TIP SHEET

Conservation on the Exhibition Floor (2017)

MUSEUMS ASSOCIATION OF SASKATCHEWAN
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Conservation on the Exhibition Floor (2017)

Museum professionals face a conflict when dealing with museum collections. It is their responsibility to protect and preserve the collections, as well as to display them and allow access to the public. This conflict is most readily apparent when dealing with museum exhibits. A major focus for any museum should be to minimise the conflict between these opposing responsibilities. This can be done by integrating conservation standards into exhibition planning. There are many ways objects on display can be monitored and potential damage mitigated, as discussed in the following sections.

When an Object Goes on Display

Objects chosen for display are often considered the most notable objects in a collection. Unfortunately, placing these objects on display substantially increases the risk of damage. Exhibited collections are exposed to many potential dangers including inappropriate temperature, relative humidity (RH), lighting and UV radiation, physical stress (such as vibration and shock), and even the materials used to display objects (1, 2, 3, 4, 5, 6, 7).

Temperature: Ideally, galleries and display cases should be kept at a stable temperature, usually within the range of 20ºC - 25ºC (some suggest 15.5ºC - 21ºC) (4). Elevated temperatures can accelerate chemical reactions and breakdown within objects. Temperature fluctuations also trigger fluctuations in relative humidity, which can cause both structural and chemical damage to objects *(See Relative Humidity)*.

Temperature can often be influenced by light levels and light placement *(See Lighting)*.

Relative Humidity (RH): Most objects in museum collections are highly susceptible to changes in the relative humidity within an environment. An environment with a stable relative humidity, appropriate to the object(s), can help to slow corrosion and deterioration of displayed objects (4).

Relative humidity requirements differ depending on the object's physical composition. For example, metals will often show signs of active corrosion at RH levels above 30% (15% for iron or iron-alloys) whereas wood benefits from stable RH in the range of 45-55% (too low a level will cause shrinkage and too high a level will encourage mould growth). One can see how a composite object can be problematic when choosing an appropriate display environment (4).

Fluctuations in RH can cause physical stress on the object due to expansion (high RH) and contraction (low RH). Relative humidity in a display case may be

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controlled with the use of buffering materials and desiccants such as silica gel, and a humidifier or dehumidifier may be used to regulate the ambient humidity (4).

The RH in a display case or gallery can be monitored using specialized equipment, such as: integrated building management systems (BMS), data loggers (many can measure RH, temperature, and even light levels) (***See Note 1***), electronic temperature and humidity meters, and humidity indicator strips.

Lighting: Objects may be exposed to both natural and artificial light when on display. How much and what type of lighting to use must be carefully considered; exposure to ultraviolet (UV) radiation can be particularly detrimental to museum collections. Sunlight through windows is a source of light, UV radiation and heat. Certain types of artificial lighting, such as metal halide, fluorescent and incandescent lights will also emit light, UV radiation and heat. The amount of UV radiation and heat emitted by LED lights is negligible, making them by far the safest type of lighting (4, 7).

Potential damages from light include fading, cross-linking, embrittlement, and yellowing (particularly plastics) (6). As previously mentioned, most light sources will also cause an increase in temperature and, as a result, RH.

Specialized equipment is available for measuring UV and visible light levels, however, many museums do not have access to such resources. Monitoring with Blue Wool Standards (fading strips) is an inexpensive and discreet way to monitor light levels and potential fading in exhibit areas.

Preventive measures include exhibit placement (away from light sources, and direct light), limiting exposure time for objects, placing UV film on windows in galleries, using cases with UV filtering built in, and/or installing diffusion panels or directional lighting (4, 7).

Physical Stress: When planning an exhibit, proper support and protection from physical shock and vibration are important considerations. Adequate weight distribution, and internal support should be considered when planning exhibit mounts and object placement. Using appropriate mounting materials is paramount, for example: mounting wax can be used to keep small objects from moving, fabrics and foams (*See Display Materials*) can be used to protect fragile objects, mounts made of inert materials (such as acrylic) can be created to shape and support objects (See **Figure 1** and **2**) (4, 6).

