RUST NEVER SLEEPS
CARE AND CONSERVATION OF FARM MACHINERY

MAAS staff moving a Sunshine reaper and binder harvester. MAAS Collection

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CARE AND CONSERVATION OF FARM MACHINERY

Museum of Applied Arts & Sciences

Contents

Introduction

Why save old farm machinery?

The collection, display and interpretation of old farm machinery and equipment can be thought-provoking, engaging and entertaining. They offer a link to the past by giving insight into different ways of life, people's experiences and their relationship to the land and the environment. They can also show how traditional trades and skills differ so much from today's farming practices. Learning about the history of farming, from the machinery to its intangible stories, can provide important information about the society the machine came from, human ingenuity and values of the past. A well displayed collection can encourage tourism to a community with benefits to many local businesses.

Agricultural machinery can be vulnerable to loss, theft, damage and disposal, so it is important to understand its significance. If historic farm machinery inherited from past generations is researched and maintained, it can be appreciated by generations to come.

Who is this book for?

This publication is for anyone who cares for historic farm machinery — whether you work in a museum, community group, are a private collector, have an interest in history or just own a piece of old farm equipment. This book offers practical advice that may help to prolong the life of your historic farm machinery.

Fowler steam ploughing engine in operation. MAAS Collection

These guidelines may encourage you to discover more about historic farm machinery — the stories associated with it and its importance for a local museum or a region. Being history custodians requires careful decision-making about the intended use of the objects in a collection while balancing the conservation needs and resources available.

Everything is prone to wear and tear, but the simple measures discussed here could help slow the rate of deterioration of historic farm machinery. This will extend its life so that current and future generations can enjoy and learn about past farming practices in Australia.

Understanding your collection

What is in your collection?

It is important to know exactly what is in your collection so a good place to start is by undertaking a survey. For a large collection, begin by looking at a selection of objects from different storage areas. Ascertain the various types of machines, how old they are, their rarity, what they were used for, how they were made and who used them. During the review process, you will probably decide that some objects don't fit into your collection criteria and can be deaccessioned. If an object is of little significance, is in very bad condition or there is a duplicate copy, the object could be used as an educational example, a working model or a reference tool, or it may be donated to another museum or collector.

Once you know the value and significance of the collection, you can then decide where best to direct your resources. The more significant objects can be researched, preserved and treasured for the future.

Keep on track — a collection policy

Have you been collecting the right things?

A mission statement and a collection policy are very useful tools in guiding how a museum is managed and developed.

- A mission statement is a short paragraph or a single sentence that sums up the main goals of a museum.
- A collection policy provides parameters that clearly explain what a museum collects and why.

These will help guide decisions on what to collect. It is more interesting to collect objects that have a provenance; that is, a record of ownership to a person or to the area. You might choose to collect objects that fill a chronological gap in the collection, illustrate important social or technological development, follow a theme or fit in with an interpretation of the museum and the district.

A collection policy is particularly useful when museums are faced with donations that aren't relevant to them. People often use museums as a place to off-load items they no longer want, but they may not realise what is involved with the ongoing preservation, storage and display costs. If the object is common; is in bad condition; has no provenance or no connection to the area; and storage and display space is limited, or you simply have other better examples, politely use the collection policy to decline the donation. Perhaps the object would be more relevant to another museum?

Photo of Buffalo Pitts steam traction engine hauling posts and rails. Tyrrell Collection, MAAS Collection

For information on how to write your own mission statement, collection and deaccession policy, go to Museums and Galleries of NSW: Collection policy template and explanatory notes: **http://mgnsw.org.au/media/uploads/files/Thinking_about_collection_policy_1.pdf**

It's a good idea to get to know staff in other regional museums in the area and to find out what they are collecting and if you are duplicating collections. It may be wise to specialise in a certain area to make your collection more interesting, unique and relevant to your community. Some examples of specialist collections could be dairying, beekeeping, horticulture, rabbit eradication, fruit growing, poultry production, cheesemaking and water conservation.

Before acquiring objects

In addition to knowing what to collect, you also need to decide whether you have the resources to care for it. Consider decisions and costs for: handling and transportation; time and skills required for writing grants; potential hazards, remedial conservation and the skills required for this; preservation costs; regular and ongoing maintenance and cleaning; display or storage spaces and the time needed for the project.

Researching objects

Researching the collection can be an ongoing activity. The potential to unearth stories about a piece of historic farm machinery will help bring an object to life and make it much more interesting for visitors.

Researching an object can require some detective work. The obvious place to start is with the owner or owner's descendants. If possible, interview the owner about their memories of the object. Photos, videos or oral histories are a wonderful way of capturing information and can make an exhibit come to life when it is on display. Other sources of information about the object could come from local farmers, librarians, Trove (National Library of Australia's online access to historical resources), community groups and heritage officers, or you can enquire at museums with similar collections. You could write an article in your local paper asking for any information about farm machinery in the area. Contact a state museum for more information on assessing significance and treatment of historic farm machinery.

Preserved sunshine harvester. MAAS Collection

To learn more about the social and cultural significance your farm machinery may have had, look at what was happening in the region at the time it was used. Consider aspects such as: the settlement of the area; the economics and politics of the day; the labour force; the materials that were available; how produce was transported to market; how the weather (floods and droughts) and other factors, such as pests, affected the farming families and any other issues that may be relevant.

The following is a list of questions you could ask that will deepen your understanding of an object:

- What is it, how did it work and what was it used for?
- What is it made of and what are the components?
- Who made it, where and when (document maker's details such as labels, serial numbers, sign-writing or other identifying marks)?
- How was it produced, designed, manufactured?
- Was it sold via a local agent?
- Who used it and for how long?
- Where was it used, what type of farm?
- Did it make a difference to working on the farm, did it change people's lives and did it influence other regions?
- Did it replace a machine, which was then replaced by another machine?
- Was it altered and have new parts been added over the object's working life?
- What condition is it in? Has it been damaged?
- How rare is it?

