Structural Treatments of Textile Supports: Tear Repair of A Church Painting In 1889 -- The Use of Low-Cost Heated Needle

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Introduction

The Church Painting 1, possibly painted in 1889 by an unknown artist, is framed with a four-membered wooden frame. Together with Church Painting 2 is the collection of St Columb's Church Hawthorn. The owner sent the painting to the Grimwade Centre of the University of Melbourne as a teaching and research object. The painting was in poor condition, with a major tear of approximately 300mm noted at the top right of the canvas.

Traditionally, the sturgeon and wheat starch paste mixture is used for thread-by-thread tear repair. However, natural adhesives pose a threat to insect and microorganism attacks. As the painting will return to the church and possibly be stored in an area with limited environmental control, the heat-activated synthetic adhesive, polyamide welding powder, was chosen.

The treatment was taken under the guidance and support of Grimwade teaching staff, Dr Paula Dredge, John Hook, and Dr Jonathan Kemp. Special credit goes to Dr Jonathan Kemp, who sourced the tear repair equipment (Pine64) under the Master's course in Cultural Material Conservation at the University of Melbourne.

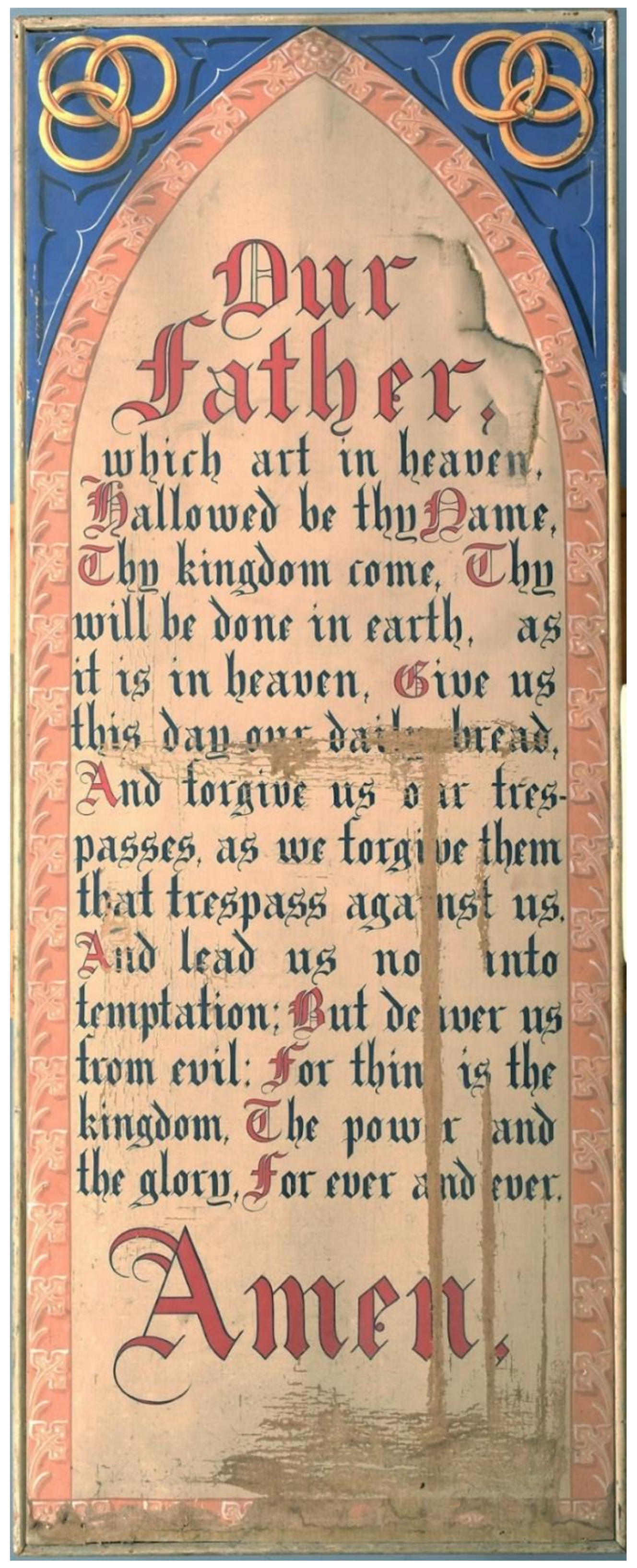

Figure 1

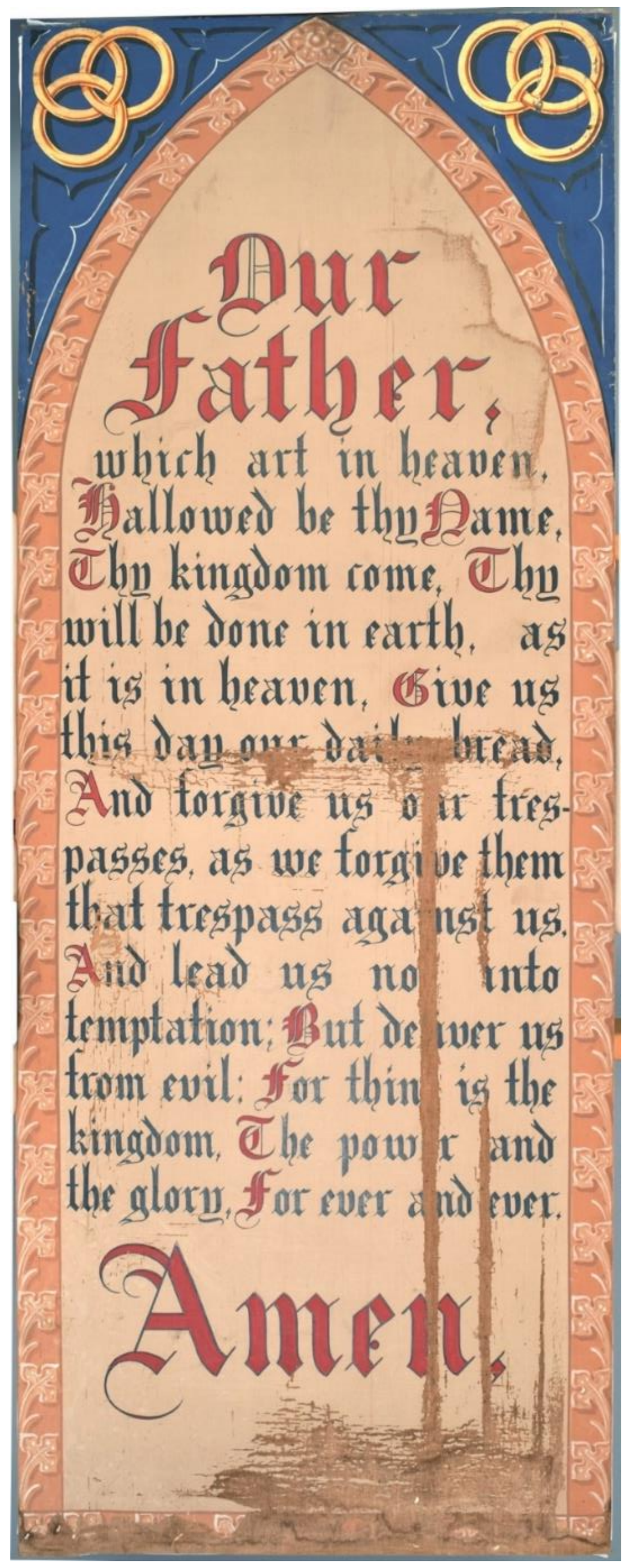

Figure 2

Figure 1, 2: Recto of the *Church Painting 1* before and after structural treatments
Figure 3, 4: Recto of the *Church Painting 1,* Tear, before and after treatment
Figure 5, 6: Recto of the *Church Painting 1,* Hole, before and aftertreatment

Decision-Making

Tear Repair Methods

The painting experienced overall water damage with loss of paint and fragile of canvas, full lining was the choice for canvas treatment. However, an inscription, '19th april 1889', possibly marked by pencil, is noted at the back of the painting next to the major tear. Therefore, full lining methods were ruled out so as to retain the historical information of the painting. Only the heavily water-damaged canvas bottom was lined with additional canvas along with the bottom strip lining (method suggested by John Hook).

The tear and the hole were treated by a mixed thread – by – thread and bridging method. Owing to later environmental concern, synthetic adhesive was chosen. Polyamide welding powder was selected as it has great tensile strength [1]. A mixture of original fibre extracted from the canvas and new linen fibre were used as the threads.

