

The Use of High Bay Mobile Storage in a Traditional Special Collections Library: The Zhang Legacy Collections Center at Western Michigan University

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Abstract:

In October 2013, Western Michigan University opened the Zhang Legacy Collections Center, a branch library housing over 30,000 cubic feet of regional historical books, manuscripts, and archival materials. Western Michigan University is the fourth largest public university in the state of Michigan and classified by the Carnegie Foundation as a research university. The “Zhang” incorporates a traditional special collections research library and reading room with a high density mobile storage system and space for the staff of six full time employees and another ten to twelve student assistants and volunteers. This paper examines the decisions that went into planning a special collections library and reading room which uses high density high bay (32 feet/9.75 meters) mobile storage and brought together collections held in several locations around the campus. Careful planning resulted in a smaller footprint which allowed the branch library to remain on campus rather than having operations in two or more locations with storage at an off-site location. Designed as a LEED silver building, the operational costs have been reduced while at the same time maintaining strict environmental controls with separate storage and work zone climate requirements. There were also significant planning considerations when moving collections from traditional archival shelving in three locations to one central high bay mobile storage system. This paper also examines the planning for the move and how researcher expectations and experiences have changed in this hybrid branch library/storage facility.

The Use of High Bay Mobile Storage in a Traditional Special Collections Library: The Zhang Legacy Collections Center at Western Michigan University

In October 2013, Western Michigan University opened the Zhang Legacy Collections Center, a branch library housing the Archives and Regional History Collections which includes over 30,000 cubic feet of historical books, manuscripts, and archival materials. The “Zhang” incorporates a traditional special collections research library and reading room with a high density mobile storage system and space for the staff of six full time employees and another ten to twelve student assistants and volunteers.

This paper will look at the decisions that went into planning a special collections library and reading room which uses high density high bay (32 feet/9.75 meters) mobile storage and brought together collections held in several locations around the campus. The planning spanned nearly a decade and included serious consideration of traditional shelving, remote storage, new construction, and remodeled space. Careful planning resulted in a smaller footprint which allowed the branch library to remain on campus rather than having operations in two or more locations with storage at an off-site location. This is a case study of a medium sized facility at a state supported institution. Many of the lessons learned may be applied in other settings.

Designed as a LEED (Leadership in Energy and Environmental Design) Silver building, the operational costs have been reduced while at the same time maintaining strict environmental controls with separate storage and work zone climate requirements. There were also significant planning considerations when moving collections from traditional archival shelving in three locations to one central high bay mobile storage system. The high density mobile storage system also presented challenges in planning the space for operational purposes in numerous ways, including the physical location of collections and staff and patron access. This paper will look at the planning and move. It will also describe how researcher expectations and experiences have changed in this hybrid branch library/storage facility since high density storage systems have traditionally been designed for remote storage and researcher access has been a secondary concern.

Western Michigan University is the fourth largest public university in the state of Michigan and classified by the Carnegie Foundation for the Advancement of Teaching as one of only 139 public institutions it considers research universities. It is located on the west side of the state near Lake Michigan in Kalamazoo, a community of 75,000 people and a metropolitan area of about 326,000. Western was founded in 1903 as a two year teacher training normal school and became the state’s fourth public university in 1957. Today it offers more than 240 academic programs to students pursuing degrees through the doctoral level. More than 20 percent of its 25,000 students are enrolled in graduate course work, studying in disciplines ranging from atomic physics and graph theory to medieval literature and blind rehabilitation. A medical school is being opened in fall 2014.

The archival program at Western Michigan University dates back to 1956 when the institution’s president asked a retired chair and faculty member of the history department to arrange and describe the papers of the institution’s first president, Dr. Dwight B. Waldo, and those of Dr. Ernest Bumham, former head of the Western’s nationally renowned rural education department. By the end of the 1950s, the history department had started an archival program on a part-time basis and a committee headed up by faculty member and Michigan historian Dr. Willis Dunbar recommended enlarging the program to include

collecting regional manuscripts and documents. As a result, the Archives was designated by the Michigan Historical Commission in 1962 as a regional repository for the public records of twelve counties in southwestern Michigan, including tax rolls, court records, and township minutes. Today, the Archives and Regional History Collections totals 30,000 cubic feet and includes a historical collection of manuscripts, printed works, newspapers, photographs, maps, oral histories and other materials documenting the history of southwestern Michigan and WMU. It is one of six regional depositories and by far the largest and one of the most active in Michigan. The other five are located at the Burton Historical Collections (Detroit Public University), the Clarke Historical Library (Central Michigan University), Kresge Library (Oakland University) and the J. R. Van Pelt Library (Michigan Technological University), and the Olson Library (Northern Michigan University).

