Storage Solutions for Bed Frames in Museum Collections

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Abstract

Museum staff often face difficulties determining the best storage solutions for objects of irregular size. One example is bed frames, items which are typically large and intricately structured. These characteristics contribute to preventive conservation concerns regarding storage space and potential object damage. To address the issue of storing bed frames, various housing options, including vertical and horizontal storage, have been tested by comparing small-scale models housing a selection of bed frames in ranging sizes. This determined the stability and consolidation of frames in different storage options while keeping in mind the need to maintain a small storage footprint. Combining vertical and horizontal storage units have been found necessary to accommodate all bed frame requirements. These results demonstrate possible housing alternatives that improve the organization and stability of such irregular objects, protect the objects from themselves and other bed frames, reduce storage space, and promote current preventive conservation practices.

Methods

1. **Identified the bed frames to be tested.** The bedframes in the collection were measured and evaluated for their stability. Based on these factors, it was determined that the middle-sized bed frames in the collection, which range from 41”-58” in height, would be tested. It was also determined that both bedframes with a simple structure and an intricate structure would be tested.
2. **Listed preventive conservation concerns.** Before creating models of the storage units, preventive conservation concerns were identified, including:
   i. Using archival-quality materials
   ii. Ensuring structural stability of the storage unit
   iii. Identifying weak points in the bed frames
   iv. Providing support and protection to the bed frames while keeping them off the floor
3. **Sketched various models of storage units.** Sketches were created for two types of units: those that would store bed frames vertically and those that would store bed frames horizontally. (See *Figures 1 & 2*). The conclusion was reached that the vertical type was better for the selected bedframes’ stability, and the horizontal type was discarded for this test.

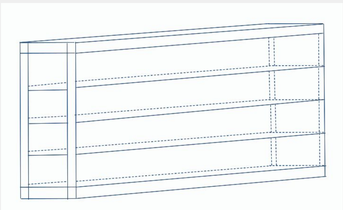

Figure 1: A sketch of a horizontal style storage unit.

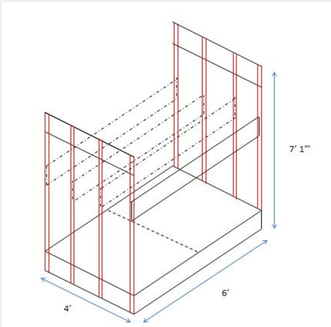

Figure 2: A sketch of a vertical type storage unit. This model was the chosen design for the constructed storage unit.

4. **Researched estimated prices for materials and finalized the design after consulting Museum of Texas Tech University’s Exhibits Division.** A hardware store’s price estimates for a variety of materials, such as PVC, aluminum, lumber, and steel, were compared. After discussing the sketches with the Exhibits Division, a final design for a customized storage unit was decided upon (see *Figure 2*). This design allowed for the bedframes to be tested for stability at different heights for contact points. The final design also provided ample space in each section to test how many bed frames could be stored in each section.
5. **Constructed our storage unit.** (See *Figures 3-5*). After customizing the sizes of the materials, the unit was assembled by attaching steel tubing to plywood platform, adding divider boards at various heights, and stapling Tyvek and ¼” foam around plywood and lumber. Staples were placed near the bottom of each board to minimize the risk of scratching the bed frames. Feet were also placed at the bottom of the base to keep the unit off the floor.
6. **Tested the bed frames in the storage unit.** (See *Figures 8 & 11-15*). The bedframes were placed into the storage unit, evaluating their levels of stability in the different sections and leaving them in the section that seemed to provide the most stability for a couple of days before reevaluating their condition.

Construction

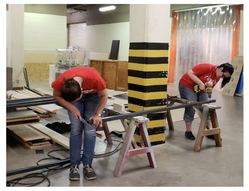

Figure 3: Drilling bolt holes through metal tubing

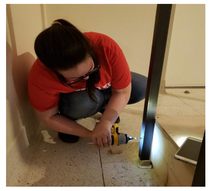

Figure 4: Attaching metal tubing to platform

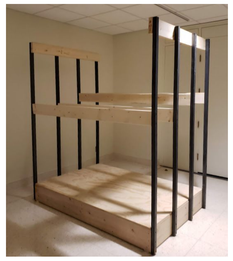

Figure 5: Uncovered storage unit

Protection and Placement

Figure 6: Tyvek and ¼” foam applied to divider boards

Figure 7: Tyvek and ¼” foam applied to platform

Figure 8: Moving frames into storage

Figure 9: Collections frames in former location

Figure 10: Collections frames in test storage unit

Testing Bed Frames

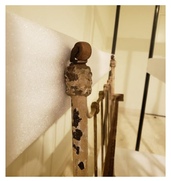

Figure 11: An example of a fragile wheel on a frame resting on the dividing board

