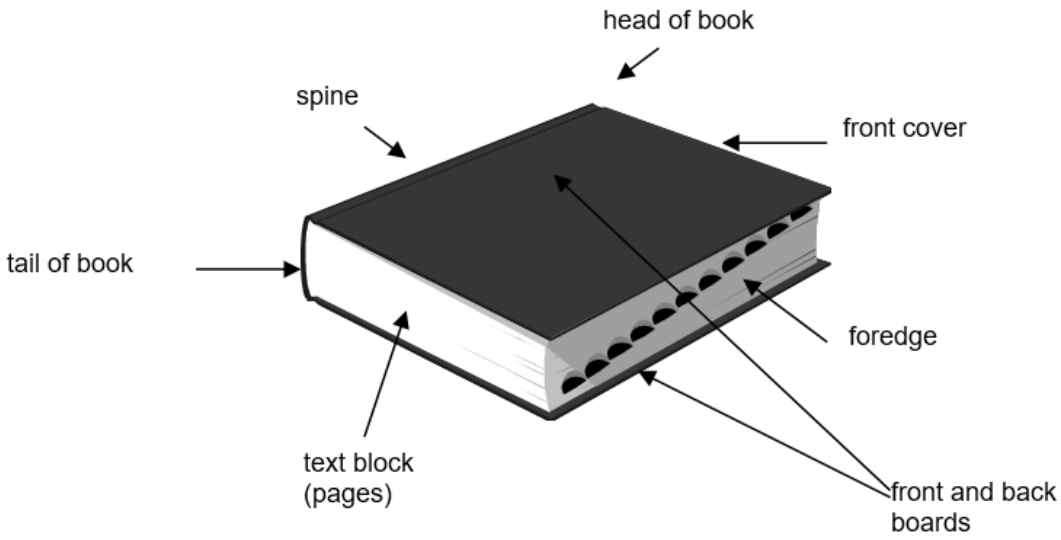
STATE LIBRARY
QUEENSLAND

Caring for your collections:

Books and bound material

This leaflet provides general guidelines for the care of bound volumes, including printed and manuscript material. It outlines what causes deterioration and methods for minimising further damage.

Book structure



What causes damage?

- **Paper quality** is an important factor in a book's stability. The most stable type of paper is made of cotton, hemp, or linen fibres. Unfortunately, it is uncommon for modern publishers to use these types of material. The majority of books are made from wood pulp. The lignin in wood pulp reacts with moisture, heat, and light causing the paper to become discoloured and brittle. Old paperbacks and newspapers provide graphic examples of these deterioration processes.
- Harmful acidic by-products produced from **poor quality storage enclosures** can have a damaging effect on books.
- **Warm, humid conditions and poor air circulation** encourage the growth of mould and insect activity causing irreparable damage. Paper and boards will warp.
- **High temperature and humidity** accelerate chemical deterioration.
- If conditions are **too dry,** paper will become brittle and weak, causing tearing and cracking. Leather bindings may crumble and split.
- **Light** is another potential cause of damage to your book collections. Light fades inks, dyes, leather, and book cloth and speeds up chemical deterioration. The ultraviolet and visible components of light are responsible for much of the damage. Sunlight and fluorescent lights are strong sources of UV and visible light.
- Due to the mechanical nature of books, **the way we handle and use** books will greatly affect their long-term stability. For example, damage is caused by pulling books off the shelf by the top of the spine. If a book will not lie flat, do not force it to open further. Always support the covers when a book is open.

- **Oxidant, acidic, and sulphating gases** attack all components of books and cause leather and paper to become brittle. Nitrogen oxides and ozone are two of the worst offenders.
- **Airborne pollutants** such as soot and ash particles from manufacturing processes may be greasy, abrasive, and chemically or biologically active. This can settle on shelves and books and create dust that can abrade materials when handled.
- Books can become weak and brittle when stored in close proximity to **environmental fumes** from wood, paints, varnishes, poor quality paper, or plastic products, and fumes from common cleaning solvents.
- If possible, avoid storing books in **wooden or wood by-product shelving** as damage can be caused by off-gassing of harmful pollutants such formaldehyde and acetic acid. This is particularly a problem if there is poor air circulation as pollutants can build up to harmful levels. Please see our guide on *Storage furniture* for more information. This guide can be found on our website at this link – *How to guides*.