Photos of your machine in operation, receipts, instruction books and catalogues can enrich your research greatly. It is also interesting to investigate what other types of technology were around at the time. Compile your research in a catalogue file.[1]

What condition are the objects in?

A condition report is an important record about the state of the object at a particular time. It can be updated periodically or when objects are moved on and off display. Reports and photos are also very useful for insurance purposes. For more information on what to put in a report, go to **https://www.tepapa.govt.nz/sites/default/files/26-condition-reporting.pdf**

Photo of seed grading machine mounted on a wagon made by Clyde Engineering of Granville, NSW. Clyde Collection, MAAS Collection

Good, clear photographs showing an object from every angle are the best way of documenting an object's condition. For more information on photographing objects, go to **https://maas.museum/research/conservation/conservation-resources/**

It is important to document and photograph everything that happens to the object, including how the machinery was moved into the museum, disassembling and tracking of parts and any fabrications of missing or damaged parts. All new additions must be photographed and clearly marked. Reassembly, display supports and ongoing maintenance should also be recorded in a condition report.

Deciding if an object is significant

When the research and condition assessment is completed, you will have gained a good understanding of how important the object is. It may be of local, state, national or international significance. A piece of farm machinery that was made locally or is identified with your region will add considerably to its significance. You can then write a significance statement for each object or for each collection.

A significance statement is a great tool for guiding decisions on how to care for your collection. It can be used to make a compelling case to your museum committee, local council or government funding body to show how important it is to preserve your object. It may also be useful in raising sponsorship from interested organisations or applying for grants.

A significance statement condenses your research into a few short paragraphs that tells a rich story about the object. Imagine trying to enthuse a young person who knows nothing about the object. Ask yourself questions that person might ask you. Pull together all aspects of the information you have collected in a general way so it reads easily and tells a story. It should start with a paragraph of about 100 words that describes and sums up the object's physical appearance and historical context. Generally, it is mostly men who are interested in farm machinery, but aim to engage women and children too, as they also visit your museum. Provide information about the families and the society that used these machines.

An interesting threshing machine.

It is always good to write significance statements with at least one other person, if not a group. Other people can offer different perspectives about the history of your object. Ask donors, museum colleagues, family and other people interested in local history if they have any memories to contribute. If information is lacking, try appealing for help in local newspapers or online.

A written statement of significance can also be used for exhibition labels or online content.

Further detail can then be added to the significance statement to help give a broader understanding of the object's importance.[2] For more information, go to **http://www.significanceinternational.com/Portals/0/Documents/SI_Summary%20Card_Significance2.0.pdf** or **https://www.arts.gov.au/what-we-do/museums-libraries-and-galleries/significance-20**

Managing the collection

Following the steps above will assist with managing the collection effectively and provide a clearer vision of where the museum is heading in the future. Like any good spring clean, you will know what you've got, what is significant, what is less significant, what can be used as an educational tool, what you can dispose of and what you may want to acquire to build your collection.

For more detailed information on this topic, go to **http://collectionstrust.org.uk/resource/larger-working-objects-a-guide-to-standards-in-their-preservation-and-care/**

Woolsheds can be preserved on a farm. Photo: Tyrrell Collection, MAAS Collection

Keeping historic farm machinery in situ

Historic farm machinery should, if possible, be kept in situ and preserved on site where it has a connection, rather than relocating it to a museum that may not have the resources to care for it properly. It will add to the region's heritage, and visitors could view the machinery by appointment.

If you own such material, approach local museum staff to see if they can help with research and documenting the stories about your object. Gather photos of the object, the storage shed and where it was used. It could be beneficial to write a significance statement if you are applying for a grant to help house and preserve the machinery. Keep a copy on the farm and one in the museum catalogue.[3]

Relocating historic farm machinery

Moving large objects to a different location can be problematic and dangerous for staff and the object, so careful planning and training need to be done beforehand. Some points to consider are:

- First assess the condition of the object, as it may be too corroded or fragile to move. Look for weak points.
- Nominate one person to be in charge of the operation.
- Check the original specifications for the machine's weight and for recommendations on lifting points. Check how it has been moved before.
- What equipment is required to move and transport the machine? Do you need a trailer, forklift or crane?
- Can museum staff and helpers move the machine? If so, make sure they are aware of their responsibilities

Examples of machinery that should be left in situ.

and the potential risks to the object as well as to themselves. If it is too difficult, hire contractors.

- Use experienced contractors who can keep the object stable and safe at all times.
- Drain all fluids from the machine before moving.
- Carefully plan the move beforehand and clear any obstacles on the route.
- Check weight and height restrictions; the local police may need to be informed.
- Dismantle parts of the object if possible to make the load smaller to move, and photograph the process.
- Some wheeled machines may have functioning wheels or some may be too fragile. Ensure functioning wheels are lubricated.
- Split rim wheels can be dangerous to undo (see page 40).
- Can the object be secured to a frame or structure to provide stability for transport?
- Can the object or parts of the object be secured to a pallet? This makes movement much easier as it can then be forklifted. Use strapping to secure the object.
- Protect the object from physical shock, vibration and bad weather. Make sure parts don't scrape or rub together in transit. Use clean packing materials such as tarps, plastic sheeting, bubble wrap and blankets.
- Check the object throughout the trip.
- If using a trailer, make sure the brakes are working and that it can carry the load.[4]

For more information on moving an object, refer to **http://collectionstrust.org.uk/resource/larger-working-objects-a-guide-to-standards-in-their-preservation-and-care/**

Fowler steam ploughing engine being lifted prior to transport on a semi-trailer. MAAS Collection

Conservation versus restoration

The decision about whether to restore, reconstruct or conserve an object can be a difficult one.

