Medieval and Early Modern Wax Pendant Seals

Examination, Treatment, and the Creation of Digital Surrogates

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Introduction and Background

The first goal of this project was to devise easily reversible treatment methods for the repair of wax pendant seals. The second was to seek a digital documentation method that had the ability to capture the detail of these low-relief objects.

In the Middle Ages and Early Modern eras, wax pendant seals served to authenticate legal documents such as deeds. The iconography, design, text, and size of a seal also suggested the status of its owner. Today these seals can be used to identify and occasionally date a given document.

Recently there has been great interest in the deeds contained in the Battle Abbey collection of British manuscripts at the Huntington Library. Within this collection a complete monastic archive is represented, spanning the time from the birth of the abbey in 12th-century England to its dissolution in the 1500s.

Deeds in the Battle Abbey collection were constructed using typical materials: iron gall ink on parchment with wax pendant seals. Based on observation, historical research, and preliminary XRF analysis, the seals most likely consist of beeswax and colophony plus colorants such as red lead and verdigris. Generally seals were attached to a document by means of a parchment tab and impressed with a metal matrix. Cracking, flaking, discoloration, and loss are common. Many of the seals have been lost entirely, and others have been repaired with new wax.

A typical document from the Battle Abbey collection. "Conveyance of a message – Middlesborough, Roberts – Lowe, 2 Feb 1587" (BA 56/1182).

Historic wax repair on a pendant seal.

Treatment Tests

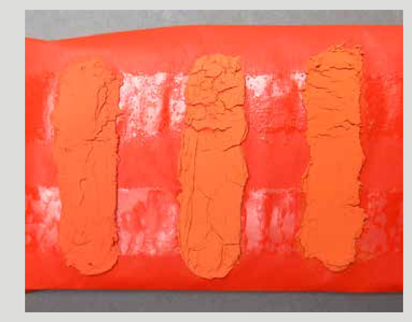
Though the importance of treating the Battle Abbey deeds as complete, composite objects was recognized, special attention was paid to the treatment needs of the wax pendant seals. Traditionally, pendant seals have been repaired with warm wax and solvents. Unfortunately, these techniques are not easily reversible and have the potential to soften and distort the seals. Alternative consolidants, adhesives, and fill materials were sought and tested on mockups made of beeswax, colophony, and red lead or vermillion pigment.

Treatment methods were deemed successful if they were reversible, displayed good optical properties and adhesion, and if the repairs appeared weaker than the wax seal itself. In general, minimal intervention is preferable, and fills would be applied to collection materials only when the stability of a seal is truly at risk.

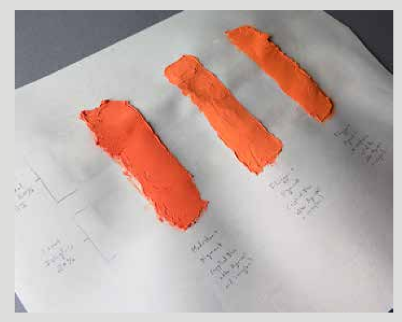
1. Testing water-soluble consolidants in a variety of strengths including isinglass, JunFunori, and Aquazol 50, 200, and 500.

2. 20% isinglass and a 1:1 mix of 50% Aquazol 50 and 20% Aquazol 500 showed the most promise.

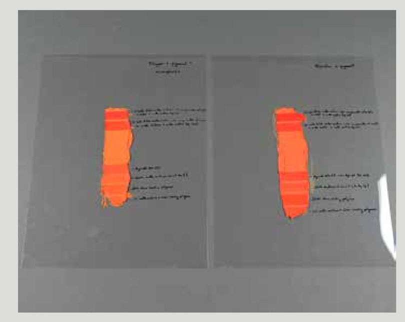
3. Low-tech tensile strength testing. Isinglass appeared much stronger than Aquazol after a 48 hour drying time.



4. Pigmented fill material over Aquazol (upper horizontal band) and isinglass (lower horizontal band) on wax. The Aquazol beaded up on the wax surface, but the isinglass did not. Modostuc (left) was more stable than Flügger or Aquazol-based fill materials.

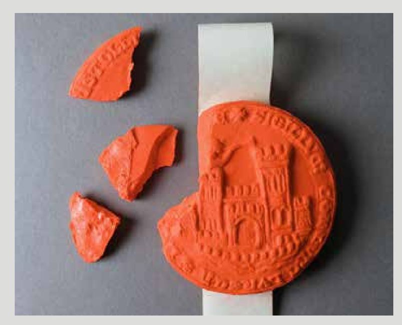


5. Pigmented fills over Aquazol and isinglass on parchment. Aquazol caused significant distortion.



6. Dilute Golden Fluid Matte Medium and acrylic paints approximated the surface of wax well.

7. Testing the reversibility in water of Modostuc over Japanese paper and isinglass on wax after a 48 hour drying time.



8. Seal mockup prior to repair with 20% isinglass.

9. A layer of Tosa tengujo saturated with isinglass was used as a barrier layer and to provide tooth for fill attachment.