Figure 3

Figure 4

Figure 5

Figure 6

Mock-up and Preliminary Test

The conservation-heated spatula in the lab was under annual maintenance. Dr. Jonathan Kemp sourced a mini soldering iron called Pinecil, which is manufactured by Pine64. According to Pine64, the soldering iron operates at a range of 100 to 400 °C [2]. The polyamide welding powder has a melting point of approximately 90 - 100 °C [3].

The polyamide powder was first applied to the mockup canvas with the heated needle set at different temperatures. The testing interval was 10 °C, and the testing started at 100 °C (marked temperature on the screen of the soldering iron). According to the mockup test results, the soldering iron set at 140 °C gently contacted the back of the tacking edge. No observable change in the paint surface was noted after the testing. Therefore, a set temperature of 140°C for the needle would be safe and workable for the treatment.

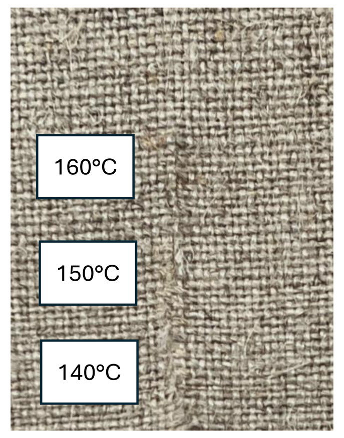

Figure 7

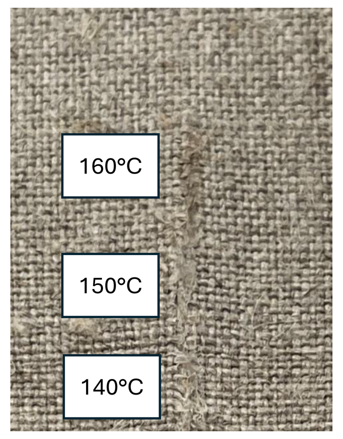

Figure 8

Figure 9

Figure 7, 8: Mockup test, Tear, before and after
Figure 9: Working photo for the tear repair
Table 1: Operation temperature test results on mockup canvas

Temperature Shown on the Soldering Iron (°C)	Workability	Mockup Canvas Appearance
100 - 110	Not workable Polyamide powder not melting	/ (Not adhering)
120 and 130	Low workability Polyamide powder started to melt but too rigid to apply	Weak adhesion. White powder noted.
140	Workable Polyamide powder melted and flexible to apply	No observable change. No white powder noted at the joints
150	Workable Polyamide powder melted and flexible to apply	No observable change. No white powder noted at the joints
160	Workable Polyamide powder melted and flexible to apply	Mild darken in canvas. No white powder noted at the joints

Table 1

Canvas Repair Treatment

1. Dry cleaning, testing (solubility, pH and conductivity) and consolidation.
2. Unframing and Stretching bar detaching.
3. Humidification and flattening of tacking edges.
4. Local humidification and flattening of the tear and hole by sandwich approach.
5. As the tear located too close to the stretcher, the 'Trecker' was not adoptable. The position of the tear was fixed by sandbags and weights. Masking tapes helped to hold the gap on areas that were not marked with inscriptions.
6. A minimal amount of molten polyamide was applied to the original canvas, which was attached to one end of the foreign thread.
7. Tightened (tensioned) the thread with a micro point tweezer and applied the molten adhesive to the other end of the thread.
8. The threads were then immediately left dried under weight.
9. Continued steps 6 to 8 until the tear and hole were completely treated.

All face-down treatments were conducted on a tailored supporting board covered by silicon-release-coated Mylar™ with a size slightly larger than the canvas.

Figure 10

Figure 11

Figure 12

Figure 10, 11: Temperature test on the verso of the tacking edge, before and after
Figure 12: Image of 'Pinecil'
Figure 13, 14: Verso of the *Church Painting 1* before and after structural treatments

Figure 13

Figure 14

Conclusion

This treatment provides insights into the material usage for paintings with limited environmental controls. The tear and holes in this painting were successfully treated with the aid of 'Pinecil', a low-cost soldering iron. Other circuit board soldering brands with a low starting temperature may achieve the same performance.

However, the soldering iron is only suitable for adhesives with a higher evaporation temperature and is therefore not suitable for traditional natural adhesives, such as sturgeon glue and starch paste.

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John Hook, Painting Conservator, Executive-in-Residence - Grimwade Centre, The University of Melbourne

Dr. Paula Dredge, Assist. Lecturer, Cultural Materials Conservation Historical and Philosophical Studies, The University of Melbourne

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