Restoring an object means returning it to a known earlier condition or its original condition. However, signs of wear and tear, original paintwork, manufacturer names, logos and decals as well as in-service alterations may be lost forever in this process.

Reconstructing an object involves adding new materials or replacement parts.

Conserving an object means maintaining and stabilising it in its existing condition. The aim is to reduce causes of deterioration and other risks to the object. The Burra Charter, developed by Australia International Council on Monuments and Sites (ICOMOS), is a best practice standard for managing cultural heritage places in Australia. It states that conservation involves 'changing as much as necessary but as little as possible'.[5] Any treatment should be kept to a minimum and be reversible. Preservation aims to display and store objects in a stable and protected environment to ensure that the object's historical integrity is kept intact.

Regional museums are encouraged to throw away the paintbrush and spare parts and set a different standard for displaying farm machinery. Conservation prevents them from deteriorating further, yet offers a much more interesting story for visitors by showing how they looked at the end of their working life, with signs of wear and tear, original components, alterations and perhaps original paint and line work. This means the integrity of the object, as well as its cultural value, is maintained. For these reasons, restoration and reconstruction are generally not recommended, especially if an object is considered to be significant. Don't make the mistake of treating the object but losing the history it represents.

In some circumstances, reconstruction can be considered for robust farm machinery that is neither significant nor rare. Nevertheless, resist the desire to make farm machinery look shiny and new. It may be possible to demonstrate a less significant piece of farm machinery in running order if you have adequate resources to restore

Resist the urge to repaint objects, such as this 1909 Sunshine stripper-harvester. MAAS Collection

and maintain it. All replacement or fabricated parts should be clearly marked to show they are not original.

The McLaren straw-burning steam traction engine no 815 is an excellent and rare example of how an engine would have looked at the end of its working life. It is possibly the best surviving McLaren traction engine in existence and no other such examples are known of in public institutions.

For more information on conservation versus restoration case studies, go to:

- **https://maas.museum/app/uploads/2017/02/to-market-to-market-case-study.pdf**
- **https://maas.museum/app/uploads/2017/02/mclaren-steam-traction-engine-no-815-case-study.pdf**

Conservation management plans

It is very important to have a conservation report, which provides thorough details and clear photographs of your farm machinery and its condition before you begin treatment. (See 'What conditions are the objects in?' on page 7.)

Writing a conservation management plan is a good idea for significant, historic farm machinery. This document should describe why the object matters and how it will be managed. It includes: the condition of the object; current photos; proposed conservation treatment and the desired outcome. It should also include equipment, materials and expertise needed for relocation and treatment; a proposed time scale; details on how the object will be maintained

The preserved McLaren steam traction engine no 815. The name of the ship that brought the McLaren to Australia is written on the front wheel, a significant preservation detail. MAAS Collection

and public accessibility. The conservation management plan can be added to as new developments arise.

After ascertaining an object's significance, seek advice from a conservator on how to care for an object. You may need a different cleaning plan for each object. Traditional methods of cleaning, such as polishing brass (which wears the metal away), are not applicable for preserving metal objects. Some objects may not be able to be cleaned, such as ones with flaking paint. You need to establish an appropriate treatment that is safe for the object and the person treating it. Working or educational objects will need a different treatment plan.

To find out about writing a conservation management plan, go to **http://www.mavic.asn.au/resources**

There are several funding agencies you can apply to for assistance in looking after farm machinery. To find out more, go to **http://www.environment.nsw.gov.au/Heritage/aboutheritage/movableheritage.htm** or **http://mgnsw.org.au/sector/support/resources/grants-and-funding/**

Contact the Conservation Department of the Museum of Applied Arts and Sciences (MAAS) or Museums and Galleries of NSW (MGNSW) for advice on assessing significance and appropriate treatments.

This small threshing machine tells us much about its original finish and working life, as it has not been restored.

This is a rare example of a winnower with much of its original paintwork and sign-writing intact.

Interpreting your object

Interpreting an object provides the visitor with a greater understanding of the machinery, its functions and its role in history. Aim to engage all audiences with information about the families and the society that relied on these machines. Collect stories about the people who invented or used the machinery, with old photographs or film, if available, to demonstrate how the machinery was developed, operated and maybe superseded. A label can explain the impact that the machinery had on the farm, town, region or state over time and how it changed and shaped people's lives. The working history of the object can be mentioned, explaining signs of wear, such as past repairs or old line work. In your labels, explain why preservation rather than restoration was chosen and be content that you are helping the farm machinery last a little longer for future generations. Remember, you are the current custodians of these objects, which you will pass on to others in the future.

These objects are stored well under cover and have good interpretative labels.

Working farm machinery

Bringing farm machinery to life by having occasional or regular operating demonstrations is a complex issue within the museum community. There are good arguments for and against working machinery and these need to be considered on a case-by-case basis, in consultation with a curator. These decisions are made based on the object's significance and your resources.

Against working

If you have an object that you wish to preserve for as long as possible, you should not operate it. This means maintaining the object in the state it reached at the end of its working life with its original components, signs of wear and tear, alterations and paint and line work. Your object will be a valuable research tool for present and future generations. Remember, part of your role is to pass on objects in as original condition as possible to the next generation of owners, curators and visitors. As the years go by, the number of 'original reference' engines and machines greatly diminishes as more and more are fully restored.

For working

If you have a piece of farm machinery that is not rare or not considered very significant, it could be restored and used to demonstrate its original function on occasion. The machinery can become educationally valuable, bringing the object to life for visitors. The decision to make a machine operational means that you acknowledge the treatment will be irreversible. There will be wear and tear and ongoing repairs will be required to maintain the machine into the future.