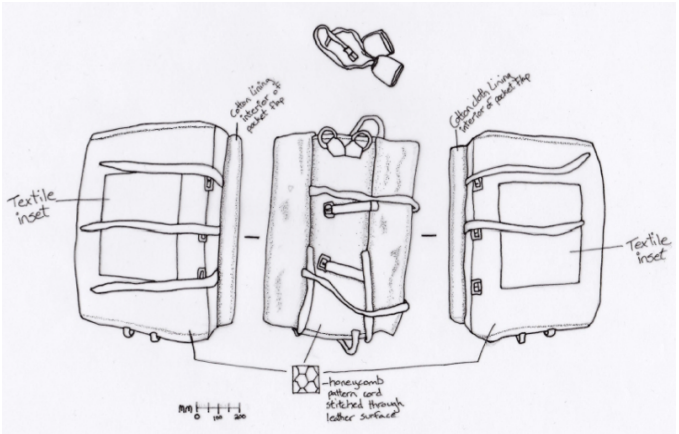

Figure 1: Drawing of leather Qashqai double saddlebag, after conservation treatment and reshaping, needing proper mount for display (Drawn by the author, Erin Lemke)

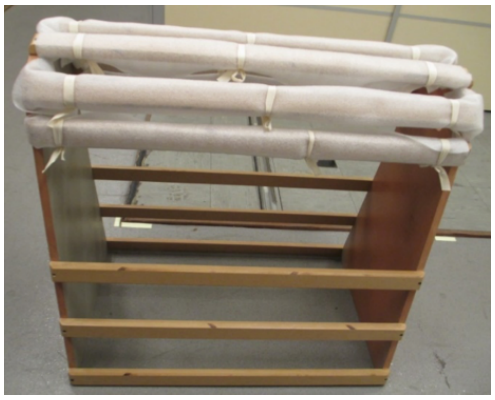

Figure 2: Qashqai double saddlebag mount, designed by the author, Erin Lemke, built by John Miller (Senior Museum Technician, Manchester Museum). Note appropriate inert materials used for padding and separation layer between wooden mount and object. Also note the flared shape of the mount to offer extra internal support and proper shaping for the saddlebag.

Additional remarks: Condition reports should be carried out regularly to monitor the "health" of the objects in a museum collection. Due to the environmental factors mentioned above, this is especially important for objects on display.

When an exhibition is being planned, and objects are chosen, a condition report should be carried out before the object is placed on display, to provide a point of reference used to monitor the condition of the object over time. Condition reports should then be carried out at regular intervals while the object is on display to identify and monitor any damages (fading, cracking, corrosion, etc.) that may develop during exhibition. A final condition report should be carried out when the object is removed from display (***See Note 2***).

Rotating objects between storage and display is beneficial for the well-being of a collection, and for keeping exhibits new and interesting for visitors.

Whatever you decide, you need to remember that what is the most appropriate procedure for one object may not be the best for another.

It is preferable to use replicas when objects are meant for handling or open-air display. Signs, ropes, and "natural" barriers should be used to guide visitors and prevent touching of non-interactive objects, without being intrusive.

Additionally, exhibits should be dusted, cleaned, and monitored regularly for evidence of pests. Survey carefully for indicators such as insect frass, small holes and damage to organic objects (such as wood), and loose or dislodged hair from taxidermy collections.

When in doubt, contact a conservator.

Display Materials Safe or Unsafe?

Many common materials used to create displays such as wood, paint, adhesive, and fabric may emit contaminants that can interact with objects and cause or accelerate corrosion or decay. Types of materials, however harmless they may seem, must be considered carefully before use. With the staggering amount of materials available for creating displays combined with the wide array of object types and materials in a collection, deciding what is appropriate can seem overwhelming. Thankfully, there are many accessible references outlining desirable, undesirable, and compatible materials for object display such as the Canadian Conservation Institute website or AIC Wiki.

