The need to focus on the detail of storage can be a stumbling block for many archive professionals, since the level of building design, storage, furniture and environmental control may be unfamiliar and confusing. Without the establishment of a secure and controlled environment incorporating appropriate high-quality storage, all other actions to preserve the collections will have limited impact.

This guide focuses on the early and comprehensive planning of your facility. We are able to share with you both Industry and Technical Standards as well as relevant best practices to ensure your project plan incorporates all considerations, helping you to build an archive to BS5454 standards.
Link 51 (Storage Products), with over 60 years of experience, is the UK’s largest manufacturer and supplier of storage equipment.

The company offers a comprehensive range of products and services for the archive and heritage market, designed with the emphasis on BSS454 archive storage standards.

Our manufacturing facilities all benefit from running ISO9001 and ISO14001 quality and environmental control systems and being UK based, keep our customers’ carbon footprint to a minimum.

Our particular commitment to health and safety in design and construction means Link 51 works in partnership with a growing number of clients, who consider Link 51 their added insurance policy – particularly when it comes to the implementation of large-scale or technically complex schemes.

Link 51 is part of Whittan Storage Systems, which manufactures an extensive range of pallet racking, shelving, lockers, cupboards and other storage equipment for clients around the world.

www.link51.co.uk

Archives & Records Association
UK & Ireland

We have been the corporate sponsors of the Archives and Records Association for over 16 years. This is testament to our commitment in developing bespoke storage systems for the archive sector.
Design Proposals
Reaching the final design that offers you all the factors required often entails several options to consider. Link 51 take pride in dedicating ourselves in dedicating time to producing as many different variants of layout and design as required to ensure you achieve the best possible solution.

You can be assured that our professional and highly skilled team will dedicate the time with you to ensure your project meets requirements.

Management of Associated Services
Link 51 is not just a supplier of storage systems. We regularly manage, within our design and solution, services that dovetail with storage requirements – examples might be floor coverings, screeding and alterations to lighting layouts. Link 51 often source and supply specialist equipment, including plan chests, map tanks, or items such as order picking equipment for taller storage systems requiring mechanical aids.

Financial Impact Consideration
The cost of storage systems is not the only area to consider. Layouts may impact on costs of continuing services such as heating and lighting costs. We will consult with you and your representatives to offer a whole solution cost view.

Specialist System Solutions
Above all, we provide a solution. Designed and managed in liaison with architects, designers and construction consultants as required. You can be assured that our solutions to your storage requirements will always receive an unbiased view of how to provide you with a system that serves your organisation well into the future.
HOW OUR EXPERIENCE HAS HELPED

Established over 60 years ago, our extensive knowledge, pool of archive industry experience and relationships with both the public and private archive sector enable us to provide our customers with expert advice from the very start of the project.

This means that at the earliest stage you can access, without obligation, our relevant experience having worked with a broad range of clients.

- Oxford Record Office
- Windsor Royal Archive
- Glamorgan Archive
- London Metropolitan Archive
- Science Museum
- Highland Archive
- Leeds Discovery Centre
- British Film Institute Archive
- General Register of Scotland

“Mobile Shelving means that the majority of the installation can be kept in a closed position, ensuring the volume of the storage cube is significantly more than static alternatives. In turn, this allows us to hold the vast number of volumes that we have on site and indeed to grow further in the future.”

David Rose
Random House Building Manager

“The basement had previously been used for catering operations so it is home to a lot of ducting, columns and plumbing installations. The Link 51 design has addressed the complexity of the layout that this produces while still ensuring that the full height of the ceiling has been utilised.

Overall capacity has been maximised by focusing on the use of Link 51’s mobile shelving design whereby an easy-to-use hand wheel moves shelving runs to the left or right as required. Because this means only one access aisle needs to be open at a time, it allows the majority of the installation to be kept in a closed position – thereby maximising the effectiveness of the storage cube.”

Peter Goulton
Royal Free Hospital, Health Records Manager
“We have an established and successful record of using Link 51 equipment with examples at the company’s Birmingham and Southampton sites. However, with this latest project, as with all installations, it was important that the shelving facility underwent a competitive tendering process which again pointed us to the Link 51 solution.”

Andrew Jenkins
BDO Head of Workplace and Projects

“Did it vital that the shelving installation reflected key requirements specified at site, which pointed towards the Link 51 solution as being the optimum choice. These not only included the need to maximise storage volume within the available footprint but also to provide a degree of versatility that could house a diverse collection of material ranging from parchments – the oldest of which dates from the 12th century – to large volumes of corporate records, plans and maps.”

Susan Edwards
Glamorgan Archivist

“We approached a total of four companies with our shelving and storage requirements and selected Link 51 on its ability to meet key objectives. Whilst it was, of course, important that budgetary considerations were met, the company was also appointed on the versatility of its design and layout proposals, and the sheer volume that the mobile concept would hold.”

Susan Beckley
Highland Council Archivist
Materials within archive collections are mostly organic and can be as varied as the collections themselves. It is the diversity of materials and their special needs that require specialised storage and preservation solutions.

Light blamed for £10 million library fire

The fire which devastated Norwich library three months ago was almost certainly the fault of a failure in the lighting or wiring of an illuminated bookshelf, it emerged yesterday. 'It seems to have developed in one of the ordinary bays of books which stood against the wall and had an extending shelf at the top to hide the fluorescent striplight which illuminated the books.'

He refused to say whether the information was a direct result of the inquiry, which will report at the end of the year, merely commenting: 'It is what I have been advised.'

The inquiry is attempting to resolve four questions: the cause of the fire, why it spread so fast, the affect of the firefighters’ response on its spread, and the difference sprinklers would have made.

Loss adjusters are attempting to put a value on the damage - the fire destroyed 170,000 books and 30,000 volumes from the Norfolk studies stock which were kept in wooden catalogues.

The claim will be the biggest made by a library in the UK.
**Causes of Deterioration**

Most damage is caused by a combination of factors, including:

- Poor handling and storage
- Damp
- Mould
- Insects, rodents and birds
- Pollution
- Unsuitable packaging
- Light, particularly ultra violet light
- Incorrect temperature and relative humidity (RH)
- Disaster and emergencies (flood, fire, etc.)