Other aspects to take into consideration are the Work, Health and Safety (WHS) standards necessary for working objects and issues, such as compulsory removal of asbestos lagging.

Another option is to make a video of the machine operating once for use as an educational and online resource. For more detailed information on this topic, go to **http://collectionstrust.org.uk/resource/larger-working-objects-a-guide-to-standards-in-their-preservation-and-care/**

Operating costs

Steam engines and boilers require qualified operators, suitable certification and regular inspections to ensure the engine is fit for use. Seek advice on requirements in these areas. Operating costs such as servicing, periodic repair, fuel, training, suitable operating licences and insurance for the operators should also be taken into consideration. While operating any machinery, ensure national guidelines and standards are strictly adhered to and that visitors are kept at a safe distance.

Signs of deterioration and how to slow it down

The common types of problems that affect historic machinery may include corrosion, dust, grease, grime, wear and tear, light and water damage to materials such as metal, wood, leather, plastic, rubber, painted surfaces and upholstery. Other problems such as broken electronic or hydraulic mechanisms, leaking battery acids and lubricants may also need to be addressed.

For a general summary on preventive conservation, go to **http://mgnsw.org.au/media/uploads/files/Preventative_conservation_by_Te_Papa.pdf** or **http://www.philamuseum.org/conservation/10.html?page=6**

The following sections look at different types of deterioration in detail. With information on what to look for and advice on how to slow deterioration, these handy tables can help you prolong the life of the farm machinery in your care.

An early oil engine tractor known as a 'hit and miss'.

Housing and controlling the environment

A roof over objects will reduce some effects of environmental deterioration.

This machine could have been saved if it had been stored in a shed.

Storing farm machinery in a fully enclosed metal shed keeps it safe from damage.

Wood is affected by rapid temperature and humidity changes — keep more sensitive objects away from external walls.

Housing and controlling the environment

The most important action you can take to conserve farm machinery is to house it in a shed rather than leave it outside, where it is exposed to harsh weather conditions as well as dirt, pests and vandals.

If the object can't be moved into a shed, consider constructing a shed or a partial shed around the object itself. If possible lift the machine off the ground, on pallets or a raised platform, to help prevent damage from dirt, grime, corrosion, and insect and vermin attacks. Ensure that the site is well drained.

Problem	What to look for	Recommendations
Building leaks, blocked drains, loose tiles, direct sunlight coming through windows, unsealed doors and other general building maintenance issues	Mould on objects and rising damp on walls, puddles, insects, dirt, dust, light damage etc	The most important factor in preserving objects is to keep them in a stable, clean environment. Carry out regular maintenance inspections of all guttering, drains, pipes and roofs, and rectify problems as soon as you can. Ensure buildings are watertight and block up drafts and gaps. Ensure storage and display buildings are regularly cleaned and well maintained. Where possible, stabilise temperature and humidity fluctuations with passive measures (eg thermal insulation, double glazing on windows and draft proofing) before considering more expensive measures, such as dehumidifiers or air conditioning. Keep doors closed, or install a revolving door or double doors to act as an airlock. Keep windows shut and use blinds or curtains. Place more fragile objects away from external walls.
Extreme temperature and humidity levels and large fluctuations	New splits on leather or wooden objects, fading of pigments and evidence of corrosion on metals, mould growth etc	Monitor temperature and relative humidity with data loggers in all display and storage areas. Stabilise fluctuations in temperature and relative humidity as much as possible.

Humidity and water damage

Evidence of wood splitting from continual expanding and contracting.

Lichen will grow on metal surfaces in damp conditions.

A data logger showing temperature and humidity levels.

Dehumidifiers will take excessive moisture from the air to prevent mould growth.

Humidity and water damage

Problem	What to look for	Recommendations
High humidity, rain and low air circulation	Mould will grow when humidity is over 70% and where there is low air circulation. Mould usually grows on organic materials such as leather, wood, paper and fabrics. Mould stains come in a variety of colours and have a distinct smell.	Monitor temperature and relative humidity using data loggers. Reduce water and dampness by checking guttering, leaking pipes and taps, missing roof tiles etc. Use fans to circulate air. Use a dehumidifier if mould persists. To kill active mould growth, place the object in sunlight. When the mould is dry, use a vacuum cleaner with a fine filter (HEPA) and wear a filter mask, coat and gloves for protection. (See 'Bibliography' on how to vacuum an object, page 42.)
Expansion/contraction due to humidity change	Cracks in fabric, wood, leather or metal	When humidity is low, organic materials can contract and crack. Use a humidifier to stabilise moisture levels. Keep sunlight off objects. Move objects away from external walls and windows.

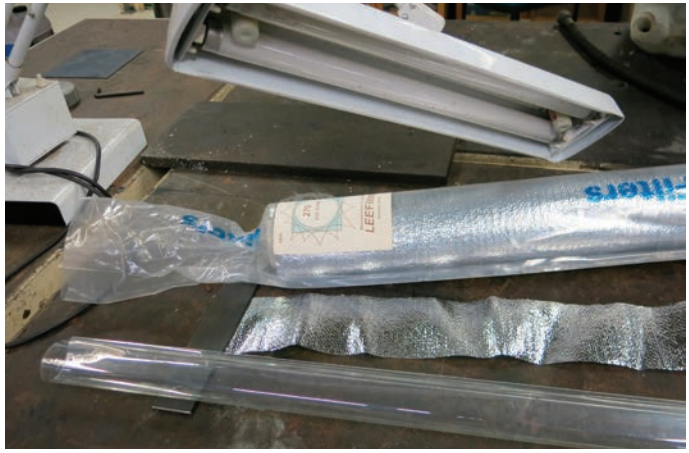
For more information, go to **http://mgnsw.org.au/sector/support/resources/collection-care/combating-mould/**

Light

Exposure to the elements, particularly light, will damage surfaces such as the rubber of this car's running board.