These resources are the result of extensive testing of materials most often making use of the Oddy test. The Oddy test (developed by Andrew Oddy) is a common method of evaluating the interactions of display materials and displayed objects and is useful in detecting pollutants in display materials that can damage objects under normal conditions (e.g. 20-25° C) over months or years (1, 2, 4).

Below (**Figures 3** and **4**) is an example of an Oddy test carried out on materials intended for use in an exhibition. Lead (Pb), copper (Cu), and silver (Ag) tokens were used to detect potential contaminants from the materials: lead corrodes in the presence of volatile organic compounds, silver tarnishes in the presence of sulphurous gases while copper corrodes in the presence of chlorine ions. Other metal tokens are also used when appropriate (1, 2).

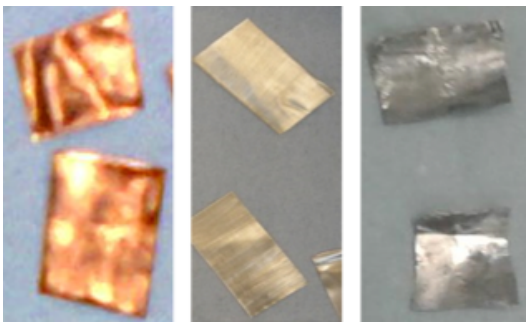

Figure 3: Cleaned Copper, Silver, and Lead Tokens before testing

The results from this test (**Figure 4**) provided the information necessary to choose the **most** appropriate display materials for the artifacts, and avoid those which could have had a detrimental effect on them. It is important to note that although metal tokens are used for detection, these contaminants can have detrimental effects on a wide array of object types. As stated previously, ample information regarding what materials are most appropriate for your artifacts can be found in the resource section and online.

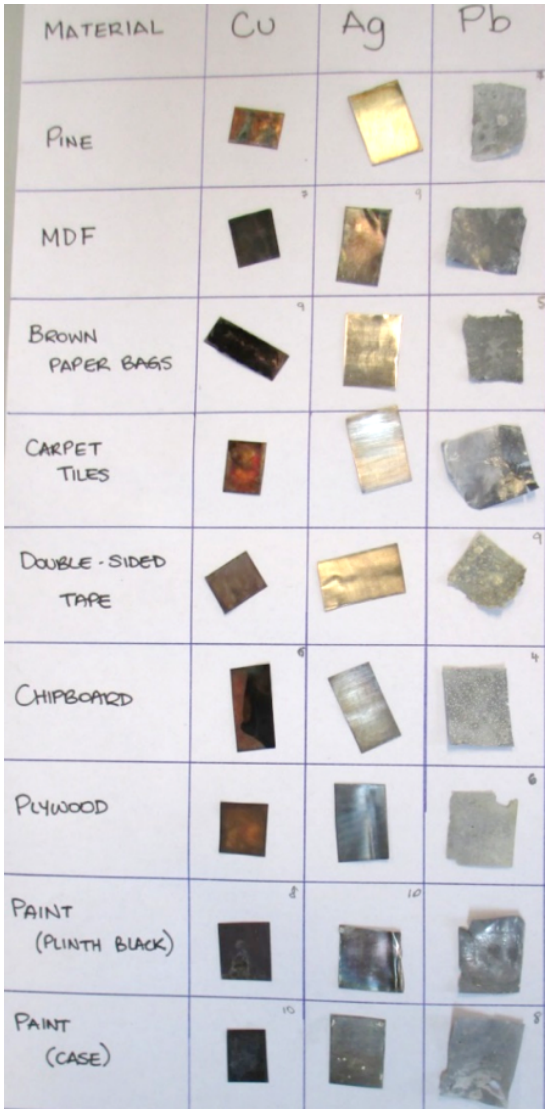

Figure 4: Results from Oddy testing (carried out by author, Erin Lemke and colleagues)

Damage can also result from direct contact between an object and display material. This can be mitigated by placing a barrier between the object and the display material (wooden display cases, for example) (2, 4, 6).