Figure 12: A large headboard resting on its most stable point

Figure 13: A headboard and footboard pair in the unit

Figure 14: Wood collections frames in test storage unit

Figure 15: Metal and wood collections frames in test storage unit

Results

The test storage unit was the most stable option for the selected bed frames that also allowed for a great deal of flexibility in future designs. The test unit was successful in providing a better storage option for bed frames than the current practices employed at the testing institution. Using the final test unit, the bed frames are now off the floor, and resting on a secure surface, with a minimized amount of stress on the object’s own structure or from the structure of other bed frames they are leaning against (See *Figures 11-15*). It took approximately a week to construct the unit. The cost of the unit materials including plywood, lumber, and metal tubing totaled $285.74.

Stability

The final test design ensures stability in its construction, thereby enabling safe storage of the objects. A stabilizing board was added beneath the unit’s plywood platform to help with the structure, and the top boards add to the overall stability of the unit. The dividing boards, in addition to their primary job of holding the objects, also add to the overall stability and cohesion of the unit. Stability is also paramount regarding the headboards themselves. Close study is needed to determine the most stable location for the bed frame to rest on the dividing boards in the unit, with careful consideration as to where it will lean and place its weight. It was determined that at least two points of contact between the frames and dividing board is best for the stable placement of the object. Careful consideration of the object’s structure and makeup, as well as the existence of any weak points or delicate parts, also contribute to the overall understanding of the object’s safety in storage. Some horizontal storage was found to be necessary in the case of overly unstable and intricate objects, such as the scrolled unit pictured in *Figure 16*. Sideboards can also be stored horizontally in the final test unit. However, it was determined that most bed frames are most securely and stably stored in a vertical position.

Figure 16: An example of a bed frame part that is more stable laying horizontally

Preventive Conservation

The physical safety of the objects is an important element of the resulting unit. Preventive conservation practices were implemented in the final test design to ensure safety of the objects. Tyvek and ¼” foam were determined to be sufficient for our purposes (See *Figure 6 & 7*)—though after letting the objects remain on the unit for a few days, the foam did slide slightly under the weight of the heavier objects (See *Figure 17*). Thicker foam would reduce this effect. Otherwise, the utilization of archival-quality materials as part of the storage unit will achieve safety for the objects in long-term storage.

Figure 17: Wood wrapped with Tyvek and foam. Note the wrinkling from the weight of the objects

Small Storage Footprint

The intention of retaining a small footprint was somewhat successful. (See *Figure 18*). The storage unit covered a large area, as it was designed to allow staff to maneuver through the sections to safely move bed frames into the unit (See *Figure 8*). In addition, a minimum 1.5 foot radius around the unit was often required to successfully move larger bed frames in and out of the unit. By strategically distributing the bed frames amongst the sections, a small storage footprint can be achieved. For example, lighter or more stable objects—which tend to be easier to move—can be stored in a single section, eliminating the need to walk inside the unit and efficiently maximizing available space. Implementing such placement strategies created a footprint comparable to the past method of storing bed frames in the collection (See *Figures 9 & 10*)—however, constructing a storage unit with the intention to implement these strategies will likely accommodate for a smaller footprint.

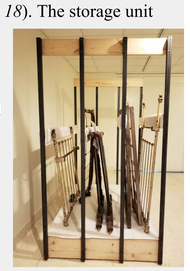

Figure 18: Side profile of the storage unit sections

Future Considerations

- ➔ Storage for sideboards, bed slats, and other parts of bed frames can be easily added to the top of the storage unit, further minimizing the storage footprint.
- ➔ When designing this unit for other institutions, the resulting measurements will vary according to the size of the objects in the collection. Institutions must keep in mind the structure of their collections and measure them to fit their own storage unit.
- ➔ Further stability can be added to the divider boards with the use of L-brackets.

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