Exposure to light and heat has caused the shellac to blister on this 1930s milk cart. MAAS Collection

Blinds reduce harmful ultraviolet (UV) rays that degrade objects.



UV-absorbing sleeves can be wrapped around a fluorescent tube to block UV light.

Light

Problem	What to look for	Recommendations
UV light from sunlight and other light sources	Paint loss, flaking, cupping and curling paint, cracking of wood, bleaching of dyes	Store machinery out of direct sunlight to protect original paintwork and other light-sensitive materials. Reduce the period of display for light-sensitive materials, as light damage is cumulative. Place curtains, blinds or UV-absorbing screens on windows to prevent direct sunlight on paintwork.
Bright display lights	Fading, discolouration, cracking	Place UV-absorbing filters over fluorescent tubes. LED lights are suitable and have very low levels of UV. Check light levels on light-sensitive materials regularly using a lux meter. Keep objects away from direct heat if possible. Use light dimmers and time switches to reduce exposure to light.

For more information on lighting, go to **http://mgnsw.org.au/media/uploads/files/Lighting.pdf**

Corrosion

A good example of painted metal corroding from exposure to moisture and high humidity.

Moisture from the open chimney and ash in the smokebox has corroded this 1904 McLaren steam traction engine.

When storing an internal combustion engine, drain oil and replace it with inhibitors to prevent corrosion.

Remove batteries to stop acid leaks and corrosion.

Corrosion

Problem	What to look for	Recommendations
Moisture on object surfaces	Corrosion on metal	Corrosion should not be a problem if your museum environment is dry. To protect unpainted metal, remove loose corrosion with a wire brush, then apply a coat of microcrystalline wax mixed in kerosene. Buff with a shoe polishing brush after the wax has dried.
Rising damp	Damp stains and tide marks on walls and objects on the floor	Choose a well drained site. Keep object from direct contact with damp soil by using concrete, gravel or stones for base.
Dust, dirt, grains, straw, water, mould	Rust can occur in combustion spaces, such as boiler tubes, smokeboxes, chimneys, boilers and water tanks. Look in all the nooks and crannies where grime and moisture can accumulate.	Sweep and thoroughly wash out these areas and store them dry and partly opened to ensure air circulation. Have a regular cleaning program of objects in storage and display areas. Surface clean objects by vacuuming. (See 'Bibliography' on how to vacuum an object, page 42.)
Roof leaks	Damp stains, puddles, tide marks, mould	Keep gutters clear and ensure drainage is effective. Keep humidity low.
Old lubricants	Oil leaks and grime	For internal combustion engines, make sure to drain old oils if possible. Don't leave them empty; however, replace with a biodegradable, inhibited lubricant that will protect and lubricate mechanisms. The inhibited oil will resist moisture, salt, acid and deter rust growth. Contact an oil company's technical department for advice on suitable products. For operable machines, use biodegradable, protective lubricants to conserve and lubricate mechanisms. Fuel pumps and carburettors should be emptied. For steam engines and other old farm machinery, use a wick to drain the oil well and leave it to dry.

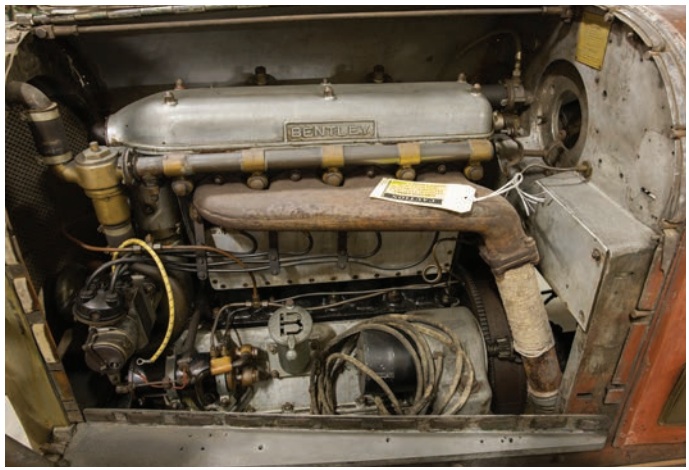
Corrosion

Problem	What to look for	Recommendations
Corrosion on batteries	Grime, corrosion on metal heads, acid leaks	To prevent corrosion of batteries and leaking acids, disconnect or remove batteries. Any batteries should be disposed of according to council regulations.
Remaining moisture or water within machinery	Corrosion in metal parts including radiators, cooling tanks and other openings, such as chimneys	Drain any areas that hold water. Pockets of water often get trapped in small spaces, so use a piece of cloth to act as a wick to absorb water. Partially cover chimneys, vertical exhausts and other openings so that air can circulate, but do not let moisture in.
Trapped water from absorbent material, such as upholstery or lagging	Swollen upholstery materials Wet or crumbly insulation lagging	Keep machinery in a stable environment under shelter to reduce this problem. Use towels to absorb water from wet upholstery. Use a string wick to absorb water. Be extremely cautious of lagging around boilers as it may contain asbestos. Go to **www.workcover.nsw.gov.au** for information on how to proceed. Asbestos must be removed by a qualified person or under the supervision of a qualified person.

Dust and dirt

Dust, grime and debris on metals react with humidity and pollutants, which cause corrosion.

Dust covers are essential to protect objects in storage areas.