The Archives is governed by the WMU Board of Trustees and is staffed by the director, two curators, one assistant curator and an administrative assistant. In addition to the full time staff, student employees provide 6,480 hours of support annually, many as an important complement to their educational goals. Temporary staff were hired to prepare the collections for the move and one temporary staff member continues to work on ingesting records into the Generation Fifth Library Archival System (LAS).

It is an active facility and the programming includes both on and off campus constituencies. In addition to answering hundreds of reference questions and staffing a reading room, staff provide onsite and off-site programming. Staff provided historic 28 walking tours for 967 people. Off campus programming also included presentations to numerous civic and historical societies. On campus programming includes sessions for students in a variety of courses, including history, English, film, and first year (freshmen) experience as well as scholarship activities for students organizations, such as the Phi Alpha Theta national history honor society. Despite the location which is about a half mile from the main campus, nearly 1/3 of all students enrolled in the first year seminar attend a session at the Archives.

The annual operating budget of \$323,042 covers staff salaries and supplies. In addition to the budget, the unit has two endowment funds and a gift fund for acquisitions and supplies. One endowment with assets of three-quarters of million dollars provides a quasi-endowment for the purchase of manuscripts. Two other gift funds provide funds for supplies.

Until construction of the Zhang Legacy Collections Center, the Archives and Regional History Collections had been housed in two primary locations. From the 1956 until 1990, the collections were housed in the main academic library and two off-site storage areas. Between 1990 and 2013, the collections were moved to a temporary location which was the first academic building constructed by the institution in 1904. Two off-site areas held about half of the collections, including the original library building constructed in 1925 and the basement of a student dormitory which had been constructed in 1965. All of the storage areas were substandard and lacked appropriate environmental controls.

Within a year of moving into the temporary quarters, discussion began on a wish list for a permanent archival facility. Initial planning included bubble diagrams, identifying adjacencies and functional relations, and the required environmental and security features. Due to a number of administrative changes and decreasing funding from the State of Michigan, the project never gained traction. Western Michigan University is accredited by the Higher Learning Commission (HLC) an independent corporation and one of two commission members of the North Central Association of Colleges and Schools (NCA). In

the 1999 accreditation visit and subsequent report, the site visit team noted, “The most striking deficiency of the library system is the setting of the Archives and Regional History Collections Library.”

In October 2006, Jeanne Drewes, a preservation consultant with experience at the Library of Congress and Michigan State University, visited the Western Michigan University Libraries and conducted a preservation survey. Ms. Drewes also made extensive recommendations for the planning of future storage space. Her recommendations were incorporated into the plans for the Legacy Collections building and included the following: 1) adequate storage space and appropriate shelving for all collections materials, 2) space for collections growth, 3) space for processing the collections, 4) design that maximizes the ability of staff to monitor collection use, 5) a segregated area to inspect and evaluate incoming collections for contaminants, and 6) an area for in-house conservation.

Momentum picked up with the hiring of a new president at Western Michigan University in 2007. Dr. John Dunn was concerned about the state of affairs of the space used by the Archives and Regional History Collections and discussions began almost immediately. This eventually coincided with plans to redevelop the original campus, including the building occupied by the Archives and Regional History Collections. On campus and off-campus sites were explored in 2008. In all instances, existing buildings were problematic due to location or the cost to retrofit them to acceptable standards. In 2009, the President authorized \$80,000 to develop preliminary plans for a new building. These plans were to be used in fundraising initiatives. Since the building would not be classified as a classroom building, it was unlikely that any State of Michigan appropriations would be forthcoming and private individuals and foundations would pay for the majority of the building.

There was an initial call for proposals and about twenty-five Michigan firms responded. In the end, about a dozen developed proposals were submitted and of these, three were called back for presentations. The SHW Group was selected as architects 2009. There were a few glitches along the way but a town hall meeting in March 2011 in which the plans were presented drew nearly 100 faculty, students, and community members. Plans were finalized and ground was broken in 2012, again drawing a record crowd.