If you are unsure about the safety of a material, contact a conservator.

	Potential Hazards	Acceptable Alternatives
Textiles	Wool; bleached or dyed cloth; resin cured polyester; nylon	Undyed, unbleached cotton or linen; polyester (not resin cured); Tyvek®
Wood	Raw, unsealed wood; composite wood bonded with urea formaldehyde resin	Sealed or painted wood (once fully cured); composite wood bonded with phenyl formaldehyde resin or formaldehyde free adhesive; air-dried wood (such as spruce, poplar, mahogany – well seasoned)
Adhesives, Sealants, Barriers	Silicone sealants (those that emit acetic acid); poly (vinyl acetate) (PVA); oil based paints; cellulose nitrate	Plastic laminated aluminum; zero or low VOC paints; two-part epoxy resin (fully cured and aerated); silicone sealants without ammonia
Plastics, Foams, etc.	Vulcanized rubber; newspaper and non-archival paper or cardboard; polyurethane foam; Poly(vinyl chloride) (PVC)	Polyethylene foam and plastic; glass; acrylic sheets; archival quality acid-free tissue paper and cardboard; stainless steel

Conclusion

There are two main priorities for any museum. The first is to safeguard their collections and preserve those collections as a physical history for future generations. The second is to make those collections accessible to the public through educational and aesthetically enjoyable exhibitions. Unfortunately, these priorities are often considered incompatible. This is not the case. By integrating conservation standards into exhibition planning, the objects exhibited can be monitored and potential damage mitigated, allowing for a merging of preservation and exhibition (See **Figure 5**).

Figure 5: An aesthetically pleasing exhibition adhering to conservation standards (appropriate light levels, inert display materials, integrated environmental monitoring, supportive unobtrusive object mounts, etc.)

For More Information, See:

(1) Caple, C. (Ed). (2011). Preventive Conservation in Museums. Routledge: London.

(2) Lee, L. and Thickett, D. (1996) S*election of Materials for the Storage of Display of Museum Objects, British Museum Occasional Papers 111* http://www.britishmuseum.org/pdf/OP_111%20selection_of_materials_for_the_storage_or_display_of_museum_objects.pdf.

(3) Raphael, T. and Davis, N. (1999) E*xhibit Conservation Guidelines a Technical Resource*. Division of Conservation, National Park Service. www.nps.gov/hfc/conservation/exhibit.

(4) Raphael, T. (2005) *Preventive Conservation and the Exhibit Process: Development of Exhibit Guidelines and Standards for Conservation.* Journal of the American Institute for Conservation, Volume 44, Number 3, Article 8, pp. 245-257.

(5) Tétreault, J. (1993) *Guidelines for Selecting Materials for Exhibit, Storage and Transportation*. Canadian Conservation Institute.

(6) Tétreault, J. (1994) *Display Materials: The Good, The Bad and The Ugly*. In, Sage, J. (Ed). Exhibitions and Conservation. Pre-prints of the Conference held at The Royal College of Physicans, Edinburg. The Scottish Society for Conservation & Restoration (SSCR), Edinburg, pp. 79-87. http://iaq.dk/papers/good-bad-ugly.htm.

(7) Tétreault, J. (2015) *Measurement of Ultraviolet Radiation* – Canadian Conservation Institute (CCI) Notes 2/2. Government of Canada, Canadian Conservation Institute.

Note:

Note 1: ELSEC and Hobo Dataloggers are available for loan to all MAS members. Please contact your Museums Advisor for more information.

Note 2: See MAS' "*Collections Documentation Manual for Saskatchewan Museums*," for examples of Condition Reports.

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