Canadian Conservation Institute
Institut canadien de conservation

CCI Notes 6/7

Totem Poles Displayed Indoors

Introduction

As a result of the revival in totem pole carving,[1] many museums have acquired these works and must learn to safeguard them. This Note discusses suitable handling and care procedures for totem poles displayed indoors. Although the information is intended primarily for freshly constructed poles, it also applies to older poles that are brought inside a building for the first time. Advice for display outdoors can be found in CCI Notes 6/8 *Totem Poles Displayed Outside*.

All true totem poles are carved from western redcedar (*Thuja plicata*), a low-density, straight-grained, aromatic softwood that is exceptionally durable due to the powerful fungicidal and insecticidal extractives contained in the outer heartwood. Redcedar is ideal for carving totem poles: it is very large and easy to carve when still wet or "green", and it is readily available near the communities that create poles. Unfortunately it is also extremely soft and it splits easily along the grain — although this latter characteristic can be convenient when large volumes of wood need to be removed during carving.

Checks

Totem poles always check (i.e. crack or split) to some extent during or after carving as a result of changes in water content as they dry. When western redcedar is first felled, it may contain more than 50% of its weight in water. As the wood dries, most of this moisture is lost, the wood volume decreases, the diameter of the pole shrinks, and cracks appear on the surface. Checks up to about 2 cm in width are normal on full-size poles. These do not normally weaken the pole, and to a certain extent are not even seen as disfiguring. They should not be filled with a rigid material, nor should any attempt be made to restrain the natural movement of the wood.

Totem poles remain susceptible to checking throughout their lifetime due to ongoing changes in water content. Although wood will reach an equilibrium moisture content at any given temperature and relative humidity (RH) (e.g. 9% moisture at 20°C and 50% RH), this moisture content will change in response to any changes in the moisture levels in the surrounding air. The resulting changes in volume can cause additional checking.

Acclimatization

When totem poles are brought indoors they are suddenly faced with an environment that is probably a lot dryer than the one to which they have been accustomed. This sudden decrease in RH can cause a rapid loss of moisture, which can result in extensive checking. By acclimatizing the pole gradually to the new environment (i.e. lowering the RH gradually), it is possible to slow down the drying process to the point where the moisture content at the surface remains as close as possible to that at the core. This reduces the stress created by drying, and also allows more time for any stress that is created to be relieved. Although acclimatization cannot eliminate cracking, it will minimize it as much as possible.

The first step in the acclimatization process is to determine how much moisture a pole contains when it is first brought indoors. This can be accomplished with a non-marking moisture meter held close to the pith of the wood, or with a resistance meter. When testing moisture levels, the highest levels will be found farthest from the surface, particularly on end grain if there has been any ground contact.

As a rule of thumb, if the highest moisture level found is no more than 12%, little effort will need to be put toward controlled drying. However, at levels above 12% (and certainly if the moisture content is more than 20%), controlled drying may be necessary to minimize cracking.

The next step is to determine whether or not a stress relief mechanism is in place. Because the carved surface

at the front of a totem pole has less wood volume and more surface area to evaporate water than the smooth back, it will dry faster. The resulting discrepancy in moisture content between the front and back of the pole will create stress that, without some form of relief, will cause the face of the pole to crack. Examples of stress relief mechanisms include a hollow back or a cut at the rear of the pole from the surface to the pith.

Most of the carvers on the Northwest Coast hollow out the backs of their poles. Others, respecting the tradition of their culture, do not hollow the pole and simply accept the visual consequences. Still others saw a relief cut (a "kerf") down the rear of the pole to near the pith, allowing the pole to open at the back as it dries. For poles that do not already have some kind of stress relief mechanism, it would be wise to make a relief cut down the back. However, if the artist who carved the pole is alive, it is imperative to obtain his/her permission before doing so.

Totem poles that have a stress relief mechanism are likely to dry without major disfiguring cracks in the front, and it is not necessary to control the drying process. However, if these poles have any reinforcements at the rear (such as steel or wood attachments), it is important to ensure that these will not resist the inevitable shrinking that takes place during drying. This may require loosening these attachments. For poles in which no measures to relieve stress have been incorporated or can be taken, preventing extensive cracking will require a regimen of controlled drying until the moisture content of the pole is down to 12%.