**What You Can Do**

You can implement the following preventative measures to considerably extend the useful life of your collection.

- Monitor and control temperature
- Limit light
- Filter air to reduce air pollution and remove pollutants from archive storage areas
- Protect archives from water damage
- Inhibit mould growth
- Reduce attractions for insects and rodents
- Protect records from poor handling and storage

**Disaster Planning**

Buildings, people and collections can suffer in an emergency, even from an event as seemingly insignificant as a burst water pipe, a blocked drain or a shutdown in temperature controls.

In order to protect your organisation, develop a disaster plan that seeks to protect your people and property, and ensure that, in the event of an emergency, action is taken to reduce the damage incurred.

Every disaster has three main phases: before, during and after. Advance planning is crucial to cope with each of these phases:

- Preparedness: developing a combination of preventative measures to forestall emergencies or disasters, and strategies for dealing with disaster should it occur
- Response: adhering to procedures to deal with any emergency situation that arises
- Recovery: restoring records and facilities to their usual condition and resuming normal activities

The plan should be easy to read and understand, and include the following information:

- Introduction and objectives of the plan
- A brief description of possible emergencies or disasters
- Risk assessments
- A description of possible preventative measures that can be taken
- Outlining the impact of possible emergencies or disasters
- Emergency procedures, including initial response
- A list of key contacts/emergency response team
- A description of items of special concern that should be rescued or protected
- A plan of the building layout
- A list of emergency equipment and supplies
- Guidelines for salvage of records after an emergency
- The date the plan is reviewed, revised and approved

Disaster planning is becoming an essential component of the overall management plan for an archive. There is ample evidence to indicate that, to be effective, a plan must be incorporated into the day-to-day management of an organisation.

---

**Heritage Motor Museum**

Link 51 helped Heritage Motor Museum, one of the country's leading and most valuable archives to recover following flood damage caused by a burst water pipe.

Faced with the unexpected, the archive needed to bring its storage and research facilities back into use as quickly and effectively as possible.

Link 51 offered help by preparing a damage report that highlighted the extent of serious damage caused to the shelving and storage equipment which had been immersed in water for some time. This was instrumental in the Trust making a successful insurance claim to re-build the archive to BS5454 standards, installing Link 51 mobile shelving systems.
Humidity, temperature, light and airborne pollutants all contribute to the deterioration of archive materials.

You can control and monitor these factors within your storage facility to ensure optimum conditions.
The British Standard BS5454 specifies a set of ideal conditions and this is used as a benchmark when assessing the environment of archival storage.

**Relative Humidity and Temperature**

The recommendations specified in BS5454 are:

- A constant temperature range 16-19°C
- Relative humidity level between 45-60%
- Conditions should be stable and not fluctuate more than +/- 1°C in temperature and +/- 5% in relative humidity
- These parameters are designed for the preservation of paper-based material
- Other media may require cooler and drier conditions and so separate storage facilities may be needed

**Air Quality**

- It is recommended that shelving is ventilated and that documents are stored away from the floor and ceiling, air movement is vital
- The repository itself should be well ventilated; however, this should not compromise the stability of the humidity and temperature
- Take care to ensure that pollutants are not being introduced, such as dust or traffic fumes
- The air should be filtered and the air quality monitored

**Light**

- It is preferable to have as little constant light in a repository as possible, to reduce direct damage
- When designing a new repository or choosing rooms in an existing building, avoid windows. Light coming through existing windows can be reduced with blinds
- Electric lighting should be switched off when not in use and be positioned at least 50cm above shelving to avoid localized heating and drying of documents
Handling
In our experience, a culture of good handling will significantly reduce the need for costly conservation work and ensure continued access to collections.

General principles:
- All users have responsibility for the care of collections
- Information and advice on how to handle collections should be available to all users
- Reading rooms/search rooms should be equipped with appropriate equipment for using materials
- Hands should be clean and free of creams and lotions
- Surgical (or cotton) gloves may be used to protect documents from dirt or grease, though gloves can reduce the user’s sensitivity
- Collection items with surface dirt, dust or mould should not be used in reading rooms/search rooms
- Fragile original material can be protected by using surrogate copies (photocopies, microfilm or digital media)

The following recommendations apply to all areas where collection items are used.
- Coats, bags and umbrellas should not be brought into collection areas
- Wash your hands and dry thoroughly before going into collection areas
- Do not drink, eat or smoke in collection areas
- Keep your workspace tidy
- Do not place items on the floor
- Do not lean, rest or write on top of collection items
- Do not use pens or highlighters in collection areas
- Use pencils for note taking or a laptop computer
- Do not touch the text or image on the page
- Do not fold over the corners of pages
- Do not insert bookmarks or attach notes to collection items
- Use acid-free paper slips to mark pages and follow text

Storage
Do not underestimate the importance of good storage practices for archival storage materials.
- Documents should be stored in archival-quality acid-free folders and boxes
- Single sheets can be stored and handled in clear, archival polyester sleeves although be aware of the risks associated with condensation, etc.
- Make sure that documents are clean and dry before packing them away
- Do not overfill boxes – match the size of the box to that of the documents to avoid damage
- Label boxes clearly with their contents
- Storage conditions should be clean and dry
- Old documents should be displayed for limited periods of time only, mounted on acid-free boards, away from sunlight
- Check the contents of stored boxes regularly for signs of damage such as mould or pest activity

Much of the damage that archive collections sustain is caused by poor storage and handling.
BS5454 Storage and Exhibition of Archival Documents is an advisory document only, helping archivists understand the key points when considering shelving and storage requirements specifically within a BS5454 repository.
What is BS5454?
BS5454 Storage and Exhibition of Archival Documents does not examine every issue covered in the full standard and archivists are recommended to contact BSI direct if they wish to examine the complete standard in more detail.

It is advised that this document is used in conjunction with BS5454 and that the archivist should contact Link 51 in the first instance for more detailed information.

Why use BS5454?
BS5454 will aid the conservation of your archive by making you aware of potential hazards to the collection.

It has been proven that early and comprehensive planning of your repository will aid success considerably when building an archive to BS5454 standards.

New British Standard PD5454 Coming Soon!
There will be a new British Standard, PD5454 – Guide for the Storage and Exhibition of Archival Materials. The new standard will differ from BS5454:2000, however these have yet to be published.

