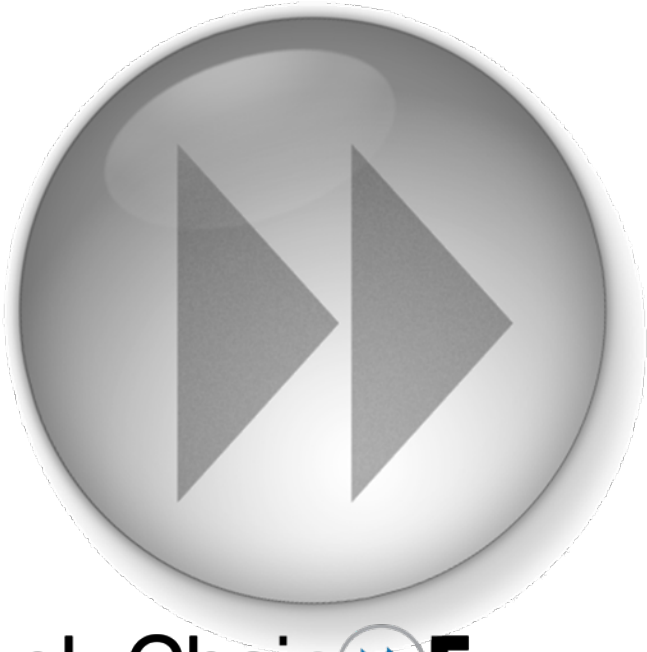
material handling logistics conference
SPONSORED BY HK SYSTEMS

Installed Automated Library Systems Report Card

Track 7 Session 9



Supply Chain Forward.

Todd Hunter

Account Executive

HK Systems

todd.hunter@hksystems.com

801.530.4718

Tom Steininger

Senior Solution Consultant

HK Systems

tom.steininger@hksystems.com

262.860.6545

Abstract

- **Each of the Automated Library Systems are unique unto themselves. This session will summarize the details of the automated library systems installed by HK Systems. Including their size, their collection data, software, operational statistics, staff size, location within the library, their maintenance statistics including Mean Time to Repair (MTTR) and Mean Time Between Failures (MTBF).**

Agenda

- **Collection**
- **System Size**
- **Operations & Staffing**
- **Maintenance & Repair**
- **Planning, Construction, Buying Process & Implementation**
- **Lessons Learned**
- **Key Takeaways**
- **Questions**

Summary of Statistics

- **The data used for this presentation was obtained from a couple of sources including:**
  - **HK information from systems constructed**
  - **Survey data received from library staff via www.surveymonkey.com. Not all libraries responded**
  - **Study data provided by the University of Chicago for the construction of their library**

Collection

- **Overview**
  - **Libraries that we surveyed had a total collection between 650,000 to 2,200,000 million bound volumes in their overall collection. The average collection size was approx. 1.2 million volumes.**
  - **Additionally, other materials in the libraries ranged from a couple of thousand up to 900,000 items including:**
    - **Government documents**
    - **Micro film**
    - **Archival material**
    - **CDs**
    - **Records**
    - **Special collections**

Collection

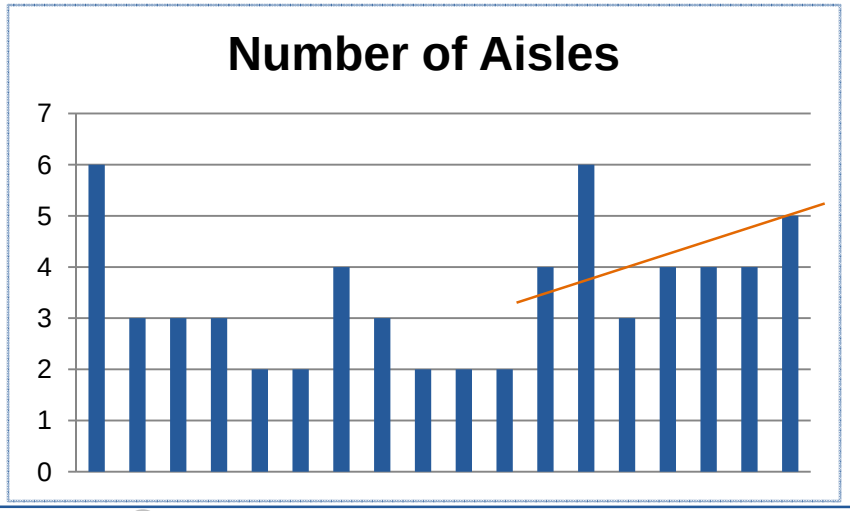
- **Planned growth of the library's collection ranged from 1,000 to 45,000 volumes per year. The mean average was approx. 10,000 volumes per year.**
- **Of the Automated Library Systems(ALS) installed, the planned storage capacity is between 400,000 to 2,000,000 of volumes and items. With the average system capacity of 1,000,000 items (Plans for a 4.5 million volume system is on the drawing board).**
- **The systems constructed are between 35-95% full, averaging around 60% of capacity. A couple of the Universities have constructed their building such that additional aisle(s) could be added for expansion.**

