



Illinois Heartland Library System

TO: IHLS Board of Directors
FROM: Leslie Bednar
DATE: May 17, 2022
RE: Automatic Materials Handler Next Steps

We have gained a better understanding of our members' delivery-related needs through interaction with members of the Automatic Materials Handler (AMH) Working Group. As we move through the AMH research phase, I wanted to share two documents with you that were beneficial to the working group (both are attached):

- AMH Insights Report from our MarCom staff
- Feedback from libraries with AMH equipment (including those we visited and an additional library system)

I hope you find this information useful.

Thank you.

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Insights Learned About Automated Material Handling Systems in Libraries

5/8/2023 Report

Executive Summary

IHLS staff and members have been investigating the costs and benefits of an automated material handling system for over a year. However, we still need more information about the specific AMH costs in order to do a proper cost-benefit analysis.

As issuing a request for proposal does not commit us to purchasing anything, it would provide us the information we need in order to conduct an accurate cost-benefit analysis, and we cannot approach sources of funding until we have much narrower cost estimates, our staff would therefore like to request that the AMH Working Group make a recommendation to the IHLS Board that IHLS move forward with issuing a Request for Proposal.

Observations and Insights

About the machines

- The **St. Louis County Library** system was staff-loaded and handled new (clean) items only. STL County also has an ergofeeder, which loads books onto the machine for them. *AMH brand: Lyngsoe Systems*
- The machine at **Champaign Public Library** was staff-loaded and handled circulated (potentially dirty) items. *AMH brand: Tech Logic*
- The machine at **Decatur Public Library** was patron-loaded and handled circulated (potentially dirty) items. *AMH brand: Lyngsoe Systems*

Machine setup

- Some machines are significantly louder than others. The Lyngsoe machine is pretty quiet.
- Some machines are taller than others.
- Some libraries used spring-loaded sorting carts and others used shallow tubs.
- Some machines had tubs on both sides and some only had tubs on one side (enabling the machine to be put against a wall).
- Some had an ergofeeder and some didn't.
 - The ergo feeder would be absolutely essential for IHLS.
- Books/materials that the machines doesn't have an assigned location for are sorted by the machine into an "exceptions" bin. These are then hand-sorted.

- For IHLS, items without a barcode on the outside of the item would be sorted into the “exceptions” bin.
 - IHLS-member items not part of the SHARE catalog would be sorted into “exceptions.”
 - We could decide if some item types should always be *manually put into an exceptions bin for hand-sorting*.
- IHLS’s theoretical machine would need to do two, and possibly three, passes through the sorting machine.
- An optional add-on is tote-level check-in. Libraries could check a whole tote of materials into their library at one time, but the returning items and the newly lent items for patrons wouldn’t be sorted. At the time of the Request for Information, I add-on to make this happen would cost around \$30k for each hub. Would this add-on be worth it?

Overall Experience of Libraries

- St. Louis County, Champaign, and Decatur public libraries all like having the machines. STL County is expanding with Lyngsoe to other locations.
- While Bibliotheca is an option for an AMH machine, both Decatur and Belleville PLs are unhappy with *other* bibliotheca technology-based solutions.
- Anecdotally, the AMH reduced library staff time on sorting; libraries reported that their staff members were freed for other projects. However, we don’t have numbers.

Potential Damage to Books:

- Paperback picture books and magazines were “exceptions” (hand-sorted) at STL County, and they went on the belt at Decatur PL and Champaign PL. STL County and Champaign PL both reported that these occasionally get caught in the belt, but they seemed to be going down the belt fine at Decatur PL.
- For IHLS, we could make sure our staff puts magazines and thin picture books spine-first down the belt, which seems to alleviate this problem. OR, they could be “exceptions”/hand-sorted at IHLS.2pprox.gler” helps put the books in the tub evenly.
- When using loading carts, the carts are spring-loaded, minimizing the fall height of books.
- Note from STL County: “Items are rarely, if ever, damaged by the AMH. Even if they are, it would be very minor damage. I don’t think anything has ever been so damaged that we had to remove an item from circulation.”

Maintenance:

- Required routine maintenance includes the cleaning of sensor eyes (weekly/as needed), unblocking of the sensor reflector plate in the bins (daily) and the vacuuming of dust (weekly).
 - IHLS expects operations or IT staff to be able to take care of this.
- We would get a kit of spare parts in case something breaks.
 - It would be helpful if one of the IHLS sorters or operations manager at each hub had mechanical inclinations.