The controlled drying process must be conducted in a location that is protected from any potential leaks, and is away from direct sun.

Support the pole horizontally (supports should be placed about every 2–3 m along its length) at least 15 cm (6") above the floor, and build an airtight humidity chamber or tent around it. A suitable chamber can be constructed by erecting a frame of 2 by 4 lumber and tenting it over with 6 mil (0.15 mm) polyethylene sheet. This chamber must surround the pole down to the floor or the ground, and be large enough to allow a person to walk around inside it to inspect the pole on all sides. Do not wrap the pole tightly in plastic sheet as this could allow mould to grow on the surface, causing staining.

Once the chamber is finished, install enough humidifiers to raise its RH to a level that corresponds to the highest observed moisture content of the pole,[2] up to a maximum of 65% (higher levels can promote the growth of mould). Portable room humidifiers are adequate for this purpose, but water may need to be added each day.

As the totem pole dries and its moisture content decreases, the RH of the chamber can be lowered accordingly. This is a slow process that may take many months. For example, a 1-m-diameter (39") cedar pole with a moisture content of 40% will take approx. 18 months to dry to 10% moisture.

More detailed information on this process can be obtained by contacting the Canadian Conservation Institute.

Handling

Totem poles are fragile and should always be handled with care.

Dry poles may not be as heavy as they look, and even large ones can often be moved short distances by a small group of people. However, if a pole is too heavy to be moved in this manner, some type of mechanical system must be used.

When a hoist or crane is required to lift a pole, use webbing slings padded with folded blankets or a good thickness of plastic foam (polyethylene foam

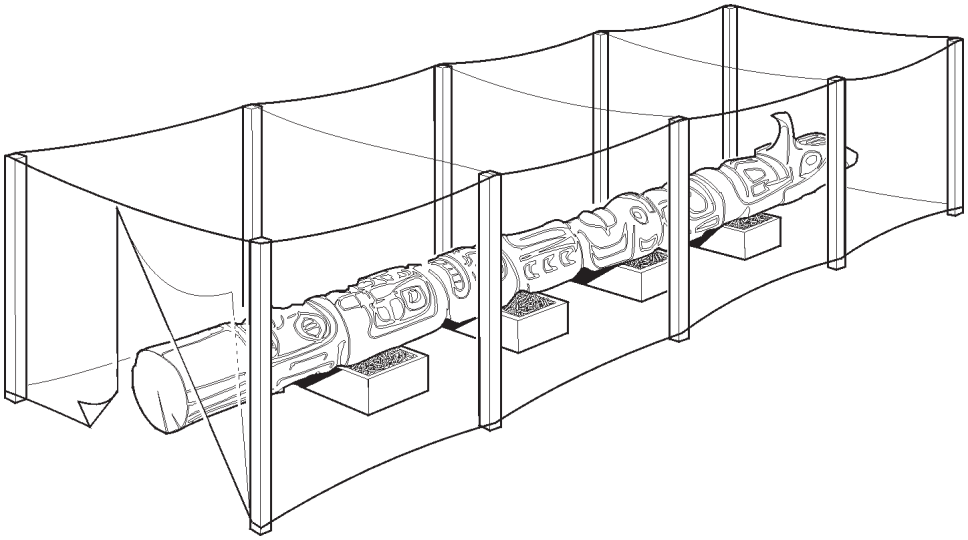

Figure 1. One example of a suitable chamber for controlled drying. Polyethylene is draped over wooden supports to form a tent that surrounds the pole completely. Allowance is made for a doorway which can be sealed with duct tape.

is recommended) to protect the pole. If a rope, wire, or chain sling is to be used, protect the pole with blankets or foam and then with a strong, dense material such as motor tires or wooden slats. Should a forklift be necessary to lift the pole horizontally, insert a sheet of heavy plywood padded with blankets or foam plastic between the pole and the forks of the lift.

Support

Before attempting to raise a totem pole inside a building, it is imperative to verify that the floor can support the concentrated weight of the upright pole. This can be accomplished by estimating the weight of the pole and consulting an architect or building engineer.