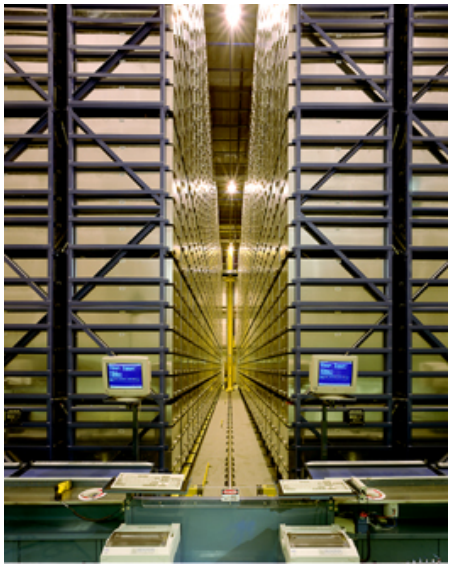
Collection

- **As the ALS are being filled, bound volumes actually stored range from 180,000 to 600,000, averaging around 450,000. It should be noted that the most recent systems are larger in size which may skew the data.**
- **Additional “other items” range from 0- 100,000 items stored within the ALS.**
- **50% of the systems hold special collection material.**

System Facts

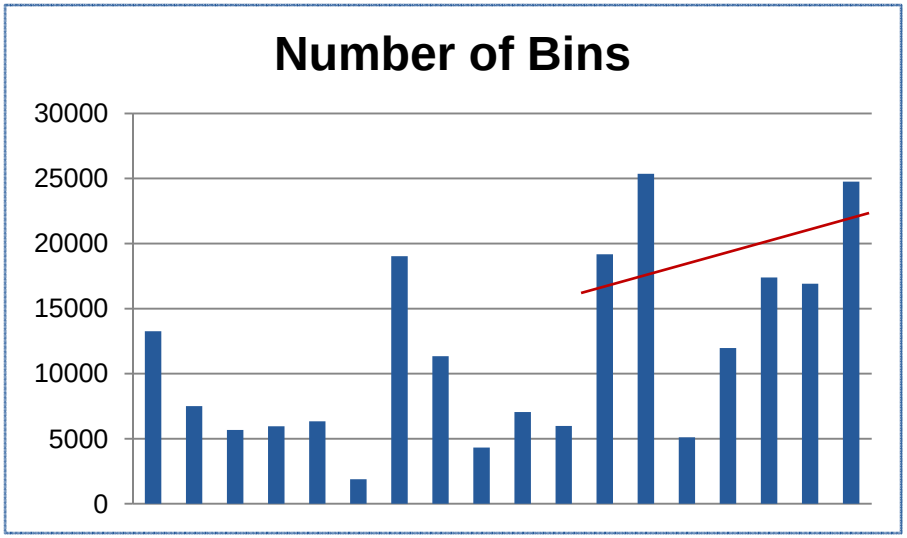
- **Number of Aisles**
  - **64 aisles have either been constructed or in the process of being installed**
  - **(2) Aisles is the smallest system provided**
  - **(6) Aisles is the largest system installed**
  - **(3.5) aisle is the average**
  - **(12) aisle solution is on the drawing board**