An update will be available from www.link51.co.uk as appropriate.
CHOOSING A SITE

The BS5454 standard offers guidance on site, structure, security, fire precautions, equipment, climate and lighting.

Key components are:

- Site away from hazards of fire, subsidence, atmospheric pollution, noise and vandalism
- Preference for a free-standing building, single occupancy
- Unimpeded access for emergency services, especially fire brigade, to all parts of the exterior
- If the public are to be admitted, easy access by public transport
- Access for deliveries, and parking for staff and the public
- Orientation of building to reduce direct sunlight in storage areas
- Good natural light for office, conservation workshop and reading rooms
- Consider future expansion space

Be sure to avoid:

- Flat roofs – can leak
- Basements – liable for flooding or damp
- High ceilings – can be a waste of cubic capacity, also Health & Safety implications
- Multiplicity of pillars and structural supports – impedes free positioning of racking
- Water pipes passing through the storage area
- Accommodation that will be costly to make fire resistant
CHOOSING THE RIGHT BS5454 STORAGE SYSTEM

General Shelving Recommendations
Key items to specify, include:

- A site visit from the manufacturer is essential to advise on the most suitable storage system
- Shelves should possess sufficient load-bearing strength for items to be stored
- Shelf materials should not emit harmful emissions
- The shelving system should allow for sufficient air circulation to items being stored
- Shelves should be versatile and adjustable to allow for varying sizes and items in the collection
- There should be no sharp edges on the shelf
- The shelf clips should not obstruct the withdrawal of documents or items stored
- Items should be stored inboard of the outer edge of the shelf and upright

Mobile Shelving Recommendations
Key items to specify and consider, include:

- A site visit from the manufacturer is essential to assess floor loading requirements and advise on the most suitable storage system
- Mobile systems should be installed onto tracks that are levelled to support the mobile bases
- Minimum gap of 25mm between runs will help air circulation
- Smooth movement of bases to ensure the items cannot slide or fall off the shelves
- Provision of security for a closed mobile system, security locking can be incorporated. This will prevent un-authorised movement and enhance user safety
- Operation of all mobile systems should be possible with one hand by operating a geared manual-assisted drive system
- Note that the length of the mobile base will be limited by the imposed load on the base
- Mobile systems with a height-to-depth ratio of between 5:1 and 7.5:1 should be fitted with anti-tip devices. Heights in excess of these measures require bespoke design for stability purposes
- The cladding of spines at the rear of every 6th run of shelving assists in controlling the spread of fire
- Gangways are recommended to be not less than 1100mm wide
- Aisles should be not less than 750mm wide

By using a Link 51 shelving or space-efficient mobile system, ergonomically designed and tailored to specific needs – documents, publications, archives, manuscripts, or digital data can be retrieved quickly and easily, and returned for safe keeping. All Link 51 mobile systems conform to recommended BS5454 standards.
The design process should include analysis of cost benefits and tradeoffs between various storage systems and methods, structural loading requirements, amount of built floor space, and future expansion needs. Link 51 can provide advice on the interaction between building design and selection of storage method.

Building Design
Before calling on the advice of architects, it is essential that you know the answers to the following questions:

- What functions will the building be expected to serve?
- How many people (staff and members of the public)?
- What quantity of stored materials (linear/cubic)?
- What methods of storage?
- How much space will be required for each item?
- What is the expected duration of occupancy/life?
- Should there be a provision for future expansion?
- What is the budgetary provision?
- How will the collection be grouped/indexed?

Storage methods can have a major impact on the size and configuration of storage spaces, with large cost implications for building design and storage equipment.
Protection of the archived materials is a principle design driver

Flexibility and provision for archive expansion

Compartmented storage spaces to limit loss in case of fire or flood

Aesthetics (extent of public visitation)

Full accessibility for all workers and visitors to the archive building

Safety of staff and visitors

Cleaning – Build-ups of dust in awkward or inaccessible spaces can attract insects and lead to outbreaks of mould

Environmental monitoring and control – temperature and humidity requirements

Walls and columns must be located efficiently to allow optimum storage space

Floors must be designed for sufficient weight loading

You Should also Consider these Important Building Design Issues:

- Lighting (not less than 100 lux, not more than 300 lux at floor level)
- High ceilings to accommodate vertical expansion
- Avoid electric power – high cost, carbon footprint
- Controlled access to archive storage areas
- Secure and safe loading and receiving areas
- Secure and public researcher access
- Fire protection of the stored materials
- Budgetary provision
Manage Your Archival Storage Space

The way in which archival storage space is managed, calculated and apportioned for the different formats of your collection is important to ensure efficient and economical use of the available space.

- Compartmented storage spaces – consider fire protection and egress, environmental requirements of different stored materials. No windows, skylights, roof penetrations above compartmented archive spaces
- Structural loading should consider wet weight of stored material in the event of sprinkler activation
- Configuration of storage spaces will be dependent on size and nature of objects to be stored and frequency of use/access to stored materials
- Storage methods can have an impact on the size and configuration of storage spaces, with large cost implications for building design and storage equipment
- It is generally less expensive to increase building height than footprint area for the same amount of volume of stored materials
- Consider the interaction between building design and selection of storage method that will affect height and volume of storage spaces, weight and structural loading, accessibility, and fire protection measures
- Consider the impact of tiered archived storage on fire protection
- The cost of high-density storage systems should be compared with offsetting the reduced cost of a smaller building footprint or building volume
- Movement between archive spaces must be convenient, logical and efficient
- Physical access – sufficient space must be provided to retrieve items. Ensure that drawers can be fully opened and that enough space is provided for the retrieval of out-size items such as long rolls
- Gangways are not less than 1100mm wide and that aisles are not less than 750mm wide
- Consider carefully the implications of the Disability Discrimination Act (DDA)
- Allow enough space if using mechanical handling equipment
- Corridor and door widths should be sufficient for staff and equipment to pass each other, or for largest objects being stored

Providing the Correct Method of Storage

Storage methods can greatly affect building design and costs, seek expertise from Link 51 during the building design phase. Link 51 have experience in most formats and are a competent source of advice and guidance.