The SHW group was experienced in academic libraries but was also open to a plan which was a hybrid featuring the storage commonly associated with off-site facilities and a branch special collections library with a reading room. There was some professional literature to provide guidance but it really required looking at both components and determining the best solution for Western Michigan University. Site visits to a number of off-site storage facilities also provided answers and in some instances questions that had not been considered. (1)

The earliest and best known of off-site storage facilities is the Harvard Depository which dates back the mid-1980s. Much has been written about the utility of using less expensive space far from the campus and pulling materials on a regular basis and transporting it back to the library or campus for use. The Zhang Legacy Collections Center at Western Michigan University is a hybrid, combining the best of both worlds. It uses high bay non-automated compact storage and the site is on campus. It also incorporates the latest green technology and is a LEED silver building. The building is one story, 16,373 square foot building. It cost 8.7 million dollars or approximately \$532 a square foot which is substantially more than often quoted \$170 a square foot for typical academic library construction costs.

Many lessons were learned in the process of planning the building, planning the move, implementing the move itself, and finally the operation of the building. The move is lengthened due to the logistics imposed by a mobile high bay system. While planning may not reduce the move time, it will alleviate stress at many junctures.

The preparation of collections for this type of facility adds several layers and can take up to a year or more. In addition to examining collections and cleaning or dusting materials, there are additional variables. This system is very much dependent on uniform box sizes. This is an excellent time to try and get the most materials into uniform boxes and rebox if necessary. For example, we had many boxes that were repurposed commercial boxes. We transferred about 4,000 cartons into standard size boxes. Unlike an automated or robotic retrieval, the system used by Western Michigan University allowed direct box to shelf. No additional boxing is needed as is the case with some robotic systems. It makes sense to have the best boxes possible and uniform sizes.

Not all archival material may fit into uniform boxes. This was one of the most difficult issues to convey to the vendor and even some of the library administrators. As much as possible was boxed. Collections consisting of non-uniform ledgers were the most problematic and included dozens if not hundreds of different sizes. Many of these are records produced by regional governmental agencies and include tax records and court calendars. Nineteenth and early twentieth century business records also had a number of ledgers. Archival consultant Thomas Wilsted recommended using shrink wrap for moving and storage. There has been quite a bit written on this practice.⁽²⁾ Shrink wrapping continues to be used for non-standard ledgers. At a point, our shrink wrapper broken down and we resorted to having non-standard ledgers wrapped in plain brown paper. When we used shrink wrapping, we were able to include the catalog information and a bar code underneath the wrap. When we went back to wrapping in brown paper, we put the catalog information and bar code in a sandwich bag and taped it to the outside of the wrapped ledger. We are going back and shrink wrapping those as time permits.

This system is very dependent on electronic catalog records. Our regional collections have been described in an electronic for nearly twenty years. Our University holdings were still described and maintained by a system of paper inventories. The electronic catalog record was needed to link the items and barcodes. Very basic MARC records were created for the University holdings. Since many of these materials are not readily accessible, the records are repressed. We are in the process of identifying which records will be made viewable to the public in our catalog.

Every item requires a barcode. This includes every book, every box. Everything. Many of our cataloged non-special books had been barcoded. These barcodes now needed to be on the outside of the book. A duplicate barcoding module was used for this process. The barcodes will need to be linked to the catalog record. We barcoded about 70,000 items in the sixteen months leading up to and including the move. Sometimes items were being barcoded minutes before the movers were placing the boxes or books onto carts to go into the truck.

Planning for the location of manuscript placement will make the move and the operation go more smoothly. Making decisions about placement of materials occurred months before the actual move. One of the vendors we worked with indicated again and again that location did not matter. Daily operations dictate differently. There is no disagreement on the fact that uniform sized boxes are the most efficient for shelving. Researchers in archival collections may browse one or many boxes in a collection. It is more efficient for retrieval if the

collections are kept together. It also made the curators feel better about the system. This was probably the largest and most difficult mental hurdle. In reality, collections using different types of boxes will be separated and stored according to box size. Similarly, when books are ingested into such a system, they will also be stored by size rather than classification. To the degree where it is possible, it is beneficial to keep collections together for researcher access.

Some of our frequently used materials are just easier to retrieve without the lift. It may be beneficial to identify most used collections and house them in an easily accessible location. We also have a series of vertical files on each building at the University as well as commencement programs and directories. We also opted to keep the majority of our photographic holdings in a place that could be accessed without the lift. We opted to keep some of our still microform holdings in a place that is easily accessed with a rolling ladder.