Asbestos insulation has become friable in the engine of this 1924 Bentley tourer. MAAS Collection

Dust and dirt

Problem	What to look for	Recommendations
Dust, dirt and grime in display areas and storage buildings	Dust, dirt and grime build-up on interior surfaces	Building interiors should be kept clean. Seal concrete floors and vacuum rather than sweep them. Windows should be close-fitting and kept shut. Wash curtains and dust sheets periodically. Use disposable booties to reduce the build-up of dirt. Use mats at door entrances to catch walked-in dirt.
Dust, dirt and grime on objects	Dust and dirt in small nooks and crannies, which can hold moisture and may cause mould or corrosion	All large objects in storage should be protected with a dust sheet. Ideally, a conservator should decide on the appropriate cleaning method for each large object. Write a cleaning regime and note it in the conservation file. Protect objects from dust and dirt but keep cleaning to a minimum. Trained staff should brush vacuum objects as gently as possible, unless the surface is unstable. Never use household cleaners on objects as abrasion will cause damage. Cleaning with water, detergents or solvents may chemically damage the surface of the object. Some painted surfaces may be water-soluble, and some metals are porous and may corrode. Contact conservators from MAAS or MGNSW for information on treating farm machinery. Machinery stored outdoors needs protection from dust, dirt, vermin, pests and rain. Even a tarpaulin will give some protection.
Historic dust and dirt	Any material that is not harmful to the object but tells part of its history	Don't brush vacuum if the surface is unstable or if the dirt is integral to the object's history and explains its working life.

Dust and dirt

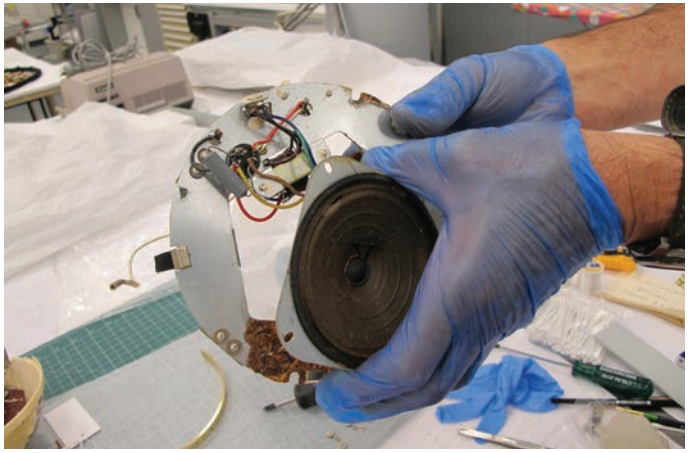
Problem	What to look for	Recommendations
Hazardous materials	Friable asbestos, lead paint, rat excrement	Hazardous substances may be disturbed during cleaning. Use protective clothing such as masks, gloves, lab coats or fume extractors when cleaning. Contact WorkCover for information about asbestos and other hazardous materials. Asbestos must be removed by a qualified person or under the supervision of a qualified person.
Remains of coal, wood, chaff or grain	Corrosion, mould, vermin and insect attack	Remove all remains of fuels and cargo from machinery and engines where possible.

For more information, go to **http://mgnsw.org.au/sector/support/resources/collection-care/cleaning-museums/**

Cleaning techniques

Remove dust and dirt by surface cleaning with a low-suction tube attached to a vacuum cleaner.

Wear protective clothing and masks when treating objects.



Use nitrile gloves when handling or treating objects.

Removing an old wax coating and reapplying a fresh coat on Sydney Observatory's time ball mechanism. MAAS Collection

Cleaning techniques

Problem	What to look for	How to clean
Leather	Only clean if necessary and if the object is sturdy enough. Do not use leather dressings as they do more damage by creating a sticky surface that attracts dust, mould and insects	Surface clean objects with a vacuum cleaner. Use low suction by attaching a plastic tube to a vacuum cleaner with masking tape and using a brush to push dirt into the tube. (See 'Bibliography' on how to vacuum an object, page 42.)
Metals	Dust will cause corrosion in humid conditions. Look out for rusted and unstable areas. Avoid using metal handles that may be weak.	Brush vacuum (see 'leather'), or wipe surface with a soft, lint-free microfibre cloth. Clean silver with a silver cloth, only when necessary. (See 'Corrosion' on how to protect metals, pages 24–26.)
Textiles	Fabrics and upholstery weakened and fragile from acids, light, pests etc	Brush vacuum (see 'leather').
Wood	Avoid lifting wooden objects by the handles. Watch out for damaged areas such as rot, insect, mould and moisture damage. Do not use furniture cleaners as they may contain silicon and colourants.	Brush vacuum (see 'leather'), or wipe surface with a soft, lint-free microfibre cloth.

Rodents and other pests

Example of an object damaged by insects.

Loss of mortar and loose air vents make it easy for insects to enter a building.

Regularly inspect rat, blunder and sticky hanging traps to monitor pest activity.

Rodents and other pests

Problem	What to look for	Recommendations
Small animals such as rats, mice, possums and insects such as termites, moths, carpet beetles, silverfish and borer	Nests, droppings, carcasses, nibble holes, eggs, fur, odours	Establish an integrated pest management (IPM) program. This consists of placing various types of traps near objects to monitor pest activity and maintaining a good housekeeping regime. Inspect traps regularly, particularly in summer. If you find insect activity, keep a dead insect so it can be identified. Use chemicals as a last resort. Organic pyrethrum is recommended for perimeter surface spraying. Refer to article in website below. Use flyscreens on doors, windows and air vents to prevent insects entering the building. Block any other openings. Regularly check any organic materials such as leather, wood, paper or fabrics for signs of insect attack. Keep your object clear of any vegetable matter or grains that might attract pests or retain moisture. Brush vacuum objects, unless the surface is not stable or if the dirt is considered integral to the history of the object. Keep a sample of the dirt in a sealed plastic bag in your catalogue for ID purposes. Insects and vermin will be attracted to leather dressings, so avoid using these unless they are part of a working display such as operating harnesses or engine driving belts. Have a designated eating area away from storage and display areas. Inspect new objects for pest activity before they enter your collection area. Have a quarantine room or area set aside for this. Some objects can be frozen to kill pest eggs.