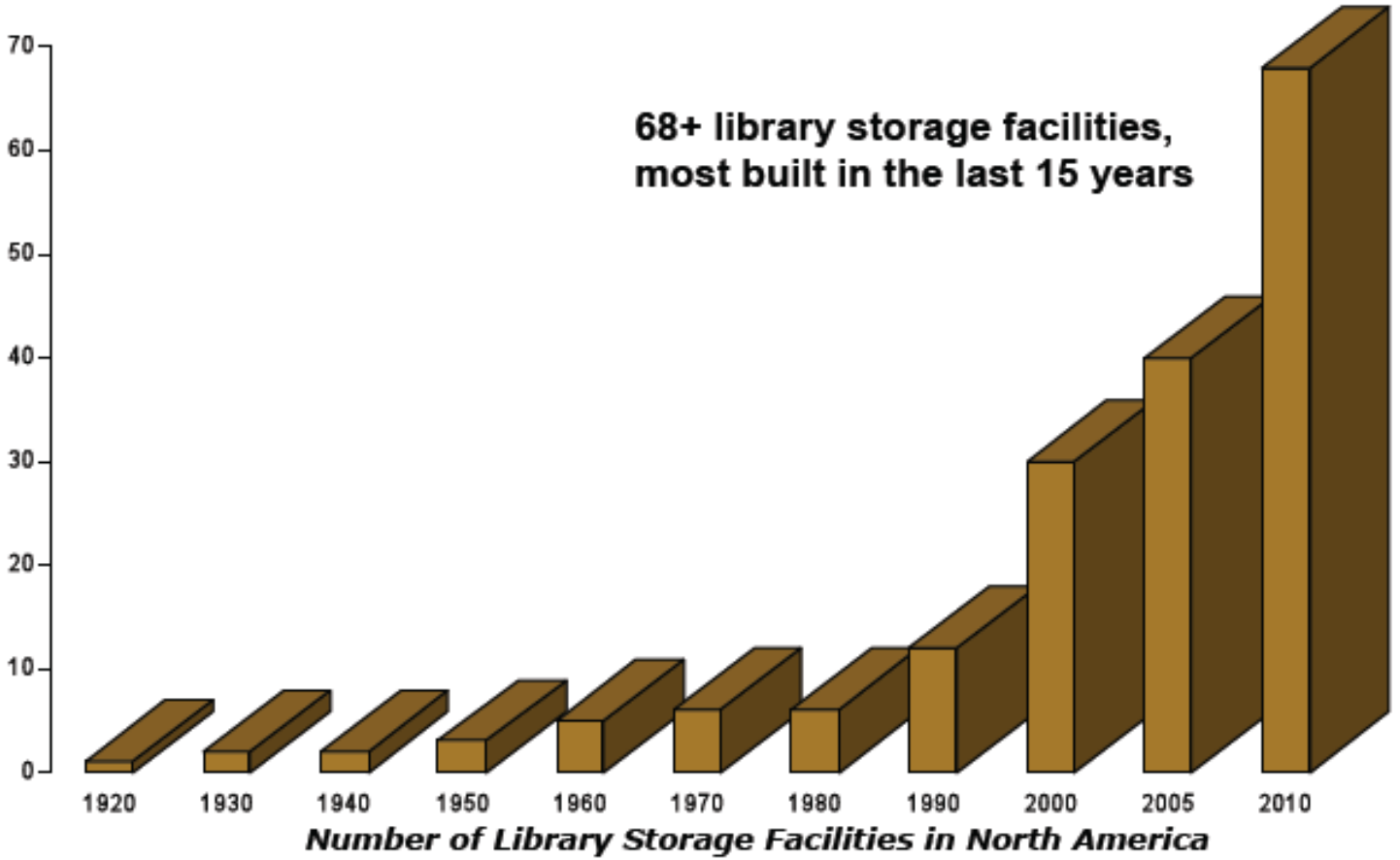


System Facts

- **Number of Bins**
  - **210,000 bins have either been installed or in the process of being installed**
  - **(1,880) Smallest amount of bins in a system**
  - **(25,358) Largest number of bins in a system**
  - **(11,600) Average bins in a system**



