

Analysis of the painting techniques

Areas using a badger

The painter used a badger to create a matte finish. The techniques used are similar to those of water-color; made by blending half-tints. Colors are applied one on top of the other with the badger, the brush leaving traces. Firing can happen between each layer.



Highlighting

Marks were made with a sharp instrument to high-light some areas.



Trace

There is little trace work. It is limited to a minimum: eye lashes, structural lines, they are transparent and very soft using a brown or green grisaille.



Samples of paint

Several samples of paint are done to match the colors of the original pieces. Several grisailles and red enamel are chosen. The medium used is cloth oil.

<i>For the flesh</i>	<i>For the shadows</i>	<i>For the trace</i>
$\frac{3}{4}$ Umber brown 403 $\frac{1}{4}$ Stencil Brown + a touch of Yellow red GM 3001	$\frac{1}{2}$ Grey green 1220 $\frac{1}{2}$ Shammy	$\frac{1}{2}$ Grey green $\frac{1}{2}$ Bistre brown + a touch of Black stencil



Graphic research

David Fraser has developed a very helpful technique using digital photos. Each piece of painted glass is photographed with a digital camera and then transferred to the computer. The images of each piece are then modified in the software “Photoshop” to match the real dimensions of the glass pieces. Some details can be added during the process, like trace lines, colors. The image is then reversed horizontally (the painted pieces must be painted reversed) and printed on vellum paper. This transparent print helps with the tracing and painting process because the cover plate pieces can be laid on top of them on a light table.

Cover plates

To restore the lost details without affecting the original pieces, a cover plate is applied to the original damaged piece of glass. As the flesh parts and the donkey are painted on opalescent glass, the cover plates are laid on top of the pieces otherwise they would be illegible. The missing artwork is painted on the untextured, colorless piece of glass that was cut to the shape of the piece (we used the pieces which were made to maintain the leads together) over which it will be plated. The paint is applied to the surface of the glass plated closest in proximity to the original, deteriorated paint surface. This is done to diminish the parallax when the restored piece is viewed from an angle. It is a challenging process to paint a reversed image from the original painted piece. The cover plates, once done, are applied mechanically with foil and floated to the remaining leads. This process is chosen because of its total reversibility.

The painted pieces found in Brown Baptist Memorial Church give a lot of information for the restoration. Although they are great references, they can’t be copied literally one for another. David Fraser has the philosophy “Less is more” in the restoration process; during the painting of the cover plates, not more than the minimum of information to make the window legible again will be chosen. The cover plates must be suggestive not inventive.

Original piece	Cover plate	Original piece + cover plate
		
		
		
		

7. Re-leading

Every task involved in the re-glazing of this window was driven by the fact that the majority of the inside lead skeleton was saved. The inside lead was in most cases high heart lead and held the two (up to three in one case) layers of glass. The process of rebuilding went as follows:

- The first layer of lead was skinned of its face on the reverse side,
- The two (or three) layers of glass were removed from the lead skeleton and cleaned,
- The first layer was reinserted into the high heart lead,

- Each piece of the second layer was copper foiled and reinserted on top of the other layer. (In the case of the three layers, the one in the middle is held by the two others),

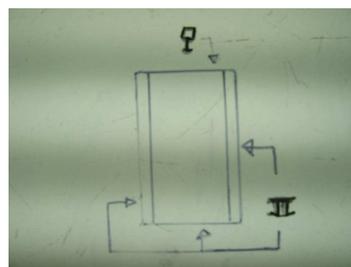


- The foiled glass was then soldered to the heart of the lead and the lines were floated. This creates a strong base that retains the original lead face.

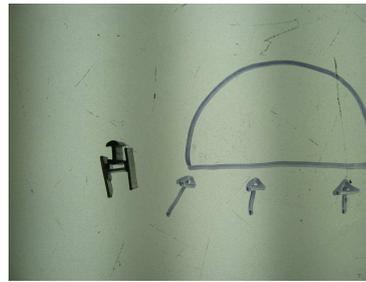


- The borders are plated with transparent, non textured glass and re-leaded with 5 mm high heart on one side and a hollow high heart lead 12 mm on the perimeter. The combination of the plates and the hollow high heart lead make the window stronger than it ever was.

- 4mm U-lead is glazed on the upper part of the main panel to make this part fit in the frame.



- 3mm U-lead is glazed on the lower part of the top panel. And then a 13 mm lead is customized (the heart is shaved away) and is glazed on both sides.



- The same copper foil process is applied to the painted cover plates. The original leads are cleaned with a metallic brush to get rid of the oxidation, and then they are floated. The copper-foiled painted pieces can now be attached on top of the original leads. The cover plates and the areas that have received some solder points are covered with a patina “Novacan Black Patina for solder and Lead”. These areas are then rinsed carefully with cue-tips because the patina contains some nitric acid.
- The back plates are copper-foiled and attached on top of the floated pieces on the exterior side of the panel.
- The original cover plate on the vent section is attached with a 2 mm U-lead.