What you can do

- To minimise deterioration caused by damaging levels of moisture, heat, and light, it is important to **create a stable environment.**
- Prevent dramatic fluctuations in temperature and humidity. The recommended conditions for books lie between 19°C-21°C and 45%-55% relative humidity. Although these conditions are very difficult to achieve without humidity-controlled air-conditioning systems, it is possible to lessen fluctuations with a few simple steps:
  - Avoid placing bookshelves on external walls. External walls are subject to much greater daily fluctuations in temperature and humidity than internal walls. If possible, use a room with solely internal walls and good ventilation.
  - Avoid areas where sources of heat and moisture are located (e.g. bathrooms, kitchens, and laundries) as there is a high risk of mould growth. Don't exceed temperatures of 23 °C and humidity of 65%.
  - Store and display books away from direct light. Avoid areas near windows where sunlight may fall on books or under other sources of light such as lamps and overhead lighting.
  - **Avoid exposing book collections to internal sources of airborne pollutants** such as photocopiers, cleaning products, and poor quality shelving.
  - In areas where there are high levels of external air pollution (e.g. busy roads and industrialised areas), place valuable books in **archival storage boxes** to prevent particulate matter from settling on the books. Thorough cleaning of shelves and books on a regular basis will also assist in minimising build-up of harmful particulate matter and pest activity.
- It is important to **choose shelving carefully** as some material can cause damage to your collections:
  - Wood or wood-based shelving (e.g. MDF, plywood, chipboard etc.) produces acidic volatile organic compounds (VOCs) which can cause degradation of leather bindings and discolouration of text pages. Direct contact with wood can cause brown staining spots. If you have to use this type of shelving, line each shelf with polyester sheeting to prevent books from touching the wood. Allow space between the books and the back of the shelf and ensure there is a small amount of space between each book. This will increase air circulation and make it easier to safely retrieve books.
  - It is also wise to avoid storing collections in glass fronted wooden bookcases. The VOCs emitted from the wood can be trapped inside. If enclosed wooden bookcases must be used, mitigate against pollutant build-up, by lining the shelves and regularly leaving doors open to allow dispersion of the VOCs.
  - The best choice of bookshelf is powder-coated steel or anodised aluminium shelving. Neither of these materials produces harmful by-products. Baked enamel shelving will emit harmful gases if it has not been cured properly. A cheap, suitable option is galvanised steel shelving which is safe to use as long as it does not become rusty.
  - With any shelving, it is important to ensure correct weight loading on each shelf so its doesn't collapse or topple.
- To minimise pest and mould activity, keep books and shelving free of dust and dirt. Store book collections away from sources of food or moisture. Regularly check for signs of pest and mould activity.

- Sticky insect traps (also known as blunder traps) can be strategically located to monitor the variety and quantity of insect activity. (Please refer to our guide on *Pest management* for further information. This guide can be found on our website at this link – *How to guides*.)

Storage Methods

- Small and medium sized volumes in good condition may be stored either upright on shelves or within folders or boxes.
- Similarly sized volumes should be shelved together to ensure uniform support, thereby discouraging warping of the boards or other physical distortion.
- When storing books on shelves ensure they are held vertically without jamming them in tightly. Packing books tightly places them under continual lateral stress and prevents air circulation.
- Do not allow books to lean or slant.
- Bookends should not have sharp edges.
- There are several options for the storage of damaged volumes:
  - Weak volumes can be wrapped in strong archival wrapping paper or an archival folder and stored flat.
  - The ideal storage for a damaged volume is in **archival quality boxing.** These can be hand or custom made – please see our guide *How to make an archival corrugated phase box* or commercially purchased (e.g. pre-fabricated corrugated board box or polypropylene box). This guide can be found on our website at this link – *How to guides*.
  - Storage enclosures should be made from either acid-free, lignin-free, alkaline buffered paper, or board (if possible 100% cotton cellulose fibre) or chemically stable plastic (e.g. uncoated polypropylene). Ready-made boxes can be purchased from a number of conservation suppliers and at the Library Shop (ph. 07 3840 7576). You can also make your own box like the one shown (right) by following the instructions provided in our guide *How to make an archival corrugated phase box*. (This guide can be found on our website at this link – *How to guides*.) Ensure you use appropriate archival board.
  - Slipcases are not recommended as volumes suffer abrasion when being removed and light damage can occur along the exposed spine.

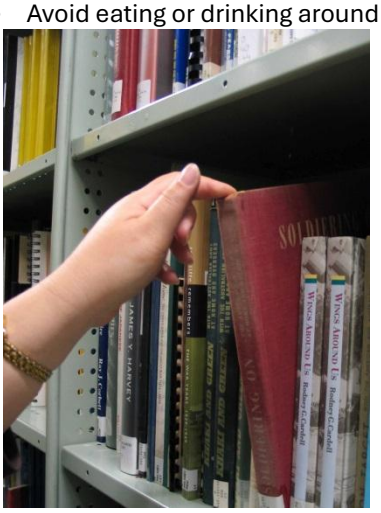


Phase box

Handling

- The mechanical nature of books results in damage caused by wear and tear. Careful handling can minimise this type of physical weakness.
- Always open a book gently. If you force open a book beyond the point of resistance, the spine will crack. This often happens with paperbacks as they are glued not sewn. Spine damage is also caused by forcibly flattening open books when photocopying or scanning.
- When displaying books open, use a book cradle or pillow designed to support the spine. Do not display material open for long periods. Regularly change pages to minimise light exposure.
- Avoid licking your fingers to turn pages. As well as introducing moisture to the paper, page corners can become creased and crushed.
- Avoid folding over or "dog-earing" page corners as the creasing will cause page corners to become weak and break off.

- Always wash and dry hands thoroughly before handling books. Wear nitrile or white cotton gloves to protect leather spines and remove the gloves for page turning.
- Avoid eating or drinking around your collections.



Never remove a book by the top of the spine as this can cause significant damage.



Always push the books on either side back and remove the volume from the middle of the spine.

Useful websites

- *AICCM Australian Institute for Conservation of Cultural Material* www.aiccm.org.au
- *AIC American Institute for Conservation* https://www.culturalheritage.org/
- Find a conservator in private practice through the *Australian Institute for Conservation of Cultural Material* (AICCM) https://aiccm.org.au/find-a-conservator/

Supplier information

Please refer to our guide on *Suppliers and guide to selecting preservation materials* for details on stockists of archival board and blunder traps. This guide can be found on our website at this link – *How to guides*.

The procedures described here have been used by State Library of Queensland in the care of its collections and are considered suitable by State Library as described; however, State Library will not be responsible for damage to your collections should damage result from the use of these procedures.

Need further information?

(07) 3840 7810 | http://www.slq.qld.gov.au/preservation

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Queensland Government