Your archive may need to accommodate a range of different formats, to include:

- Boxed archives
- Books and bound documents
- Large flat items
- Rolled material
- Photographic material
- Magnetic media
- Digital media

Understanding how each format will need to be stored is vital if materials are to be adequately protected. Be sure to consider:

- Most practical and cost-effective means of storing each format
- Dimensions and weight of different formats determines method of storage required
- Forecast level of usage for each format should be used to define their access and retrieval requirements
- Remember, if the method of storage is not accessible there is a risk that although well protected whilst stored, the materials are damaged when moved. For example, glass plate negatives
The following table suggests a way to identify shelving and storage furniture needs:

<table>
<thead>
<tr>
<th>Format of material</th>
<th>Type of storage furniture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Archive documents (maximum Foolscap)</td>
<td>Shelving</td>
</tr>
<tr>
<td>Archival documents (larger than Foolscap)</td>
<td>Plan chest or deep shelving</td>
</tr>
<tr>
<td>Books (average size)</td>
<td>Shelving</td>
</tr>
<tr>
<td>Books (large or heavy)</td>
<td>Deep shelving with close shelf intervals – books should be stored no more than three high</td>
</tr>
<tr>
<td>Large, flat material</td>
<td>Plan chest or deep shelving; stored flat at frequent shelf intervals</td>
</tr>
<tr>
<td>Rolled material (up to 1500mm)</td>
<td>Cantilever shelving</td>
</tr>
<tr>
<td>Rolled material (above 1500mm)</td>
<td>Cantilever shelving</td>
</tr>
<tr>
<td>Photographic material</td>
<td>Shelving, metal storage cabinets, drawers</td>
</tr>
<tr>
<td>Magnetic media</td>
<td>Static shelving or mobile shelving, metal storage cabinets, drawers</td>
</tr>
<tr>
<td>Drawings</td>
<td>Map tanks</td>
</tr>
<tr>
<td>Digital media</td>
<td>Static shelving or mobile shelving, metal storage cabinets, drawers</td>
</tr>
<tr>
<td>Framed material</td>
<td>Purpose designed vertical (and sliding) shelving or static deep shelving with close shelf intervals or plan chests – items stored flat one or two high</td>
</tr>
<tr>
<td>Fragile material (including glass plate negatives, documents with seals and gramophone records)</td>
<td>Static shelving, drawers or plan chests. Requires appropriate packaging</td>
</tr>
<tr>
<td>Museum objects</td>
<td>Drawers – Plastazote foam lining can be fitted to drawers for stable, safe and non-reactive storage of museum objects</td>
</tr>
</tbody>
</table>
Plan Chests – Flat Storage Drawers

In our experience, a good-quality plan chest can be a real asset and serves to protect flat material and ease retrieval and replacement.

The following issues need to be considered:

- The standard of the carcass construction – robust, but lightweight (usually aluminium) and ideally fire resistant
- The ability of the manufacturer to produce a range of drawer sizes
- Rigidity of drawer construction for support when open and filled
- Floor loadings
- Amount of space needed for opening drawers
- Security locking, especially for public areas
- If plan chests must be stacked, it is advised that the maximum should be two

Map Tanks – Hanging Storage Chests

Upright, hanging storage chests are widely used in libraries and record office search rooms.

This form of storage is ideal for saving space but be aware of the risks when managing original materials:

- The standard of the construction and the archival quality of the chest
- The availability of an access panel at the base to retrieve maps that have fallen or been dropped
- Access to individual maps can be difficult with some varieties of chest
- The chests are often over filled due to overall space restrictions
There are many types of documents that have to be retained for long periods of time in order to comply with legal requirements. In many cases, it is unlikely that these documents will ever need to be accessed but organisations still have to find storage space for them.

**Onsite or Off-site?**

It is important to remember that you can increase onsite storage capacity by installing high-density storage systems. For instance, mobile shelving will increase storage capacity, save off-site storage costs and improve retrieval times of archived files.

**Off-site Storage**

Off-site storage can be an ideal way of keeping your historic records secure. The key benefits are:

- **Cost saving** – Boxes or files on your site for legal retention purposes can become an unidentified cost for businesses
- **Space saving** – Free up valuable office space
- **Time saving** – Reduce staff time searching for files

**Guidance**

Think carefully about how often you will need to refer to records and how soon they will need to be destroyed before you send the records to an off-site storage facility.

- **Active records** are needed on a regular basis and should ideally be stored onsite to control retrieval costs.
- **Inactive records** are no longer required on a regular basis. When records become inactive, this is an appropriate time to consider off-site storage.

*Off-site storage of mortgage deeds for a leading UK bank*
Commercial Off-site Storage

Before making the decision to go off-site, it is important to consider:

- The cost of retrieving documents can be expensive
- The cost of transporting records to and from the site
- The cost of copying records
- Retrieval times can be slow and cumbersome
- The hidden cost of delays – for example, a lawyer waiting two hours for that important file
**Advantages**
- BS5454 steel shelving is considered an archive industry standard
- Aesthetically pleasing – choice of colour combinations
- Can be constructed and adjusted by staff
- Useful for material at risk on mobile shelves (fragile formats such as glass)
- Suitable for heavy/large format items that require deep through storage
- Ideal for hand-loaded items
- Usually available with a wide range of accessories

**Considerations**
- Requires aisles between facing runs, reducing storage space
- Many suppliers – variable quality of manufacture
- Risk of deterioration in poor environments
- Risk of buckling during a fire

**Other Important Issues to Consider are:**
- Shelving should conform to BS5454 standards
- Specify steel shelving with a suitable inert finish that does not off-gas
- Specify a system that offers maximum versatility, for example choice of standard sizes

---

**2772 linear metres of static shelving**

Based on notional size of 20m x 20m x 10m high building

Drawings and characteristics are indicative only
Static shelving can be configured to accommodate a wide range of sizes and loadings ensuring all different types of archive material can be stored within the repository.
5040 linear metres of mobile shelving
Based on notional size of 20m x 20m x 10m high building
Drawings and characteristics are indicative only

Various types of shelving can be accommodated upon a mobile shelving chassis ensuring that all types of media can be stored within the system.
MOBILE SHELVING