8. Cementing the panel

The three sections of the panel are then carefully cemented with some putty on both sides.

9. Wires

Inside wires that tie the stained glass to the rebar are made and attached to the panels.

10. The metal frame and the protective glazing

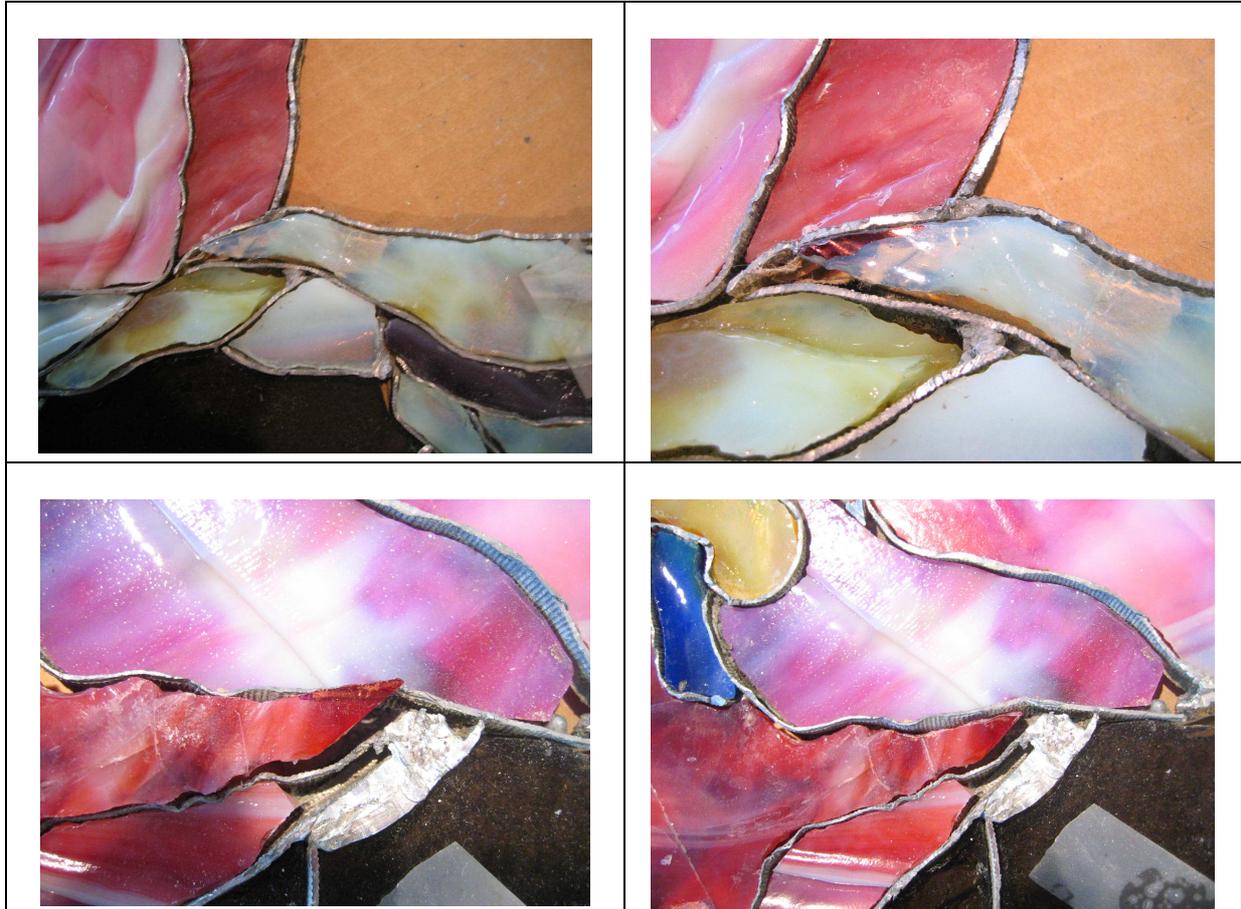
It is clear that the old protective glazing has damaged the stained glass window and the wood frame because it had been incorrectly installed.

The Isothermal protective glazing system that is now installed will allow the circulation of air. The basic parameters are that the window is internally vented. The exterior glass (the protective glass is a thermal barrier) is sealed completely. The metal frame holding the stained glass must be installed at an inch and a half, or 2 inches from the protective glazing. The chimney (top) and vents (bottom) must be one inch wide and run all the way along. The sides of the window are completely sealed. This system is true for every type of window. The reason why David Fraser creates the ventilation inside rather than outside is that the hot air, in winter times, is attracted by the coldness of the exterior window. And if one of the windows gets condensation, it will be the protective glass and not the stained glass.

V. Problems encountered

The re-leading process

There are some ethical problems which are encountered during the re-leading process. Some pieces of glass seem to have broken with time because they were cut a little too big to fit in the leads. The decision to make is either the pieces of glass are left broken in the leads again, or they are glued together but grinded on some edges to fit in the leads again. The second solution has been chosen because of aesthetic reasons.



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