For more information, go to **http://mgnsw.org.au/sector/support/resources/collection-care/managing-pests-collection/**

Unstable supports and other physical damage

Objects will deteriorate if they are in direct contact with the ground.

Rubber tyres perish over time, causing further deterioration to the machine. Axle stands will take the load off the machine.

Stands help support the structure of this bread cart to prevent straining and damage. MAAS Collection

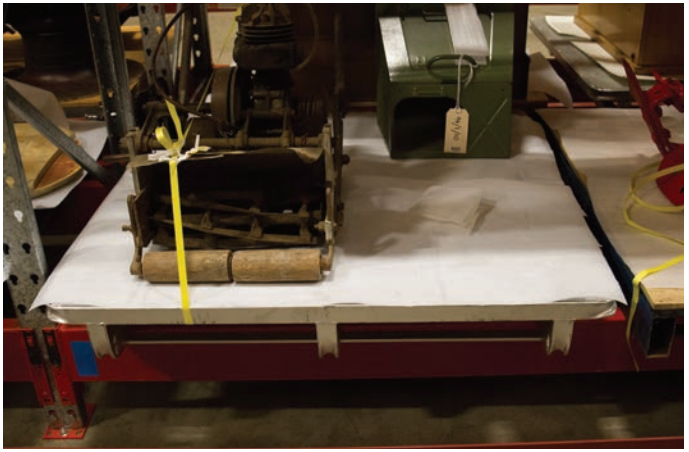
The tyres on these cars are supported by axle stands.

Unstable supports and other physical damage

Problem	What to look for	Recommendations
Corrosion and insect damage	Objects in direct contact with the ground are more likely to corrode or be attacked by insects.	Axle stands take the load off perishable rubber tyres and should be used for storage and display. Make sure the wheel/tyre is clear of the floor. Metal stands are better than wood. Stands and mounts have to be strong enough to support more than the weight of an object. Concrete blocks can also be used. Remember to cushion the contact points between the stands and the objects with wood or rubber.
Distorted tyres	Cracked or deflated rubber tyres	Use axle stands to take the weight off tyres of vehicles. Also reduce air in pneumatic tyres slightly to take pressure off the rubber.
Uneven support — distortions, strain	A large, heavy object on a small base, where weight may be unevenly distributed Cracked or warped materials	Check that your object can support its own weight for extended periods, especially for wooden-framed machines. Use a larger base to support a heavy object, ensuring the weight is spread evenly over a bigger area. Prop overhanging parts to prevent the object from toppling over.
Aged materials	Splits, cracks, breaks, holes, missing parts	Ensure machinery is evenly supported.

Pollutants

If possible, use powder-coated metal storage units (not wood) and stable plastic containers (not PVC).



Use stable storage and display materials, such as steel pallets.

Seal wood used in display and storage areas with water-based, acrylic varnish or VOC-free paint.

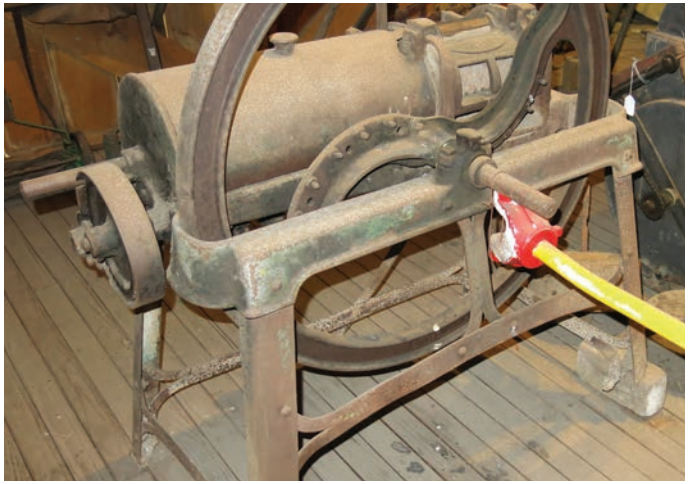
Seal concrete floors.

Pollutants

Problem	What to look for	Recommendations
Outdoor pollutants, fossil fuels, car exhausts etc produce harmful gases such as sulphur dioxide, nitrogen dioxide etc	Pigments fade, rubber disintegrates, leather rots and becomes powdery, textiles become brittle, paint binders crack, metals tarnish and corrode.	Keep windows and doors closed. Regular housekeeping is essential. If possible, use an air conditioner to filter out pollutants. All materials used for storage and display should be chemically stable and acid-free.
Indoor pollutants	Unsealed concrete, off-gassing from display furniture, paints, acids in wood, plastics, varnishes, sawdust, epoxy glue fumes etc	Seal concrete floors. Avoid wood if possible. Use metal racking, steel pallets and powder-coated metal storage units. If wood is used, seal it first with a water-based VOC-free acrylic paint. Allow paint/varnish to finish off-gassing (two weeks at least) before bringing objects into the area. Wooden shelves can also be sealed with polyethylene plastic sheeting or aluminium foil (although it tears easily). Use acid-free tissue paper, acid-free boxes or polypropylene storage containers (not PVC) for storing small objects. MDF, Western red cedar and blackbutt sawdust are known carcinogens. Hoop pine is recommended for display/storage. Use PPE when using glues and solvents.
Food and drink near objects	Oily particles may be deposited on objects	Keep food away from display/storage areas.
Lead paint on object surface	Flaking paint	Use personal protective equipment (PPE) when removing paint and using solvents.

