

Storage furniture





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Library and archive storage furniture

Introduction

Without the establishment of secure and well maintained accommodation, incorporating appropriate high-quality storage furniture and materials, all other actions to preserve library and archive collections will have limited impact. Most library and archive collections will spend a much greater proportion of time in storage than in any form or use (such as reading rooms or exhibitions), so it is important that storage strategies are prominent in the overall preservation strategy. At its broadest 'storage' must encompass the building, environment, storage furniture, packing materials and housekeeping routines. This booklet focuses on furniture and equipment for storing physical library and archive collections. The principles apply whether improving or refurbishing existing storage facilities or building new storage facilities, whether you are considering off-site storage, shared storage or outsourced storage. The guidance is relevant to both small and large organisations.

Storage options

Storage should support the purpose, functions and range of activities within an organisation, and will be determined by the following factors: acquisition, disposal, retention, format, condition and access to the collections, as well as sustainability, cost and resources for their management.

Before considering what type of storage furniture to use and how it is arranged, think about the storage envelope. There are many options: in-house or off-site, commercial or shared facilities, instant access or dark storage. Warehouses, underground facilities, purpose-built pods, converted buildings and bespoke stores are all now commonly used to store library and archive collections.

Whether old or new, adapted or purpose-built, buildings that store library and archive collections should, as far as possible, conform to current standards. For library and archive materials these are detailed in **PD 5454:2012 Guide for the storage and exhibition of archival materials**. The primary issues to consider are:

- Location
- Construction
- Environmental stability
- Security
- Fire suppression
- Protection against water.

A risk assessment should be carried out to evaluate the suitability of a building for storing library and archive collections. This process will highlight potential threats and provide a sound basis for their ongoing management. Consideration should also be given to levels of use of the collection and access requirements.

Space management

The way in which storage space is managed, calculated and apportioned for the different formats is very important. The layout of storage furniture must ensure efficient and economic use of the available space. The processes of calculating and managing the space will require close collaboration with buildings staff, and where appropriate, architects. Standardisation is a key requirement for the optimization of space; the shelving configuration must reflect the formats and sizes of the collection material. As a general rule, shelving capacity should be expressed as linear metres and the generally accepted standard shelf length is 1 metre. To make optimum use of space, books of a similar size should be shelved together. For archival material, packaging and box sizes can also be standardised if the collection is fairly uniform. Ideally a size should be chosen and used as standard which will make best use of the storage capacity. Material that will not fit in the selected standard size, either because it is too large or too small, will need to be stored at another location. The future growth of collections must be considered during the planning process. Precise calculations may be possible for fairly static collections but for others only estimates can be provided. A minimum expansion capacity of 20 years is recommended¹.

¹ PD 5454:2000 section 5.3

Collection formats

The choice and configuration of storage furniture will be influenced by collection format. A library or archive may need to accommodate a range of different sizes, shapes and materials, but in general terms, there will need to be appropriate storage for:

- Books and bound documents
- Boxed archives
- Large flat items (this may include large books that must be stored flat)
- Rolled material
- Photographic material
- Magnetic media
- Gramophone discs
- Digital media (hand-held)
- Framed material (paintings, prints, drawings etc).

Environmental targets may vary according to format and condition. It may also be possible to store material by size/shape; if so, the process and the management of space becomes easier. This is heavily dependent on a high standard catalogue and location system. In this case different formats can be allocated to specific areas and the storage furniture chosen and arranged accordingly, using appropriate shelf depth, height and shelf intervals or special storage furniture such as plan chests.

Storage furniture

In general terms, the storage furniture options for library and archive collections are as follows:

- Shelves to accommodate standard boxes
- Shelves to accommodate books stored upright
- Deep shelves for large flat documents or books
- Plan chests for flat maps, plans and documents
- Deep shelves for rolled material
- Wall-mounted racking for very long rolled items.

The following table suggests appropriate storage furniture for a range of common library and archive formats.