- We would likely have a maintenance plan for bigger maintenance needs.
 - We would need a backup plan for sorting when the machine breaks.
 - Decatur PL eliminated their maintenance plan after a year.

Staffing

- It's not staff-free operations; it's staff-*reduced* operations.
 - Will the "fewer" people need to be there for longer hours? We don't know for sure.
 - Would they be full-time rather than part-time? We don't know for sure.
 - Would drivers sort now, or at least help stage the items? We don't know for sure.
- An AMH system would likely change the workflow for the drivers.
- Our concern is the staff turnover. We have to frequently hire replacement sorters; over the last 18 months (approx.), of the 11 sorter positions across IHLS hubs, we lost and needed to retrain 1 sorter every 2 months.
 - There's a definite cost to IHLS for that—*about \$1,000/sorter for onboarding, administration hours on onboarding and training. This does not include termination costs.*
 - Because of the high turnover, loss of jobs isn't a major concern. We'll want to make sure that our staff who do want to stay longer-term are considered.
- We need more information about the specific AMH costs in order to do a proper cost-benefit analysis.
- We also need a better estimate of what percentage of items would still have to be hand-sorted.

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Costs:

- We learned from the responses to our Request for Information that the machines vary widely by the vendor in terms of capabilities, base costs, and add-on options. Therefore, we do not have a good estimate of the costs. However, we were able to narrow the range a little, from \$250k-500k for the Edwardsville unit to \$250k-\$450k for this unit.
- Staff turnover – *about \$1,000/sorter for onboarding, administration hours on onboarding and training, plus termination costs, times one person every 1.9 months.*
- It's the hardest to estimate the costs for Carbondale.
- Because of all the variables with the machines and vendors, we can't yet accurately determine the cost of the machines and maintenance compared to the return on that investment.

Funding:

- We can't approach sources of funding until we have a more accurate idea of costs.

- How long are the numbers of the RFP good for? We don't know; this would depend on the company.

Staff Conclusion

We need more information about the specific AMH costs in order to do a proper cost-benefit analysis.

The staff conclusion is that, while we were hoping to have a better cost-benefit analysis by now, we are unable to determine if the costs are beneficial or not beneficial unless we have more information.

An organization issuing a request for proposal (RFP) is similar to a homeowner asking multiple companies for a quote for replacing a deck. The homeowner explains their needs and the contractor lays out a plan proposal and provides a quote. The homeowner is not committed to anything until they sign a contract and put down a downpayment. Likewise, a request for proposal for an AMH is a request for AMH project specifics and a formal quote for the agreed-upon project. It is not a commitment to purchase anything.

We cannot conduct an accurate cost-benefit analysis without accurate details. We cannot approach sources of funding until we have much narrower cost estimates. A request for proposal would provide us the information we need for funders and both of these issues, and it would not commit us to a purchase. Therefore, our staff would like to request that the AMH Working Group make a recommendation to the IHLS Board that IHLS move forward with issuing a Request for Proposal.

A request for proposal (RFP) is not a commitment to purchase; it is a request for project specifics and a quote.

Possible Next Steps for the AMH Working Group:

- The AMH Working Group could recommend to the Board that IHLS stops the research process.
- The AMH Working Group could recommend to the Board that IHLS issues a Request for Proposal.



Illinois Heartland Library System

Feedback from AMH Sites

Illinois Heartland Library System has reached out to four different sites that utilize AMH technology at their organizations. We have gathered feedback from them and have created a document to share their experiences with the Working Group. The following are excerpts from email communication that we have with all four sites.

Champaign:

The Champaign Public Library has an automatic materials handling system purchased from and installed by Tech Logic during the construction of our current building in 2007. The unit was upgraded from pneumatic to electric in 2020. It was added to allow the Circulation staff to handle a bigger and busier space without the addition of many new staff members. The system has been a success. We are able to check in and process over 1.5 million checkouts per year and return those items back to the shelves within 24 hours. We work well with Tech Logic staff and keep the system running with little downtime. Along the way, library staff members learned a great deal about the unit which allows us to perform most repairs on our own as well as customizations that work best for our workflow. We have no regrets in the purchase of this AMH.

