed and cleaned with compressed air after the larger debris and parts were picked up.

Once the interior was cleaned, the previously restored unpainted ceiling was toned with Liquitex acrylic dispersion paint applied with an airless sprayer. In order to show how the box car was used at the mill, empty reproduction flour barrels were acquired and are displayed inside.

The window end of the box car sustained the worst damage to the paint on the siding boards. The paint layer was brittle and had lifted off the wood siding surfaces. The treatment consisted of consolidation of the existing paint with Rhoplex 234 acrylic emulsion adhesive solution 1:1 in deionized water. The solution was brushed under the lifting paint and allowed to set. The consolidated paint was heat-sealed to the wood with a tacking iron over silicone-release polyester film. This method was used over the extent of the siding boards where there was lifting paint.

When the paint was stabilized, the loss areas were in-painted with Liquitex acrylic dispersion paints to blend in with the existing paint color.

Structurally unstable areas of the siding boards were first consolidated with Abatron two-part Liquid Wood epoxy wood consolidant. When the epoxy set up, the broken areas were mended with poly-vinyl



Figure 3: Proper right side view of the boxcar before treatment.



Figure 4: Cleaning of interior in progress.



Figure 5: Interior view of the ceiling.



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acetate emulsion wood glue and clamps. Once the boards were properly positioned and mended, loss areas were in-filled with Abatron Wood Epox two-part epoxy putty and surfaced with Permafix acrylic emulsion putty. After smoothing with sand paper and a compressed air rotary grinding tool, the fills were in-painted with Liquitex acrylic dispersion paints.



Figure 6: View of window end of box car after paint consolidation and in-painting.



Figure 7: Wood fills being applied by the author.



Figure 8: Proper right side of boxcar showing finished fills below door opening.



Figure 9: View of deteriorated roof boards before treatment.



Figure 10: Detail of roof board stabilization in progress. The darker areas show where the liquid epoxy was used.



Figure 11: Overview of roof repairs.

The proper left front end of the roof had an approximately six foot long area of boards that had sustained severe water damage during outdoor display and were no longer structurally stable. The rotted wood was powdering and breaking off.



The deteriorated boards were removed and discarded of. The underlying plywood roof support was cleaned. Remaining parts of the outer boards were consolidated with the Abatron Liquid wood epoxy.

New pine flooring boards were purchased and cut to fit the loss areas. The new boards were attached to the roof with screws. The new boards were toned with Liquitex acrylic dispersion paints to blend in with the existing roof color.

The trucks and undercarriage were in stable condition overall; however, there were areas of deteriorated paint and corrosion products on the metal surfaces.

The metal surfaces were cleaned with compressed air needle scaling tools and rotary steel brushes. The heavy corrosion products were removed down to a more even oxidized surface. The metal surfaces were then brush coated with Rust-X corrosion stabilizer. The formulation consists of tannic acid and a water-based ethylene vinyl acetate (EVAc) resin and can be used on painted surfaces as well as on raw metal. The tannic acid reacts with the corrosion products and forms a stable surface. The EVAc resin forms a durable coating over the surface, obviating the need for further coating.

The exterior brake adjustment mechanism was removed prior to moving the box car to the MCM. The mechanism was cleaned and waxed before reattachment in the original position.



Figure 14: Tannic acid/resin treatment in progress on inner surfaces of wheels.



Figure 12: Before treatment detail of the cover of one of the journal boxes.



Figure 13: Before treatment view of the inside of a wheel and axle.



Figure 15: Tannic acid/resin treatment results on metal components with paint remnants.



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Figure 16: Before treatment view showing brake mechanism attachment area.



Figure 17: View of the brake mechanism in place.

### Conclusion

The treatment has returned the box car to an as-used, well-maintained condition. The treatment as described here took approximately 90 hours to complete. Ted Bores, who held the position of Objects Conservation Lab Technician from 2000-2003, assisted with the treatment.

The fills can be removed if necessary for re-treatment, yet are robust enough to withstand touching by visitors as this is an accessible object. The treatment was also designed with continual object cleaning in mind. The MCM exhibits maintenance staff is responsible for upkeep of the large functional objects on display. The Minnesota Historical Society objects conservation lab worked with the museum staff in training for objects maintenance and has developed a cleaning manual and schedule.



Figure 18: Overview of the completed box car.