Advantages

- Maximises storage capacity within a given area
- Ideal when floor space is expensive or limited
- Static shelving can be incorporated within the runs of mobile shelving – ideal for fragile formats
- Requires just one aisle width to provide access to the entire collection
- Can incorporate plan chests and storage for fragile formats
- Can reduce the space required for shelving by up to 50%
- Decorative end panels can be fitted for aesthetics
- Improved security as bays can be locked
- Quick to install with minimum disruption
- Modular system – can be relocated to another area
- Mobile archive shelving can be installed on a mezzanine floor offering an optimum storage solution

Considerations

- Existing building installations may require either a track sunk into the floor (noisy, costly) or a false floor which may reduce height of proposed shelving
- Good housekeeping – regular maintenance is required
- Health & Safety concerns – all users must be trained on safe use
- Not always appropriate for fragile material formats such as glass
- Can reduce picking rates
- Unused areas of the collections might remain in closed and dark spaces – this can encourage moulds and insects in poor environmental conditions

Other Important Issues to Consider are:

- Mobile shelving tracks should be set into screed whenever possible to minimise maintenance and prolong the life of the system
- Lighting can be positioned parallel to aisles in order to illuminate the opening that is in use
- Static shelving may be required to cater for the storage of fragile formats, such as glass

The ability to lock mobile shelving runs in a closed position provides added security to items stored.
**MEZZANINE FLOORS**

**Advantages**
- High-density system – smaller building footprint
- Maximum use of overhead space
- Cost effective
- Freestanding – independent of building structure
- Bespoke to your needs
- Mezzanine will free up space for other uses
- Think cube – get the best use from the total volume of your building
- Can be one, two or three tiers high
- Wide range of floor types from 10 m² to well over 15,000 m²
- Suitable for all applications with imposed load ratings. From 3.5 to over 20 kN/m²
- Prefabricated for fast onsite installation
- Rapid alternative to relocation
- Mobile archive shelving can be installed on a mezzanine floor offering an optimum storage solution

**Considerations**
- Expensive – requires structural floor and staircases
- Reduced picking rates because of multi levels
- Impact on fire protection – may require fire protecting
- Impact on daylight
- Health & safety implications, for example, use of staircase
- Lighting supports can be incorporated

---

**3880 linear metres of static shelving**
Based on notional size of 20m x 20m x 10m high building
Drawings and characteristics are indicative only
Other Important Issues to Consider are:

- Mezzanine floor structures must comply with Building Regulations, requiring approval to conform with Building Regulations and Fire Authority requirements.
- Emergency egress from all archive spaces.
- A mezzanine floor, if fitted with a suspended ceiling and column protection may negate the need for a sprinkler system which will ultimately reduce the overall cost.
- Lighting – specify both the intensity (not less than 100 lux, not more than 300 lux at floor level). Tubular fluorescent lights are recommended.
- Floor must be designed to accept weight loading of storage equipment and items stored.
- Should comply with BS5950 parts 1 and 5 and BS6399.

7920 linear metres of mobile shelving

Based on notional size of 20m x 20m x 10m high building

Drawings and characteristics are indicative only.
Advantages
- High-density system – smaller building footprint
- Maximum use of overhead space – doubling floor area
- Cost effective
- Accessible with order picking equipment
- Keeps personnel in closer proximity to each other

Considerations
- Health & safety implications (users must have IPATH Licence)
- Possible reduced picking rates
- Heights over two metres require mechanical handling
- Impact on fire protection – may need in-shelf sprinkler head
- Impact on daylight

Other Important Issues to Consider are:
- Better suited to accommodate materials that require infrequent picking
- Emergency egress from all archive spaces
- Remember to budget for additional costs associated with the installation of lifts – in the event that lifts are required to replace staircases for health & safety reasons
- Lighting – specify both the intensity (not less than 100 lux, not more than 300 lux at floor level). Tubular fluorescent lights are recommended

10080 linear metres of high-rise mobile shelving
Based on notional size of 20m x 20m x 10m high building
Drawings and characteristics are indicative only
High-rise mobiles will need to be accessed from steps or specialised mechanical equipment.
Advantages
- No need for separate structural mezzanine floor
- Maximum use of overhead space
- Bespoke to meet your needs
- Cost effective
- More economical than a mezzanine floor
- Walkways supported by shelving to eliminate need for structural floor

Free standing – independent of building structure
- Typical shelving mounted structures allow loading for between 3.5 to over 5 kN/m²
- Wide range of floor types from 10 m² to well over 15,000 m²

Considerations
- Reduced picking rates due to multiple levels
- Impact on fire protection – may need in-shelf sprinkler heads
- Impact on daylight
- Reduced flexibility when compared to static shelving and mezzanine floor
- Lighting supports can be incorporated

Other Important Issues to Consider are:
- Tiered storage structures must comply with Building Regulations and require approval to conform with Building Regulations and Fire Authority requirements
- Emergency egress from all archive spaces
- Remember to budget for additional costs associated with the installation of lifts – if lifts are required to replace staircases for health & safety reasons
- Lighting – specify both the intensity (not less than 100 lux, not more than 300 lux at floor level). Tubular fluorescent lights are recommended
Two tier shelving is the most cost effective solution for utilising the height available as the ground floor shelving provides the structure to support the raised walkways and is widely used for document archiving and picking operations when shelving is used at both levels.

4788 linear metres of tiered shelving

Based on national size of 20m x 20m x 10m high building
Drawings and characteristics are indicative only
Materials are vulnerable to damage and loss when being moved. An organisation must be certain that whenever records are moved they are kept secure from loss or damage.

Challenges

- Misplaced files leads to unproductivity and impacts on the organisation
- Inability to trace a lost file increases the risk of legal liabilities and breaches of security
- Failure to comply with regulations such as the Data Protection Act can result in fines, prosecution and damage to reputation
- Lost or misplaced files result in poor customer service

File transfer can be a very cumbersome, time-consuming and error-prone process. Many storage companies will offer a file move service whereby professionals will manage and implement all the stages of the move.

**Link 51 File Transfer and Move Management**

Link 51 professionals will manage and implement all stages in your file move or conversion. Your normal working procedures can go on as usual while the work is in progress, eliminating the risk of misplaced files and ensuring minimum disruption.