Format	Storage furniture	Depth
Archival documents (maximum foolscap ²)	Shelving	450mm
Archival documents (larger than foolscap ²)	Deep shelving or plan chest	500 – 600mm (shelving) 965mm (plan chest)
Books (average size)	Shelving	350 – 400mm
Books (large or heavy ³)	Deep shelving and frequent shelf intervals (shelving may be roller-fronted) Flat storage, no more than 3 items high	500 – 600mm 750mm for exceptionally large material
Large flat material	Deep shelving and frequent shelf intervals or plan chest	500 –1000mm (shelving) 965mm (plan chest)
Rolled material (up to 1500mm long)	Deep shelving and frequent shelf intervals	1500mm
Photographic material	Shelving or cabinets	450mm (average archival box depth)
Magnetic media	Shelving or cabinets	450mm (average archival box depth)
Gramophone discs	Shelving or cabinets	450mm
Digital media (hand-held)	Shelving or cabinets	450mm
Framed material (paintings, prints, drawings etc)	Purpose-designed vertical (and sliding) racking or static deep shelving with close shelf intervals or plan chests	

² 216 x 343mm

³ Generally, books over 450mm high should be stored flat.

Shelving

The most effective way of protecting the collections and ensuring the most economic use of space is through good use of shelving. PD 5454:2012 specifies that 'shelves should be of a size and shape that fully supports the archival materials that they are intended to hold, while leaving sufficient space for the contents to be easily and safely withdrawn or replaced'⁴. Shelving can come in many forms and the choice may depend on the resources available:

- Proprietary office shelving in wood or metal
- Tailor-made shelving specially integrated into the building fabric
- Wooden shelving
- Metal shelving
- Heavy-duty industrial metal shelving.

Proprietary office shelving may be suitable for some collection material but may have a restricted range of sizes and components. Tailor-made shelving is more commonly found in libraries and requires individual planning. Wooden, metal and heavy-duty industrial shelving are the most common types of shelving found in libraries and archives and are usually available in the following formats:

- Static/free-standing
- Mobile
- Wall-mounted.

Generally, it is not advisable to store material (especially unprotected material) on wall-mounted shelving in close proximity to external walls, and the resultant lack of air circulation, increases the risk of damp and the associated risks of mould and insects.

The maximum height of the shelving will be controlled by the shelving construction and the ceiling height. Adequate clearance should be allowed for fire detection and suppression systems, and shelving canopies. For health and safety reasons, the height of the highest shelf should be such that it can be reached with ease by a person of

⁴ PD 5454:2000 section 6.12.4

normal height, unless suitable arrangements are made for the safe retrieval of items from a greater height. In most cases, this will mean manual handling training for staff and the provision of appropriate equipment – ladders and/or lifting devices. One solution is to mark all shelves over the manual handling limit in a different colour (usually red), to make it clear when extra equipment is required. All shelving suppliers should provide clear signage to ensure that shelving is used and loaded appropriately. The minimum height of the lowest shelf should be 150mm from floor level. This will minimise damage by passers-by and from water in the event of a flood.

Wooden shelving

There is much professional discussion about using metal shelving as opposed to wooden shelving. Good quality wooden shelving that has been in place for a number of years should not be regarded as high risk. The primary concerns regarding wooden shelving are:

- Volatile Organic Compound (VOC) emissions from the wood itself and/or coatings⁵.
- Widespread use of Medium Density Fibreboard (MDF) containing residual formaldehyde (a VOC).
- Vulnerability to insect attack.
- Combustibility.

The risk of damage caused by VOCs can be reduced by placing acid-free board/paper or MicroChamber[®] paper on each shelf.

Metal shelving

The primary concerns regarding metal shelving are:

- Variable quality of manufacture.
- Risk of rust in poor environmental conditions.
- Risk of buckling during a fire.