10. A pigmented Modostuc fill was added and sealed with acrylic medium.

11. Discussions with the curator are ongoing regarding the appropriate degree of inpainting for archival objects.

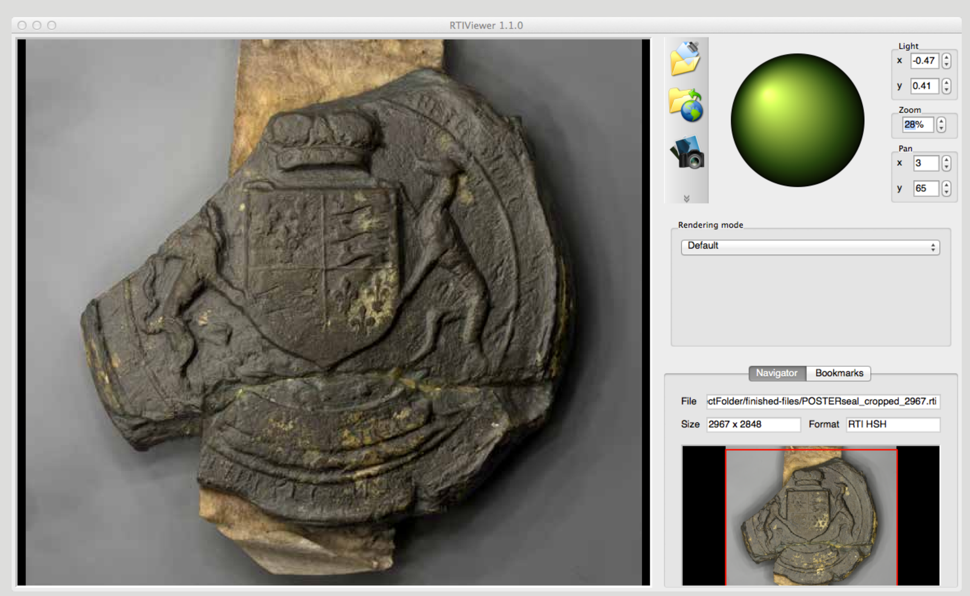
Reflectance Transformation Imaging

Reflectance transformation imaging (RTI) was investigated as a possible aid in constructing surrogate seals. RTI files are interactive and allow an object to be viewed digitally in a range of lighting conditions. The RTI concept and software were developed by Cultural Heritage Imaging.

Curators and sillographers weighed in on the potential use of RTI in a library setting. RTI files enable scholars to virtually interact with digitized seals much as they would with real seal impressions. The files accentuate details that are difficult to discern in the flat lighting conditions of a reading room. In theory, RTI could also reduce the need to handle fragile seals.

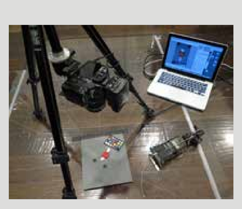
To facilitate the use of RTI files by researchers, the Huntington is beginning to investigate the integration of these files into existing scholarly web browsing tools such as the International Image Interoperability Framework (IIIF). The combination of the RTI viewing experience with the layers of tagging offered by IIIF could be very helpful to scholars. Using such merged software, researchers could export annotated stand-alone images that support their theories.

Lighting conditions in the Huntington Library's reading room. A reader has improvised raking light with moderate success. RTI could bring out significantly more detail. "Richard Strongbow Earl of Pembroke with Seal, XIIth Century." Credit: John McEwan



RTI Viewer and the verso of seal from "Exemplification of common recovery, 12 Feb 1584" (BA 56/1065) in the the Battle Abbey collection. Raking light from innumerable angles is possible.

"Exemplification of common recovery, 12 Feb 1584" (BA 56/1065) and recto of seal.



RTI capture equipment.

An image created in the RTI viewer's Specular enhancement mode can bring out low-relief details.

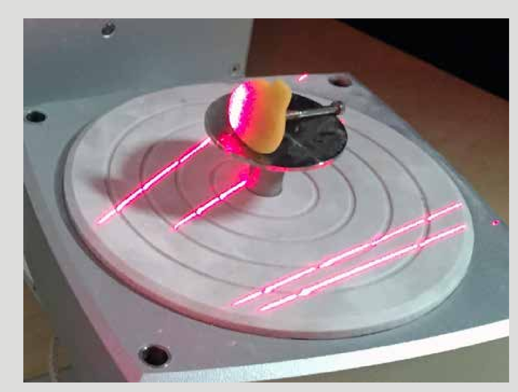
An image created in the RTI viewer's Normals visualization mode.

3D Scanning

A NextEngine 3D Laser Scanner HD was used to make test scans on both wax seal mockups and a metal seal matrix. Unfortunately, the translucent quality of the wax and reflective surface of the matrix prevented the possibility of good scans. Applying an opaque white powder or paint to these objects could improve scan quality, but this would not represent a practical option for collections materials.

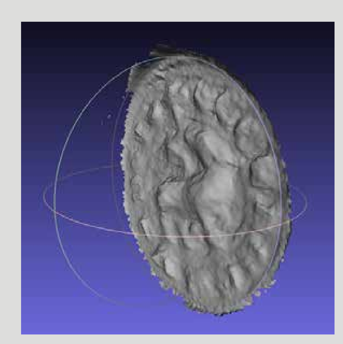
Historically, facsimile impressions have been cast in plaster from metal seal matrices to aid in viewing a positive version of the seal's image and text. Inverting 3D scans could offer an alternative to this practice.

NextEngine 3D Laser Scanner HD



Unsuccessful attempt at scanning a semi-translucent beeswax and resin mockup

Metal seal matrix used in 3D scanning tests



3D scans of a metal seal matrix viewed using MeshLab processing software. The original scan (left) can be rotated to virtually view a positive version of the relief (right).

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Conclusion

Isinglass is a promising consolidant for small wax fragments and is strong enough to adhere larger pieces of broken wax seals. Fills made from Modostuc over a barrier layer of Japanese paper appear stable and reversible.

RTI can aid in scholarly research by highlighting seals' low-relief details. It also has the potential to reduce handling of fragile seals in a reading room setting. The possibility of incorporating RTI files into IIIF is being investigated further.

Acknowledgments

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