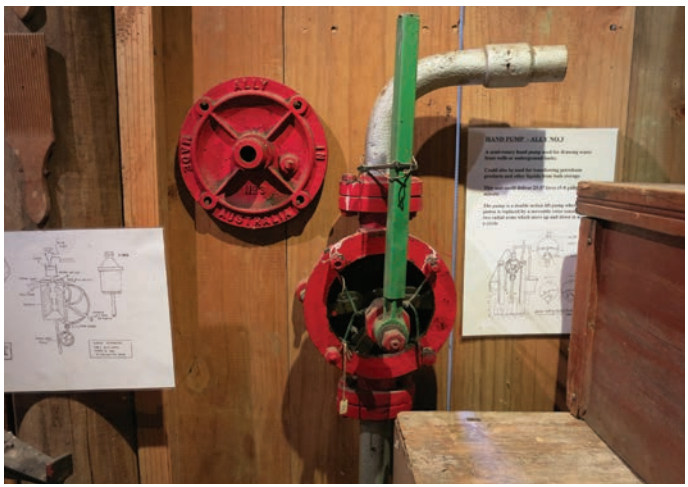
For more information, go to **https://mgnsw.org.au/sector/resources/online-resources/storage/storage-materials-avoid/**

Hazardous materials, security and safety



Objects propped on bricks could be hazardous.

Protect the object and the visitor by providing a barrier.



This lever has been secured in place to prevent it from being moved.

Object containing asbestos has been bagged for people's safety.

Hazardous materials, security and safety

Problem	What to look for	Recommendations
Overcrowded storage or display area	Damage to object	Make sure there is enough space around a large machine for inspection and cleaning. Do not allow the object to be touched, as acids released through the fingertips can cause metals to corrode.
Injury to staff and visitors	Broken pieces of machinery, sharp edges, levers, protruding nails etc	If needed, place signs and barriers near objects to warn visitors of any possible risks. Ensure that children are supervised. Use ramps, paths and barriers to guide visitors on clearly defined walkways around machines. Make sure there are no sharp edges or corroded parts that could break off or injure a visitor. Secure all movable parts to prevent clothing or fingers getting caught. Ensure that fastening is reversible.
Theft	Missing parts	Secure all movable parts to prevent theft. Use plastic-coated steel wire with fittings to anchor down loose parts. Do not drill holes in the object. If necessary, remove any parts that may be attractive to vandals and thieves such as water gauges, radiator caps, brass fittings, identification and insignia plates. Plug small holes with stoppers. Machines displayed outside need to be assessed at regular intervals. Check for signs of vandals, theft and other potential damage.
Deteriorating asbestos	Asbestos can be found in brakes, clutches, or in lagging around steam and exhaust pipes and boilers.	Cover suspected area, then contact WorkCover. Asbestos must be removed by a qualified person or under the supervision of a qualified person.

Hazardous materials, security and safety

Problem	What to look for	Recommendations
Solvents, paints, oils and other materials used in treatments	Health hazard warnings	Materials used should be of low risk to the conservator. Conservation treatments should be well documented, well photographed and reversible where possible.
Split rim vehicle wheels	Many tractors and heavy vehicles use a split rim wheel, which has two sections instead of one. If the tyre is under pressure and the locking strip or nuts are undone, the wheel parts can fly apart with enough force to kill a person.	Consult a conservator before proceeding. If this isn't possible, consult a local tyre shop that works on truck tyres for advice on what precautions to take.
Tension from releasing cables and springs	Taut springs or cables means there is tension.	Carefully research and assess the mechanics of a piece of machinery before attempting any treatment.
Assessing weight when moving large machinery	Be careful working underneath heavy machinery and ensure axle stands are strong enough (never use a car jack).	As above

For more information on hazardous materials, go to **http://mgnsw.org.au/media/uploads/files/Fact_sheet_hazardous_material_assistance_and_advice_organisations.pdf**

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  - Case studies
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    https://maas.museum/app/uploads/2017/02/mclaren-steam-traction-engine-no-815-case-study.pdf
- Museums Australia Victoria (MAVIC) — Resources and publications
  http://www.mavic.asn.au/resources
- Museum of New Zealand Te Papa Tongarewa
  - Online resources
    https://www.tepapa.govt.nz/learn/for-museums-and-galleries/how-guides/collection-management/conservation-guidelines
  - Preventive conservation
    http://mgnsw.org.au/media/uploads/files/Preventative_conservation_by_Te_Papa.pdf
- NSW Office of Environment and Heritage
  http://www.environment.nsw.gov.au/Heritage/aboutheritage/movableheritage.htm
- Philadelphia Museum of Art — online resources
  http://www.philamuseum.org/conservation/10.html?page=6
- NSW Government WorkCover
  http://www.workcover.nsw.gov.au/
- Safe in the Shed: Caring for Historic Farm Machinery
  http://www.environment.nsw.gov.au/resources/heritagebranch/heritage/safeinshedfinal.pdf

Conservation advice

- Australian Institute for the Conservation of Cultural Material
  http://www.aiccm.org.au
- Canadian Conservation Institute — Care of objects and collections
  http://canada.pch.gc.ca/eng/1443109395421
- CoOL — Conservation OnLine resource
  http://www.cool.conservation-us.org/search.html
- MGNSW — Online resources
  http://mgnsw.org.au/sector/resources/online-resources/
- Museum of Applied Arts and Sciences
  https://maas.museum/research/conservation/conservation-resources/

Suppliers lists

- MAAS
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The websites listed in this manual were available and suitable at the time of publication.

Notes

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MAAS offers a range of outreach workshops for the collecting sector through its Regional Programs. For more information, go to **https://maas.museum/about/regional-program**

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Front cover 'Pressing and branding room', farm hands loading wool into wool presses, Kerry and Co, 1884–1917. Tyrrell Collection, MAAS Collection

In memory of Graham Clegg — thanks for all your wisdom.

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