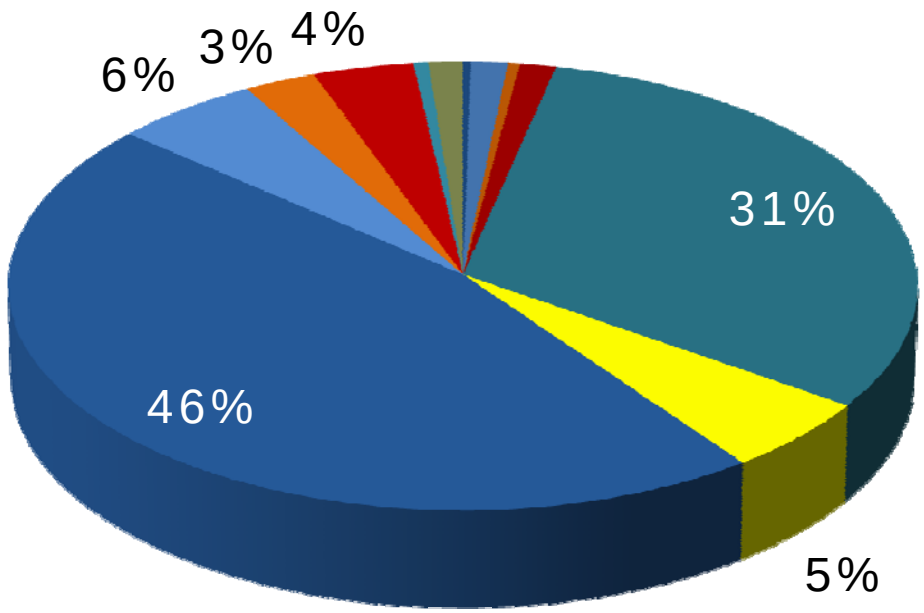
Growth & Forecast of Library Storage Facilities



[1] – Lizanne Payne, Washington Research Library Consortium, May 4, 2008

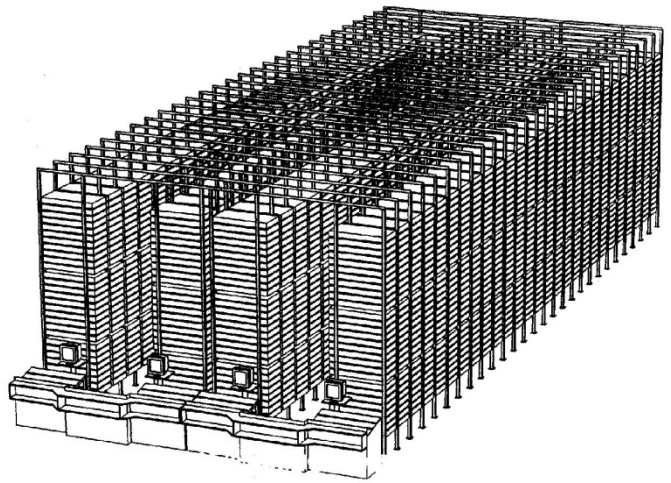
System Facts

- **Bins Heights**
  - **210,000 bins total**
  - **46% 12” tall**
  - **31% 10” tall**
  - **6% 13” tall**
  - **5% 11” tall**
  - **4% 15” tall**
  - **3% 14” tall**
  - **5% Misc. 4.5”, 6”, 8” and 18”**



System Facts

- **Physical Size of the ALS**
  - **System Height**
    - **25’ to 50’**
    - **35’ Average**
  - **System Length (Limited by Building)**
    - **75’ to 180’**
    - **145’ Average**
  - **System Width**
    - **14’ per aisle**
    - **28’ to 84’ (2-6 aisles) Range**
    - **42’ to 56’ Average (3-4 aisles)**
  - **Average Footprint**
    - **7,250 Sq. Ft.**