Additional decisions about placement of collections will involve ease of access and in some instances security of the materials. For example, our facility holds house human resource files and medical files for the University and some of the University's clinical programs. The medical files have sometimes had a turnaround time of fewer than four hours. These need to be in a relatively easy place to retrieve quickly. We also house the transcripts predating 1985 and these are still requested on a regular basis. In fact, we tracked these materials during the move because while we closed operations for two months these were among the files that we continued to service during the move. Some of the most confidential materials were placed on middle shelves. This was done with the intention that it required the use of the lift. While the area is secure and monitored, this prevented casual access to the most sensitive medical, legal, and student records covered by Federal Educational Rights Privacy Act (FERPA) and Health Insurance Portability and Accountability Act (HIPAA) of 1996.

We placed lesser used materials on the higher shelves. It has worked well. Lesser used ledgers from the county court are the least used records. It has worked out well for the amount of use of ledgers some of which date back to the early 1830s. The most used portions of the court records (Circuit Court case files) were microfilmed about twenty years ago. We generally use the microfilm which is kept in the reading room. The ledgers which are not used as much which contain tax assessment rolls are kept on higher levels.

There are also practical logistics to consider, too. Larger or oversized boxes weighing 40 pounds (18 kilos) are awkward at any level but adding heights of 25 or 30 feet (7 meters or more) makes it more difficult. Even though some of these are not among the most used, we have kept those on lower shelves. We also found that these boxes are among the least efficient in use of space. As a result, we have reboxed some of these into standard cartons.

The shelving system itself will impact the move. If at all possible, use a moving firm that has experience with this type of shelving. Only one aisle may be open at a time. Shelving must be evenly loaded on both sides. Multiple people may work in an aisle at a time to a certain extent. As materials are placed higher on the shelving, the use of a lift is required.

This system has also impacted workflow in processing, retrieving/reshelving, and providing services to patrons. On the processing end, we incorporate the bar codes into the finding aids. Our finding aids and processing now include the barcode. We use more standard sized boxes than we used to. We also avoid placing collections in different sized boxes unless there is a pressing need because we know that it will result in the collections being parceled out and stored in several places. We also no longer accept double sized banker type boxes

and in the few instances when they come in, we generally place materials into more appropriate boxes.

The system only allows one aisle to be open at a time. We find at times that we compete for aisle time. Researchers requiring materials get first priority. While we ask that researchers contact us before visiting, we welcome researchers at any time. They take priority. Beyond that, there are retrievals, refills, and such and we have had to plan and share.

The use of the lift has been one of the most interesting aspects. All of our full time staff are trained and a good number of our student staff and interns. The lift requires Occupational Health and Safety Administration (OSHA) training and after completing the training a three year license is issued. The lift operator needs to wear closed toe shoes and wearing a dress is impractical due to the required safety harness. One of our employees who is not five feet tall also has difficulty reaching the point where the device is attached to the lift. A trained lift operator needs to be onsite during all hours we are open for service. Similarly, we require at least two people to be onsite when the lift is in operation.

We always asked patrons to contact us ahead of time due to materials stored across three buildings, including two remote storage sites. All of the collections are housed together but since retrievals from the top of the shelves takes longer and it may also require staff members to put on the safety harness and use the lift, we have asked patrons to continue to call ahead. Our retrieval times are actually less now that all materials are in one location.

This new system has many advantages beyond the benefits of a purpose-built state of the art facility. The use of the shelving and related computer program resulted in a reduced footprint. The reduced footprint was an advantage when considering locations and made it possible for the building to remain on one of the campuses (though not the main campus). The Generation 5th software provides a number of reports which we are still learning. Among the reports, retrievals (broad range of information), percentage of shelf capacity, and others. The disadvantages involve our total dependence on the Library Archival System (LAS) which provides information on shelf location. Additionally, when there are mechanical problems with the shelving or the lift, it greatly affects our ability to operate.

The building incorporates the latest green technology. It is a LEED Silver designated building and careful planning of the site, the building, and all of its systems. The site is on the Oakland Drive Campus of the University, about half a mile from the main campus. It is an area that was formerly used as a State of Michigan psychiatric hospital. The building was constructed on a site that was used for recreational purposes. The site was selected to limit the disruption of natural hydrology, the project reduced impervious cover, increased onsite infiltration, reduced and all but eliminated pollution and contaminants from storm water runoff.

The building has two separate climate zones which are heated or cooled using geothermal technology. A geothermal heat pump is added to a field of wells that draw on much shallower and colder resources. They frequently combine a variety of functions including air conditioning and seasonal thermal energy storage, solar energy collection and heating.

The building uses less water and utilities. The landscaping has been designed to use 50% less water. The building utilities use 27% less potable water and sewage usage achieved by selection of water efficient plumbing fixtures, faucets and valves.