⁵ For more information refer to Tétreault, J., *Coatings for display and storage in museums* Ottawa: Canadian Conservation Institute, 1999

Metal is seen as an archival industry standard (especially for mobile shelving) and has a stringent specification within PD 5454:2012. It is usually manufactured from steel that has been powder-coated with enamel paint that does not off-gas⁶. Loading capacities should be confirmed with the supplier.

Static shelving

The advantages of static shelving are:

- Widely available and cheap.
- Can be constructed and adjusted by staff.
- Useful for material that is at risk on mobile shelves (fragile formats such as glass-plate negatives or gramophone discs).
- Useful for heavy/large format items that require deep storage.

The disadvantages of static shelving are:

- Requires aisles between facing runs, so does not maximise the use of space.
- There are many suppliers, so difficult to ensure standardisation.

Mobile shelving

Generally metal in construction, sometimes with plywood shelves. Produced as manually assisted (hand-driven) or electric powered. The advantages of mobile shelving are:

- Maximisation of storage capacity within a given area.
- Reduction in the number of access aisles required.
- Improved security as bays can be locked.
- Shelf sizes that are standardised for library and archive collections.

⁶ Finely divided, synthetic polymers are fused onto the steel to produce a chemically stable finish.

The disadvantages of mobile shelving are:

- Requires either a track sunk into the floor (complex, and costly) or a false floor (which may reduce the overall height available for the shelving).
- Not always appropriate for installation on storeys above ground level. It is vital to check that the location is suitable for mobile units and that all floor loadings are confirmed.
- Requires regular maintenance to ensure that mechanical function and health and safety considerations are met⁷.
- Long runs can be prone to 'snaking' and instability (this needs to be discussed with the supplier and included within the shelving specification).
- Older units can slip the rails (dangerous and costly to remedy). It is not recommended that old mobile units be dismantled and reassembled elsewhere.
- Not appropriate for fragile material formats (such as glass-plate negatives or gramophone discs) because of the risk of damage or displacement due to the impact of two shelves meeting or protruding material becoming crushed.
- Unused areas of the collections remain in closed and dark spaces – this can encourage moulds and insects in poor environmental conditions⁸.

Special storage furniture

Plan chests

Plan chests are used to store large flat material, especially items that will not fit into the standard size storage boxes. A good quality plan chest can be a real asset and serves to protect flat material and eases retrieval and replacement. They can be made of metal or wood. The following issues need to be considered:

- Standard of carcass construction – robust, but lightweight (usually aluminium) and ideally fire resistant.

⁷ Refer to PD5454:2012 6.12.5.3 Mobile shelving, movement of runs, stability.

⁸ Many organisations instigate a cyclical programme of opening unused areas overnight to encourage air circulation.

- Manufacturers should be able to supply a range of drawer sizes. It is better to have more shallow drawers than a few deep, over-filled ones.
- Rigid drawer construction required for support when open and filled.
- Anti-tilt mechanism required.
- Allow space for opening drawers and retrieving items.
- Check floor loadings are adequate for chests when full.
- Drawers require security locks if chests are located in public areas.
- Chests may need to be raised on a plinth to ensure that collection items are stored above floor level and so protected from floods.
- Chests are not usually designed to be stacked.

Hanging storage chests

Upright, hanging storage chests are commonly used for the vertical storage of maps, plans and drawings. The main advantage of this form of storage is the economic use of space, but there are a number of concerns:

- The standard of construction and materials used in construction.
- The availability of an access panel at the base to retrieve fallen items.
- Complicated hanging support structures can make it difficult to remove and replace individual items.
- Risk of damage from the method of hanging, which may involve attaching a self-adhesive strip to the item (the strip has holes punched to receive the hanging supports). This method should only be used for low value items.
- Chests are often over-filled due to overall space restrictions.
- High risk of damage during retrieval.

An alternative hanging system has been developed in which items are placed in polyester sleeves (Melinex® or Mylar®) and the sleeves hung on supports. In general terms there are few risks to this method of storage – it is just the retrieval process that can cause difficulties.