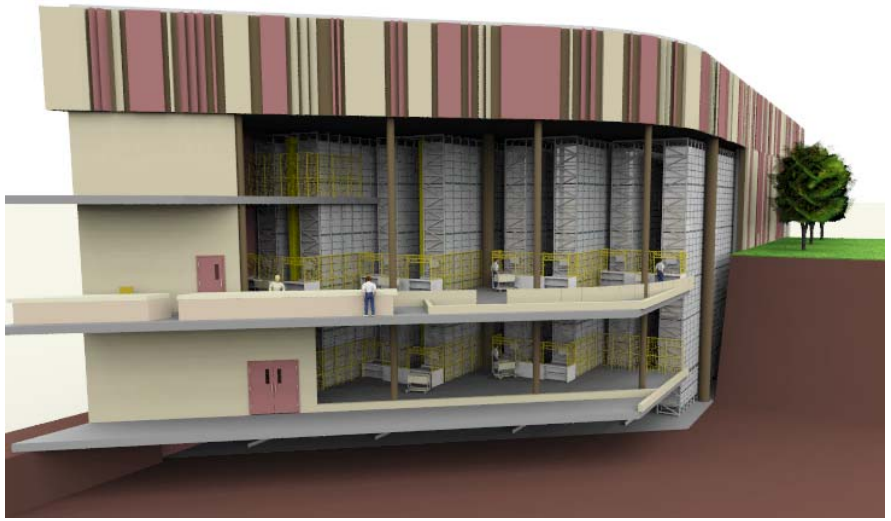


System Facts

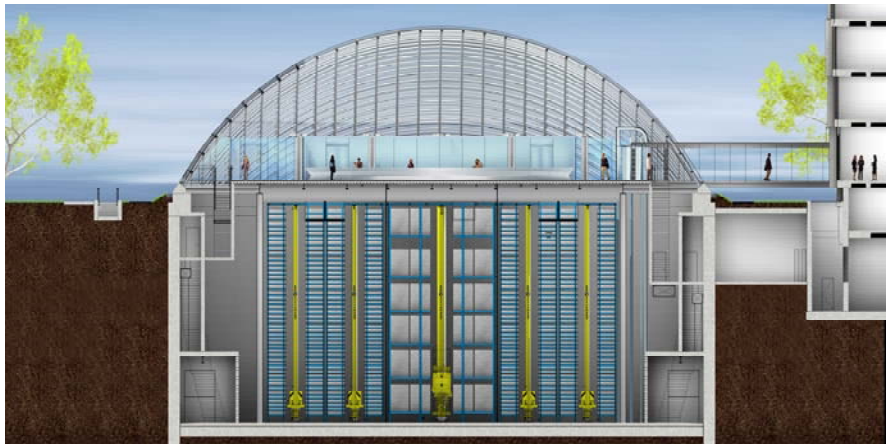
- **Access to ALS**
  - **Number of levels with Access to ALS**
    - **(2) Systems with access on three levels**
    - **Majority of systems with access on one level**
    - **Two level access on most of the current systems**
      - **Circulation**
      - **Special Collections**
  - **Systems with access on both ends**
    - **Three (one temporary)**
  - **One system has access on top and the middle**
  - **Most systems are placed below grade (6’-20’)**
  - **One system is completely underground and one is on the second level**

System Facts

- **Access to ALS**
  - **Multi-Level Access**
  - **Below Grade**



  - **Underground ALS**



Operations

- **Staffing**
  - **Overall library staffs range from 25-200**
    - **Average is 75**
  - **Library staff dedicated to ALS range from 0-5**
    - **Average is 2**
  - **Staff for ALS part-time**
    - **Average is 7 covering all shifts, maintenance and includes student workers**