· Question from IHLS: Overall, are many library items damaged frequently? Concern was expressed about the number of items that would need to be replaced.

I will have to admit that we have not kept track of the number of damaged items. It happens rarely these days. It can happen though. We have had some items get caught with the belt turning and turning which makes marks on the pages. We have also had some items get caught under the bands. If the unit is used with someone supervising it, you should be able to pull things out pretty quickly. We have a long grabber that lets us reach further into the belt without the chance of getting our hands, hair, or clothing caught.

· Question from IHLS: Do magazines, picture books, braille books, and DVDs need to be hand sorted and/or need to go into the machine spine first?

It always works best if items can go in spine first but it is not required. Picture books do well any way they are put in as do DVDs. We don't have braille books, so I am unsure about those. Magazines can get caught if they go in pages first. Some of the pages will slip under the bands and get stuck. If they are removed quickly, there is no damage to the magazine. We have had issues with children's books and CD items in a bag getting caught. The bag will sometimes roll under the bands. Those are not usually damaged when that happens though it will stop the machine. We have some issues with the RFID reader handling shiny metallic covers. We also need to check in a lot of the tiny, flat, leveled readers by hand. They are so thin the reader does not see them.

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Decatur:

We are extremely pleased with our AMH. No regrets. It has reduced strain on pages and clerks and improved our efficiency. As far as reliability, it is mechanical and does go down on occasion. Those times are pretty few and far between. Most of the time it is a cleaning issue. We have had to swap out parts on a few occasions as well. Nothing extreme. We went with LINGSOE for our AMH and have been very pleased with their customer service.

Surprisingly, there is not a lot of damage. We do sort AV into their own bins which helps a lot. A giant book landing on a DVD or CD case would cause damage. There is no need to hand-sort or put things in a special way for the most part. Occasionally, an item with a thick plastic case will need to be turned over, but it is the exception rather than the rule.

St Louis County:

The utilization of automated materials handling (AMH) at our administrative building provides St. Louis County Library with a number of benefits. The AMH checks in and sorts brand new library material and routes them to the proper destinations. This is done without the need to manually check in materials and print transit slips for each item. The library employees simply induct the material into the AMH and they don't have to worry about the destination. Materials travel down the conveyer and are discharged into totes directly across from the delivery trucks, saving steps and time. These efficiencies resulted in increased accuracy and less time spent on sorting overall.

The AMH recently provided another solution to a space problem at several branches. The addition of social workers at five branch locations meant that we needed to squeeze in more staff in an already crowded workspace. Because of the AMH, we were able to reduce the sorting shelves at these crowded branches from two large shelving units holding 20 totes down to just 3-4 totes in total. The removal of these sorting racks was possible because the sorting can all be done through the AMH when the trucks bring materials back to the administrative building. This sorting through the AMH requires just 1-2 people to do a job that used to occupy a team of 5-6 people for several hours each day.

Items are rarely if ever, damaged by the AMH. Even if they are, it would be very minor damage. I don't think anything has ever been so damaged that we had to remove an item from circulation. We have been using AMH for 10+ years now. Items do not need to be fed in any particular way since we use RFID. If the AMH used barcode scanning instead, one would need to induct the items with the barcode in a position that can be read by the scanner. We don't have braille books, but we certainly pass magazines, picture books, and DVDs through our machines. For items like magazines and larger floppy picture books or other large paperbacks, it is generally better to induct them so the open page side is trailing rather than leading on the conveyor. This just reduces the likelihood of a jam.

King County, Washington

Here is a link to a YouTube video: <https://youtu.be/RefWWSFXH4A>

This was from 2017 (although nothing has changed) and we still run the same, we also make the daily numbers that were stated in the video. Our down time is very low about 2-3 percent of time. We are

looking to replace and upgrade our AMH, as it is almost 20 years old. We currently use Lyngsoe as our vendor. They originally installed the AHM equipment that we use.

When we are fully staffed (sometimes a challenge at this point) as an example, we can pick up the materials on a Tuesday night and sort them during the day on Wednesday, then send them out to the receiving Library that night (Wednesday) and they are available to the patrons on Thursday. When we are fully staffed, we typically sort all materials each day. Before we had the AMH equipment we never finished the sort each day.