We offer a peace of mind solution to all kinds of organisations:

- Highest level of service and customer care guaranteed
- Full project management of move and space planning
- Professional survey, to accurately assess customer requirements
- CAD storage layouts and floor plans
- Decant existing shelving system
- Record tracking
- Existing shelving dismantled if required
- Secure transportation service
- Safe and secure offsite storage if required
- Full compliance with all security requirements
- Health & safety advice
- Design, manufacture and installation of new shelving system
- Safely return files to your new shelving system
The centralisation of medical records undertaken by Aintree University Hospital NHS Foundation Trust has produced enhanced operational efficiency and increased record-holding capacity. Importantly, the shelving design has not only accommodated physical objectives but has benefited from a file transfer programme from the existing facility, also undertaken by Link 51. This has meant that documents were out of circulation for the minimum amount of time – a target of no more than 15 minutes was specified and achieved.

- The facility currently holds in excess of 115,000 individual medical records on 2.5 linear kilometres of shelving
- Versatility gained from extensive use of Link 51 Stormor design
- Back-to-back shelving runs provide seven levels of storage space with vertical dividers used to segregate files
- Facility features mezzanine structure to make full use of the building height and incorporates specific needs including a ‘dumb waiter’ lift and fire-wall protection on the stairwells

Aintree University Hospital NHS Foundation Trust, Liverpool, required a file storage facility for both current and archive documents.

Link 51 will manage and implement all the stages in your file move. Your normal working procedures can go on as usual while the work is in progress, ensuring the minimum of disruption while we work to help you achieve maximum efficiency.
Avoiding an obstructed lift...
When lifting of loads at or near floor level is unavoidable, handling techniques which allow the use of relatively strong leg muscles rather than those of the back are preferable, provided the load is small enough to be held close to the trunk.

The handler should also be able to address the load squarely; preferably facing in the direction of intended movement.

Use of midway stage to change grip
If the task includes lifting to shoulder height, an intermediate stage to allow the handler to change grip will help to reduce the risk.

Good handling technique for lifting
Think before lifting/handling.
Plan the lift. Can handling aids be used? Where is the load going to be placed? Will help be needed with the load?
Remove obstructions such as discarded wrapping materials. For a long lift, consider resting the load midway on a table or bench to change grip.

Keep the load close to the waist.
Keep the load close to the body for as long as possible while lifting. Keep the heaviest side of the load next to the body. If a close approach to the load is not possible, try to slide it towards the body before attempting to lift it.

Adopt a stable position.
The feet should be apart with one leg slightly forward to maintain balance (alongside the load, if it is on the ground). The worker should be prepared to move their feet during the lift to maintain their stability. Avoid tight clothing or unsuitable footwear, which may make this difficult.

Get a good hold.
Where possible the load should be hugged as close as possible to the body. This may be better than gripping it tightly with hands only.

Start in a good posture.
At the start of the lift, slight bending of the back, hips and knees is preferable to fully flexing the back (stooping) or fully flexing the hips and knees (squatting).

Don’t flex the back any further while lifting.
This can happen if the legs begin to straighten before starting to raise the load.

Avoid twisting.
Avoid twisting the back or leaning sideways, especially while the back is bent. Shoulders should be kept level and facing in the same direction as the hips. Turning by moving the feet is better than twisting and lifting at the same time.
Keep the head up when handling.
Look ahead, not down at the load, once it has been held securely.

Move smoothly.
The load should not be jerked or snatched as this can make it harder to keep control and can increase the risk of injury.

Don’t lift or handle more than can be easily managed.
There is a difference between what people can lift and what they can safely lift. If in doubt, seek advice or get help.

Put down, then adjust.
If precise positioning of the load is necessary, put it down first, then slide it into the desired position.

Guidelines for lifting and loading

These basic guideline figures for lifting and lowering are for relatively infrequent operations – up to approximately 30 operations per hour.

Load at arm’s length...
These figures will have to be reduced if the operation is repeated more often. As a rough guide, the figures should be reduced by 30% where the operation is repeated once or twice per minute, by 50% where the operation is repeated around five to eight times per minute and by 80% where the operation is repeated more than about 12 times per minute.

Detailed assessment...
When a load is held at arm’s length or the hands pass above shoulder height, the capability to lift or lower is reduced significantly. If the handler’s hands enter more than one of the box zones during the operation, the smallest weight figures apply. Where lifting or lowering with the hands beyond the box zones is unavoidable, a more detailed assessment should always be made.

Even if the above conditions are satisfied, a more detailed risk assessment should be made where:

a) the worker does not control the pace of work
b) pauses for rest are inadequate or there is no change of activity providing an opportunity to use different muscles
c) the handler must support the load for any length of time
Use of Mechanical Handling Equipment

Mechanical handling equipment can be used for working at height. Be sure to seek advice on the safety and suitability of this equipment by contacting the manufacturers.

General safety tips:

- This equipment is designed to be used by an able-bodied, competent adult who has read and understood the manufacturer’s operating and safety guide
- Never use this equipment if you are ill or feeling tired
- Wear practical, protective clothing, gloves, footwear and a protective hard hat
- Avoid loose garments and jewellery that could catch in moving parts, tie long hair back
- Use this equipment for vertical lifts only and use on a level area able to take the combined weight of the load and the equipment
- Ensure the load is balanced and stable, and that personnel stand clear before you use it
- It is both the supplier’s and your responsibility to perform a risk assessment before using the equipment
- Make sure anyone in the immediate work area is warned of what you are doing. Never allow anyone under a raised load or in a position where they are at risk if the load shifts
- Never use a lift near overhead power lines or similar hazards
- Be aware of the raised load when close to ceilings or other overhead obstructions
- The equipment must not be used to carry personnel or loose loads
- Never exceed the lift’s safe working load. Refer to the supplier’s SWL chart
- Check the condition of the equipment before use
Safety and Mobile Shelving

Mobile shelving is either mechanically or electrically operated. In either case, it needs someone to turn a wheel or press a switch to bring the shelving into motion.

The use of mobile shelving is usually perfectly safe. However, staff working in larger record rooms can set shelving in motion whilst unaware that a colleague is retrieving or replacing materials. There is an obvious risk of trapping between the sets of shelves.