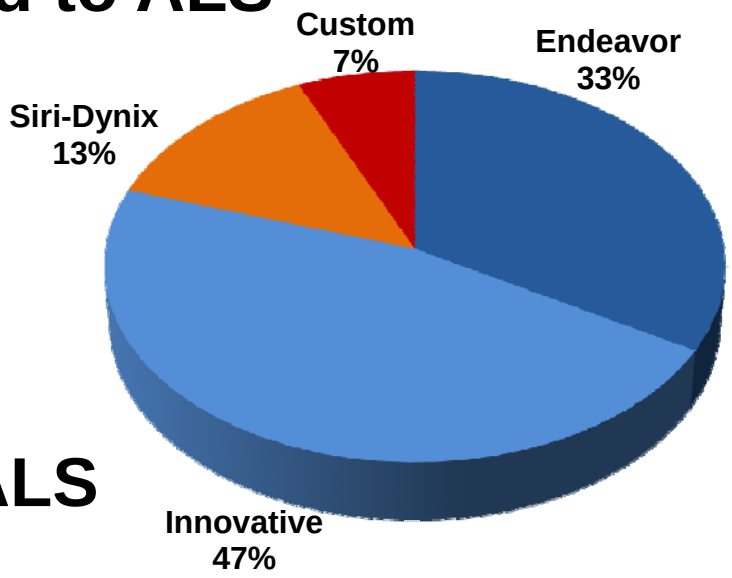
Operations

- **ALS Requests per Day**
  - **70-323 requests per day-Peak**
  - **195 average per day-Peak**
  - **32-80 requests per day-Normal operation**
  - **60 average per day-Normal operation**
    - **Aisle capacity is approx. 30 picks/hour x 4 aisles x 8 hr=960**
- **Request Times***
  - **30% of requests will occur from 6am- 9am on weekdays (many online at night). Later on the weekends.**
  - **10am -9pm 5% per hour**
  - **10pm- 12am 3% per hour**

***Based on study completed by the University of Chicago**

Operations

- **Software**
  - **Circulation System Interfaced to ALS**
    - **Endeavor**
    - **Innovative**
    - **Custom**
    - **Siri-Dynix**
  - **Staff with Admin Access to ALS**
    - **Range of 1-7**
    - **Average 3-4**



Maintenance & Repair

- **Maintenance**
  - **100% surveyed has their ALS maintained by the University Staff**
  - **86% surveyed has either a software or periodic maintenance agreement with HK Systems**
  - **(12) Preventative Maintenance Agreement**
  - **(7) Software Maintenance Agreement**

Maintenance & Repair

- **Maintenance**
  - **Mean-Time-Between-Failure/Error**
    - **Too minimal to calculate**
    - **1 every 4 months**
    - **1 every 6 months**
    - **1 bin error every couple of weeks**
      - **System probably needs to be re-mapped**
  - **Mean-Time-to-Repair**
    - **10 minutes to 8 hours**
    - **1.5 hours mean**

Planning & Construction

- **Initial Research to Construction Start**
  - **Two to Four years**
    - **Majority 3 years**
- **Construction Start to Library Operational**
  - **One to three years**
    - **Majority 2 years**
- **On average a 5 year process**
- **67% of the ALS were installed in a new library**
- **33% of the ALS were installed as an expansion**

Planning & Construction

- **67% of the ALS are visible to the general library patrons**
- **33% are hidden**
- **67% of the systems were selected by formal bid process**
- **33% were acquired with a design build contract**
- **50%+ contracted with HK to analyze the collection and develop concept with architect**
- **95% used HK specs as the preferred solution**
- **80% of the contracts were held directly by the University**

Implementation

- **Bin Loading**
  - **30% had HK load the bins into the system**
  - **70% Universities loaded the bins into the system**
- **Time to move the collection**
  - **Ranged from 3 weeks to 1 year**
  - **8 months on average**
  - **Most systems moved collection during the summer break**
- **Movement of the collection**
  - **80% of the Universities moved their own collection**
  - **20% subcontracted the movement of the collection**

Lessons Learned

- **Design**
  - **Place bar codes on the outside of material**
  - **Make sure that you purchase the latest technology**
  - **Talk to other libraries that have ALS**
- **Implementation**
  - **Everything will take longer than planned**
  - **Consider ergonomics and heights of users when designing picking interface**
  - **Don’t start loading system or complete training until the library is operational**
  - **Question all issues during implementation**
  - **Go in with a good contract**

Lessons Learned

- **Since Completion**
  - **Backup data often**
  - **Carefully study volume dimensions when selecting bin height**
  - **Consider unused airspace when calculating storage density capacity**
  - **Develop safety and maintenance procedures for staff on equipment and workstations**
  - **Marketing is important**
  - **Should have installed another aisle**
  - **Viewing the system is the most popular spot on the campus tour**
  - **All is good**

Key Takeaways

- **Capacity of the systems vary greatly, a good starting point for ALS is probably around 800,000 volumes**
- **ALS only requires 1-2 staff members to manage the collection**
- **Technology is such that the University can handle the maintenance**
- **The process may take up to 5 years from initial research to completion**
- **Definitely want to consider a study for sizing and architectural coordination**
- **Make sure you talk to owners of ALS during planning**

material handling logistics conference
SPONSORED BY HK SYSTEMS

Questions?