The weight of a totem pole can be estimated by assuming it is a cylinder and using simple geometry: allow 350 kg for each cubic metre of wood and multiply by $\pi r^2 h$ (where r = the radius of the pole, and h = the height). A pole that is 10 m high typically weighs about 1000 kg — a great deal of weight to be concentrated in a small area. Because the load capacity of floors is greater against walls and structural columns, the sides of a room will likely be the best location for totem poles.

Some poles, particularly those that are older or have loose parts or rot, may need some sort of support to connect and reintegrate the entire structure before they can be raised. The design of such a support will depend upon the condition of the pole.

All totem poles need a base support structure to hold them upright. The design of this mount will depend on the individual features of the pole and the building. A mount with a large surface area on the floor has two advantages: the load per square foot will be lower than that for a mount with a small resting area, and there will be several places to anchor the mount to the floor, which will allow for vertical adjustment. These support structures are typically made of steel. Conservation advice should be sought for attaching the pole to the support. For large poles that could represent a danger to the public if their installation is unsafe, it will be necessary to have a civil engineer approve the design of the mount and its attachment to the building.

Poles that are more than 7 m tall will probably require a crane to raise them to a vertical position. This work can be carried out in a number of ways, and should be contracted to professionals experienced in heavy lifting, e.g. crane operators. If the pole has a steel support, attach the crane's lifting cable to this support; this makes a safe connection without any risk of damaging the pole. Where there are no steel attachment points, lifting the pole will require a nylon strap rigged to the choke. The use of soft padding, as described above, will help protect the pole. This procedure must be conducted carefully to avoid unnecessary damage; many old poles were deeply and permanently disfigured by wire cables used in a choke hold to erect them.

Deciding when the pole is sufficiently vertical is primarily an artistic decision. As poles are made from trees, they are typically a bit bent and twisted. Before settling the final adjustment, it is best to regard the pole from across the room, or as far away as can be managed.

Once securely mounted in a vertical position, totem poles need no other supports or attachments.

Display and Safety

Children must be supervised whenever they are near totem poles. Young children often love to climb poles, and older children like to photograph them. Both activities can lead to accidents or damage. If a hollow-backed pole is placed against a wall, ensure the space between the pole and the wall is insufficient for a child to enter. Place a barrier around totem poles to discourage visitors from climbing on them or touching them, as frequent touching will leave a layer of oil that stains unpainted surfaces and gives a sheen to matte painted surfaces.

Few galleries are large enough to allow visitors to photograph totem poles easily. When selecting a display location, remember that attempts to photograph the poles may cause congestion. Also ensure that other objects exhibited in the vicinity of the poles are not placed where visitors taking a photograph will collide with them.

Care

Once acclimatized to the interior environment, totem poles require little maintenance.

Avoid large fluctuations in RH (greater than ±10%). If the RH in the museum fluctuates greatly, it is better to correct the environment than to protect the poles by other means.

Dust poles as infrequently as possible; once a year is enough. Cleaning staff should not dust poles on their daily rounds because the lower parts of the poles will soon become polished or abraded. When dusting is necessary, use a vacuum cleaner with a soft, long-haired brush attachment rather than cloth or feather dusters, which can snag on rough surfaces and pull off fragments. Access to the upper sections of the pole may require scaffolding or a "cherry picker". Never

rest a ladder against a totem pole as this can bruise, chip, scratch, or break the pole. One of the advantages of displaying a pole against a wall is that the ladder can rest against the wall, rather than against the pole.

Miniatures

Some poles carved specifically for indoor exhibition are "full-size", but many more are on a smaller scale. These miniature poles are easier to move, support, and protect. Also, because their volume is smaller and they were probably carved in an indoor environment, they will be better protected against atmospheric changes during shipment, and will require less acclimatization.

Endnotes

1. The art of carving totem poles has become extremely popular since the annulment of that part of the *Indian Act* that had made the practice illegal from 1881 to 1951. Not only are communities celebrating their own culture by making and erecting totem poles on reserves, but museums and collectors within and outside Canada are also collecting and displaying totem poles.

2. Tables that show the correspondence between RH and moisture content can be found in *Understanding Wood: A Craftsman's Guide to Wood Technology* and/or *The Encyclopedia of Wood: Wood as an Engineering Material*, both of which are included in the Bibliography.

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