Cabinets

In some organisations a more aesthetic arrangement is required, which enables collections to be seen but secure. The solution, common in historic libraries, has been to store books in glazed wooden cabinets. Whilst this solution achieves the objective, it does present some specific preservation problems. Dark, poorly ventilated cabinets can favour mould growth and encourage insects in poor environmental conditions. Condensation may form on the glass if the environment is unstable, and the glass may be easily shattered. If possible cabinets should be moved away from external walls and, if necessary, ventilation holes made in the back to increase air circulation. Glass can be replaced with a safety standard version or a security film applied to the glass surface to guard against shattering. Glass can also be replaced with decorative grills. Although less aesthetic, metal cabinets can also provide secure storage and protection from light, fire and water damage. For more detail see PD5454:2012.

Conclusion

Appropriate storage is vital for the long-term preservation of collections. As part of long-term preservation planning, organisations should review existing storage provision, evaluate current and future storage needs, and specify appropriate storage furniture. It is strongly recommended that **PD 5454:2012 Guide for the storage and exhibition of archival materials** is consulted.

Online resources

BREEAM: sets the standard for best practice in sustainable building design, construction and operation and has become one of the most comprehensive and widely recognised measures of a building's environmental performance.

www.breeam.org

Designing libraries: a freely accessible resource for library planning and design, a database of library buildings and a marketplace for services.

www.designinglibraries.org.uk

IFLA PAC, Energy Savings and preservation in libraries and archives, International Preservation News, No.55, 2011

www.ifla.org/files/pac/ipn/IPN%2055%20web%206%20megs.pdf

IFLA PAC, Library and archives facing the challenges of sustainable development, International Preservation News, No.44, (2008).

<http://archive.ifla.org/VI/4/news/ipnn44.pdf>

MAPLE: Major Archives Projects Learning Exchange

www.nationalarchives.gov.uk/information-management/projects-and-work/major-archives-projects-learning-exchange.htm

National Archives, Identifying and specifying requirements for offsite storage of physical records, The National Archives, 2009

www.nationalarchives.gov.uk/documents/information-management/considerations-for-developing-an-offsite-store.pdf

National Institute of Building Sciences, Archives and Storage Record building

www.wbdg.org/design/archives_records.php

National Preservation Office, Where shall we put it? Spotlight on collection storage issues: papers given at the National Preservation Office Annual Conference 2004

<http://www.bl.uk/blpac/pdf/conf2004.pdf>

Additional reading

Kitching, C. S, *Archive buildings in the United Kingdom 1993–2005*,
Chichester: Phillimore, 2007

PAS 197:2009 *Code of practice for cultural collections management*,
London: British Standards Institution, 2009

PAS 198:2012 *Specification for managing environmental conditions for cultural collections*,
London: British Standards Institution, 2012

PD5454:2012 *Guide for storage and exhibition of archival documents*,
London: British Standards Institution, 2012

Tétreault, J., *Coatings for display and storage in museums*
Ottawa: Canadian Conservation Institute, 1999

Wilstead, T., *Planning new and remodelled archival facilities*,
Chicago: Society of American Archivists, 2007

Preservation guidance booklets

The following booklets can be downloaded free of charge at www.bl.uk/blpac/publicationsleaf.html.

Free printed copies are also available.

Basic preservation for library and archive collections

Building blocks for a preservation policy

Cleaning books and documents

Damaged books

Guidance for exhibiting library and archive materials

Managing pests in paper-based collections

Managing the digitisation of library and archive materials

Managing the library and archive environment

Managing the preservation of library and archive collections in historic buildings

Packing and moving library and archive collections

Photocopying of library and archive materials

Preparing funding applications for preservation and conservation projects

Prevention and treatment of mould outbreaks in collections

Preservation of photographic material

Library and archive storage furniture

Understanding and caring for bookbindings

Using library and archive materials

The Preservation Advisory Centre promotes the benefit of good preservation practice and provides support in the form of information services, training and preservation management tools.

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