Sensible precautions are:

- For someone entering a record room – do a quick visual aisle check to see if anyone is working in the room already
- For someone working in a remote area of the room – use a kick stool or other safety device to prevent shelves closing completely
- Fit advisory signs to appropriate areas

Using Ladders and Steps

Each ladder or set of steps should be given a unique number and records of inspections and repairs kept in a log book. Ladders and steps should be tagged with the latest inspection label.

Before using a ladder:

- Make sure it’s suitable for the task – if in doubt, seek advice
- Check that it’s in good condition
- Ensure that rubber feet are fitted correctly
- Position the ladder at the correct angle – 1 out to every 4 up
- If you’ve any doubts about the angle or footing, get someone to put their foot against the bottom of the ladder to prevent it slipping
- Make sure the top of the ladder is stable or secured
- Examine ladder test label – if out of date, do not use

Before using a set of steps:

- Make sure it’s suitable for the task – if in doubt, seek advice
- Check that it’s in good condition
- Make sure that the steps are locked in position
- Make sure that the steps are set on a firm, level base
- Examine steps test label – if out of date, do not use

Don’t:

- Use a ladder that’s too short
- Stand the ladder on a box or other unsteady base
- Overstretch from the ladder
- Carry items that need both hands when using a ladder or steps
- Never use the top storage tray as an additional step

Working with Chemicals

Working with chemicals for the long-term preservation of materials involves taking suitable precautions during:

- Storage
- Use
- Disposal

It is recommended that an appropriate member of staff undertakes safety in the workshop training, with particular emphasis on the handling and storage of chemicals. This individual would then be responsible for all risk assessments and be required to report regularly to senior management.

Always check what the label on the chemical says. This should tell you what the chemical is, and any hazards linked to its use. The warning symbols you’re likely to encounter are:

- Harmful
- Toxic
- Flammable

Remember, if in doubt refer to the hazard data sheet provided by the supplier.

- Use the container provided by the supplier whenever possible.
- Store flammable liquids in a fire-proof store, cabinet or specially designed Hazardous Material Storage Cupboard
- Store similar types of chemicals together
- Check hazard data sheet or the COSHH assessment to see what precautions you need to take
- Use minimum amount of chemical needed for the job you’re doing
- Clean up spillages immediately
- Dispose of toxic and flammable materials properly and in line with legislation
- Wear appropriate personal protective equipment (PPE)

Personal Protective Equipment (PPE) and Controls

PPE is the first and most basic protection for the individual involved in the use of chemicals. Consideration in line with hazard data sheet advice must be given to the protection of:

- Hands by the use of gloves, usually latex or nitrile
- Nose and mouth by the use of dust masks and respirators
- Eyes by the use of goggles or safety glasses
- Face by the use of face shields
- Clothes by the use of aprons and overalls

In general, conservators will need protection from dust and vapours. The inhalation of harmful dust and vapours is a very real risk and must never be disregarded.
**Who are SEMA?**

*Storage Equipment Manufacturer’s Association*

**Aims and Objectives of SEMA**

- Consider everything relevant to the Storage Equipment industry.
- Benefit the industry through the distribution of technical advice and information on trading opportunities.
- Establish and publish technical standards for all types of storage equipment.
- Represent the Storage Equipment Industry in discussions with UK Government departments and Local Authorities. SEMA is a Member of the British Materials Handling Federation (BMHF) and actively influences the Federation Europeene De La Manutention (FEM Section X), the European Handling Industries Federation which seeks to establish common policies, particularly technical, amongst national storage equipment associations.
- Ensure that standards adopted by public and professional bodies are in accordance with the interests of the industry.

**Why use SEMA Accredited Storage Companies?**

**Benefits to the customer are:**

- Quality storage equipment products and systems that meet customers' requirements.
- Products designed and tested to recognised and approved standards.
- Consistent level of product quality and supply.
- Storage products designed, manufactured and installed in accordance with recognised safety standards.
- Products designed, manufactured and installed in accordance with a system that is subject to a third-party assessment.
- Increased customer/operator confidence in products/systems supplied.

**Technical Standards**

- SEMA is proactive in the development of standards for the Equipment Storage industry in the UK. They develop and influence both National and European Codes of Practice and guidelines for the design, supply and installation of all types of storage equipment.
- SEMA represents the UK’s national interests in Europe and constitutes the UK National Committee of FEM Section X, the European Federation of Storage Equipment Associations. European Codes are also monitored and administered by SEMA in the UK.
SEIRS (Storage Equipment Installer’s Registration Scheme)

SEMA has been proactive in the development of industry standards for many years. The SEIRS initiative is a continuation of this business ethic to improve safety standards in an environment where product design, manufacture and installation take place under the influence of increased legislation.

Components of SEIRS

SEIRS is based upon 3 key components:

- An installation Guideline/Code of Practice
- Storage Industry – specific safety training courses
- An ID Card and registration system

Benefits of SEIRS

SEIRS has many benefits to the Storage Equipment Supplier, the Installer and the End-User/Customer.

End User / Inspectors / Officials

Customer beneficiaries of SEIRS include end-users, inspectors and other officials involved with the installation process. Benefits include:

- Installation by professionals
- A means of verifying qualifications
- Adherence to SEMA Guidelines and Codes of Practice

Supplier

SEIRS offers benefits to the supplier of storage equipment whether this is the manufacturer, the distributor or the system supplier, including:

- Reassurance
- Supply chain professionalism
- Customer satisfaction

Installer

Individual installers and their employing companies can benefit from SEIRS in numerous ways, e.g:

- Recognised qualifications
- Health & Safety updates
- Preferred installer status

Approved Installation Companies

It is generally recommended that the installation of shelving, racking and storage equipment is only undertaken by experienced and trained personnel and preferably by installers who are SEIRS registered. SEIRS is a qualification for individual installers who themselves undergo industry-specific training in best practice, legislation and safe working practice.

Installation companies will be able to apply to become a SEMA Approved Installation Company (SAIC) to demonstrate their professionalism and dedication to safe working practices. All SEMA Approved Installers must follow the SEIRS programme.
The design and layout of load notices has been developed by SEMA (Storage Equipment Manufacturers Association) in consultation with regulatory bodies including the Health and Safety Executive. Use of specific colours and symbols is in accordance with the Health and Safety (Safety Signs and Signals) Regulations 1996 which in turn implement European Council Directive 92/58/EEC on minimum requirements for the provision of safety signs at work (see also BS5499-5:2002).