Energy systems, related equipment, and materials were selected to cause minimal damage to the atmosphere. Refrigerants were selected to cause minimal damage. All heating, ventilation, air conditioning (HVAC) and electrical systems were commissioned and certified that they are installed per specification and working as designed. Regionally manufactured materials were used extensively throughout the project and made up 57% of the total cost of materials. Recycled materials made up 51% of the total cost of materials

A great deal of attention was given to indoor environmental quality. Large windows provide building occupants with connection between indoor and outdoor spaces through the introduction of daylight into regularly occupied areas of the building. Low emitting materials, including adhesives and sealants met rigorous volatile organic compounds (VOC) standards. Every workstation has individual lighting controls allowing occupant to supplement the ambient lighting if so desired. A campus wide green housekeeping program is used to protect the health of the occupants and prevent harm to the environment. The green aspects of the building are expected to recoup costs in future operations.

There major drawbacks to this type of construction lies in the shelving and associated expenses. Cost of library construction is often cited at about \$170 a square foot.(3) The cost of this building is roughly three times this figure but it doesn't take into account the savings of the smaller footprint. Some of the cost of construction costs were due to the compact shelving. The portion of the building with the shelving required very flat flooring. The rails were laid on a foundation of about one foot of concrete. The rails were installed and could have no more variation of 1/16 of an inch. They were attached to the structure slab. The shelving cost just over one million dollars and the order picker itself cost about \$45,000. Some costs were reduced by going with a non-robotic system which has less upfront expenses and doesn't require additional bins.(4)

Reflecting on the recommendations of the preservation consultant, we achieved most of what she recommended. We have adequate storage space and appropriate shelving for collections. We have about seven to eight years of growth. Our work area includes large flat surfaces for collection processing and lots of UV filtered natural light. The design allows monitoring of collections and the building through the use of the reference desk and a number of security cameras. An isolation room provides a segregated area to inspect and evaluate incoming collections. We did not get an area for in-house conservation. The building of our dreams would have also included this and some type of classroom or multipurpose room. It would have also included twenty years of collection growth. The building with these features would have run about \$12,000,000. The plans as developed drew interest from a sufficient number of donors. The major donors include funds from two foundations, including the Irving S. Gilmore Foundation and the Kalamazoo Community Foundation. Individual donors included Charles C. and Lynn L. Zhang and funds from the estate of Frederick and Katharine Rogers which had been held by the Kalamazoo Community Foundation for the Western Michigan University Archives and Regional History Collections.

In the first six months of operation a number of things have occurred. The dedication on October 18 drew about 500 participants. This exceed any previous dedication on Western's campus and will probably only be surpassed when the University's new medical school opens in fall 2014. Traffic was disrupted. There was seating for about 300. It was an extraordinary event by anybody's estimation.

Use is up substantially and includes new user groups. The six month gate count is 16,00. It is a difficult comparison because the former facility did not have a working gate count. A number of presentations and tours have been provided for groups ranging historical societies, lifelong learning programs for seniors, women's clubs, architects groups, student organizations, and a number of librarians and archivists from other institutions throughout Michigan. Many of these groups are first time visitors.

Thirty classes visited the facility and range from First Year Experience classes, to history classes, to anthropology, to graduate nursing students. Students from nearby Kalamazoo College and middle school and high school students from area public and private schools have also used the facility to complete projects for National History Day. The former location attracted a number of classes and this is consistent.

Another outcome associated with the high profile of the new Zhang Legacy Collections Center building is an increase in potential and actual donations. The first donation of materials occurred just before ground was broken for the new building. It involved the acquisition of the local newspaper clipping file and photo morgue. Discussions about this acquisition had occurred on and off for nearly two decades. With the prospect of a suitable building as well as the impending move of the newspaper into smaller quarters, the acquisition finally happened. Since the building opened, the Kalamazoo Young Women's Christian Association (YWCA) records have been donated. The Kalamazoo YWCA was the first chapter in Michigan. Again, this was another collection that had been in discussion for a few years but great confidence in the new building and better research access finally resulted in the donation. Local governmental units in the area are struggling with legacy retiree and healthcare costs. As a result, a municipal unit is putting pressure on the University to house its historic records which would take up at least 700 cubic feet.

This project presents a case study which may be applicable to mid-sized repositories. Many of the planning, implementation and operational considerations may be applied to similar sized institutions. At this point, I will show some slides of the building, collections and operations.

Slide – Exterior Zhang Legacy Collections Center

Slide – Reading Room

Slide – Work Areas

Slide/Video – shelving.

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