

Capturing Light

Maintaining The Beauty Of Stained Glass

by Susan D. Turner

The glorious colours and designs of stained glass windows have been associated with European churches for centuries. Although glass has existed since Egyptian times, it became a significant feature in buildings with the advent of the Gothic arch, where larger openings were possible. The tall glass panels of the Gothic cathedral served as a biblical textbook for the illiterate congregation.

In North America, building glass was primarily imported from England and Holland through the 17th and 18th centuries, since colonists failed to establish viable glass works until the 19th century. Stained glass was present in many buildings, such as Georgian and Victorian houses, churches and other public buildings designed in the traditional pictorial style. The 1893 Columbia Exhibition in Chicago witnessed the onset of the Art Nouveau style, followed rapidly by Art Deco. Stained glass was integral to these architectural styles.

Stained glass is fragile, susceptible to breakage by accident, vandalism or negligence. Any repairs need to be undertaken by a professional. It is prudent to thoroughly document stained glass before anything happens to it. If it is ever broken, this will provide a record for both insurance purposes and restoration. It can also serve as a benchmark against which to monitor any deterioration.

Research

Before undertaking a restoration project, it is essential to document the window with photographs taken in both reflected and transmitted light. The first will illustrate surface details of the window, such as the came (lead or brass strips which hold the glass together), texture of the glass, etc., while the transmitted light passing through the window gives information on the colours of the glass and the overall effect produced.

Dating the window is possible through research and inspection. Archival research may determine if the window



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Detail of window, St. Andrew's Episcopal Church, Ann Arbor, Michigan.

is original to the building or if it was installed later when funds were available. On-site inspection for consistency of the frame profiles and for the construction of the rough opening will also give clues to its history. The style of the stained glass—whether traditional, Art Nouveau, Art Deco or Prairie—will point to a general time period, while the composition of the glass, came and frames can date the age of the window into a range of years. Specific glass types were manufactured in specific periods (such as Tiffany's patented opalescent glass in the 1890s), certain profiles of came were produced at certain times, while particular patterns of windows were mass-produced during particular periods. Finally, some significant studios would sign their pieces, although absence of a signature doesn't mean that it is not attributable.

Symptoms Of Deterioration And Repair Methods

There are three main aspects of deterioration in leaded windows: glass, decorative and structural deterioration.

Glass Deterioration

Longevity of glass is tied to its original composition and manufacturing process. While this cannot be controlled, exposure to the elements and acid rain can be. In some instances, exposure to the weather causes a reaction resulting in delamination or weeping of the glass. Acid rain can cause etching of the surface, leaving the glass dull. A protective outer layer of clear glass could prevent further



PHOTOS: SUSAN D. TURNER



A Tiffany glass window was discovered intact behind wood siding in a former Unitarian church in Ann Arbor being renovated for office use by Hobbs and Black Architects. Tim Osius, a stained glass artist, removed the window, cleaned it with water alone, and added several saddle bars to support sagging in the glass. The rest of the comes were stabilized as found, and the window was installed. During this work, he uncovered the words "Tiffany Studios," dating it to ca. 1902. Further research authenticated that the piece was by Tiffany.

deterioration, but care must be taken to ventilate the cavity in between this layer and the interior, in order to prevent heat build-up that in turn would accelerate the deterioration of the lead comes.

Decorative Deterioration

Glass painting—used for faces, patterns or lettering—is applied to the glass as a mixture of ground glass and is then refired. If the paints were not fired to the right temperature and duration, the paints could react with the environment, causing flaking or fading. In some instances, a professional conservator could stabilize the piece, or repair it. This type of specialized work should never be undertaken by someone who does not have a great breadth of experience.

Structural Deterioration

This can be caused by failure of the comes and support members, failure of the waterproofing, or physical damage wreaked by vandalism or fire:

■ Comes

Depending on the composition (lead, zinc, or sometimes brass and copper) and the quality of the workmanship, comes normally last 80 to 100 years. During construction, after the leading is complete, the work is placed in a frame with crossbars, or saddle bars (which are stiffer) and attached to the leading by tie wires soldered to the leading. If the original design was insufficient, there could be too few stiffeners, allowing the glass to sag. If the stiffeners are exposed to moisture, they could rust and fail. Poor quality soldering could also permit deterioration. Finally, comes can fail by metal fatigue due to expansion and contraction caused by extremes of heat and cold. These problems can be solved through the careful repair of broken solders, through the careful introduction of additional structural supports, or—in extreme cases—through replacement of failed comes.

■ Waterproofing

After the leading and frame were built, the exterior surface was rubbed with a waterproofing compound to make the joint watertight, and to prevent rattling of the glass pieces. When a window rattles, it is time for this waterproofing to be replaced. This work must be performed with the window on a flat surface, and cannot be done successfully in situ. Great care must be taken to remove the window from the frame, and close in the opening, before relocating the window to a workshop. Normally, comes do not have to be replaced, although occasionally they may require resoldering.

Finally, when the window is replaced into the frame, it should be affixed with nails, which are then covered with a sealant. This sealant must be compatible with the glass, since some release acetic acid as they cure and that would cause damage to coloured glass. Neutral cure silicone glazing must be used.

■ Physical Damage

An example of a catastrophic loss is the fire in St. John's Anglican Church, Lunenburg, N.S. Most of the windows were greatly damaged, resulting in loss of the historic glass; some were completely destroyed. Photographs and the remnants of the windows served as guides for their re-creation, while glass shards left on site were used to guide the selection of replacement glass. Had exhaustive photography been carried out in advance of this disaster, the task of re-creation would have been easier and more accurate.

Cleaning

While cleaning is generally a preservation technique for glass, it is also a major cause of its damage. Frequently, stained glass is set into stone frames. This means that when masonry is cleaned, the windows and frames must be protected by plywood and plastic. Regarding the build-up of pollutants on the glass itself, it is best to seek a professional assessment. Cleaning glass should start with purified water. Next, a mild non-ionic detergent can be used on a small test-patch. Occasionally, where there is stubborn grime or a coating has been applied, more aggressive removers containing acetone could be tried by a professional on certain types of glass. Painted glass should never be cleaned without professional testing for colourfastness and surface stability. Even then, work should proceed only with the mildest of methods. It would be better to accept a deteriorated image than ruin the work by trying to clean it.

Conclusion

Restoration of stained glass is a highly technical skill. Always use an experienced conservator to work on significant works. Only minor repairs should be performed in place, such as the replacement of a small piece of glass. Otherwise, the work should be brought to the workshop.

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