**Use of SEMA Logo**

The SEMA logo should be placed in a prominent position on the load notice. It should only be used when the notice is supplied by a SEMA member, and when this is placed on a product or system which conforms to the SEMA Quality System.

**SEMA Quality System**

The SEMA Quality System ensures that the storage equipment is designed, manufactured and installed in accordance with industry standards. Where a product or system is installed by a company other than a SEMA member the said company should utilise SEIRS-registered installers.

**Training**

Load notices provide important information for the safe use of the equipment. However, they are operational signs and as such the information on the actual sign has been kept to a minimum for clarity. Users of storage equipment should always consult the manufacturer of the product to establish safe operational practice and should adequately train all persons who will use the equipment.

**Display**

Load notices should be placed in a prominent location on, or adjacent to the equipment so that they are clearly visible.

- Checking load notice information
- Always refer to the supplier if you are unsure about load notice information

**Equipment Inspections**

As part of the regular inspection routine, users should ensure that load notices are in place and are clearly visible. SEMA-approved inspectors will check for this when called upon to perform an inspection.

**Sizes**

Recommended sizes for the load notices are as follows:

<table>
<thead>
<tr>
<th>Product Equipment</th>
<th>Load Notice Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shelving</td>
<td>A4 Landscape</td>
</tr>
<tr>
<td>Mezzanine Floors</td>
<td>A3/A4 Landscape</td>
</tr>
</tbody>
</table>
INSTALLATION – TO ENSURE YOUR COMPLETE PEACE OF MIND

The success of any archive storage installation will largely depend upon finding a manufacturer that is committed to complying with current codes of practice, legislation and safe working practice.

Specify a manufacturer that can demonstrate the following essential capabilities:

- Manufacturing to ISO9001 and ISO 14001 standards
- Manufacturing and design to BS5454
- A clear understanding of BS5454 and competent interpretation of its requirement
- Membership of SEMA (Storage Equipment Manufacturers Association)
- SEIRS-registered installers (Storage Equipment Installers Registration Scheme)
- CSCS Holders (Construction Skills Certification Scheme)
- Processing UK steel
- Local labour with adequate employed supervision
- Project management service from initial briefing to final commissioning
- Longstanding business with financial stability
The Heritage Lottery Fund (HLF) enables communities to celebrate, look after and learn about their diverse heritage through a range of capital and revenue funding programmes, to include:

**Heritage Grants Scheme**

The Heritage Grants programme offers grants of more than £50,000 for projects that relate to the national, regional or local heritage of the UK (except the Channel Islands and the Isle of Man).

- Grants of more than £50,000 can be awarded
- This is the only HLF scheme which may award substantial grants over £1 million
- Not-for-profit organisations are not eligible
- Your project must make sure that everyone can learn about, have access to and enjoy their own and other people’s heritage
- The scheme aims to achieve a 12-week turnaround of grant applications

**Your Heritage Scheme**

This programme offers grants for projects that relate to the local, regional or natural heritage of the UK (except the Channel Islands and Isle of Man).

- Grants of £3,000 to £50,000 can be awarded
- The total project cost can exceed £50,000
- Your project must be able to demonstrate educational and community benefits
- You must ensure that your premises are accessible to visitors
- The scheme aims to achieve a 12-week turnaround of grant applications

**The Process**

1. Complete a Pre-Application form for the first round of assessment
   - Don’t worry if you do not have enough information at this stage to answer all of the questions
   - Easy to complete
   - Designed to help the HLF tell you quickly whether they will consider funding your project
The HLF will want to know:

- What is the heritage that your project will focus on and why it is important?
- What are the aims and objectives of your project?
- What capital work do you plan to do (if any)?
- What activities do you plan to do?
- What benefits your project will bring to heritage?
- What benefits will your project bring to people?
- When your project will start and how long do you expect it to last?
- Budgetary information – How much funding do you need?

Submit the Pre-Application Form online or send it to your regional or country HLF office.

A HLF Case Officer will let you know whether your project is likely to meet HLF criteria and what to do next.

2. Complete a Second-round Application Form

Top Tips

In order to stand the best chance possible of success, be sure that your application:

- Has well-defined aims and objectives, and the significance of your project is made clear
- Explains how your project will benefit the community
- Is presented clearly and concisely. Do not assume prior knowledge
- Meets HLF criteria
- Provides good supporting evidence
- Has realistic project costs and achievable timescales – be honest

Help is Available:

- Consult with other professionals who have experience which may be of help to you when preparing your application
- Contact the HLF for advice before making an application
- Carefully follow HLF guidelines

Highland archive centre benefits from Heritage Lottery Fund grant

The Highland Archive Centre in Inverness was created to act as a focus for the history and the heritage of a region that covers a vast area – virtually the whole of the country north of Loch Ness. Opened in October 2009, the new three-storey building includes an archive conservation unit, a dedicated family history centre, a ceremony suite and modern office accommodation.

In addition, specialist atmospheric and environmental controls have been installed to safeguard the storage of parchment, paper and records in other formats allowing the return of archives to the Highlands from Edinburgh.

The Highland Council welcomed the £4.3 million grant awarded by the Heritage Lottery Fund towards the £10.2 million cost of a new Archive Centre. Convener of The Highland Council, Councillor Sandy Park said: “This magnificent 21st Century facility is the key to providing a safe and fitting home for our very important archival heritage and I am delighted that it is being completed in the Year of Homecoming.”

Link 51 installed static and mobile shelving which provides a wide range of storage options to accommodate items, from those in boxed and document format to plans and maps.
ASSOCIATED ORGANISATIONS

Archives and Records Association
British Safety Council (BSC)
British Safety Industry Federation (BSIF)
British Standards Institution (BSI)
Health and Safety Executive
Link 51
Storage Equipment Manufacturers Association (SEMA)

www.archives.org.uk
www.britsafe.org
www.bsif.co.uk
www bsigroup.co.uk
www.hse.gov.uk
www.link51.co.uk
www.sema.org.uk