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Landing on The Right Track: Developing an HVAC System for a New Repository

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Years ago I sat in a crowded theater and watched the film *Indiana Jones and the Temple of Doom*. Indy and his companions escaped from a crashing airplane by inflating a rubber raft and using it to sail out of the plane, slide down a snowy mountainside, and float down a river. The audience reveled in every stunt, save one, throughout the movie. As the main characters make an escape by charging along a roller-coaster of railroad tracks in a mining cart, the cart takes flight over a crevasse, lands on the next set of tracks perfectly, and rolls forth at breakneck speed. Expressions of disbelief emanated from every row and even I thought, "What kind of rubes do they think we are; any four-year-old knows how difficult it is to align those miserable little train wheels along the tracks."

What does this have to do with building planning? I think Mr. Spielberg grabbed our attention with the exotic bits but he slipped up when he based a stunt on something that was familiar to everyone who had ever played with a train set. The audience reverted to memory instead of remaining open to possibility. I think we run into a similar problem in working with architects and engineers in designing archival repositories. Archivists are soaring along in a mining cart of lofty archival standards and practices, and the architects, relying on what they already know, are trying to land us on familiar tracks.

In order to get beyond this reliance on the familiar, and yet land safely, you will need to determine your expectations, communicate these to the designers, and verify that communication during various stages of the planning and building process. One of the most effective, and reassuring, means of accomplishing these goals is to employ a consultant who can advise both you and the designers, and verify that your needs are met.

The administrative offices and the Archives and Library Division of the Mississippi Department of Archives and History were located in the Charlotte Capers Building in Jackson for over thirty years. The Capers Building was constructed in 1971 for the express purpose of being an archival repository that would meet the state's needs for the next two decades.

As early as 1978 it had become apparent that space for the increasing number of collections, programs, and employees was not adequate. A more gradual realization was that our building's environment and security features were never going to live up to the standards we had developed and that, although we were ahead of the game programmatically, we were not structurally equipped for the electronic records revolution.

Planning for the William F. Winter Building began in earnest in 1997 with three events. Five members of our staff were accompanied by the project architect and project manager on a tour of four new or soon to be renovated archival repositories. The greatest benefit of the tour was the clear demonstration to the architects that our requests for specialized systems and materials were not unreasonable or idiosyncratic.

After the trip we conducted a tour of our own building emphasizing the physical nature of the

material to be preserved and handled. In the case of electronic records, we displayed a variety of equipment required to provide access to the records. This approach seemed to aid the architects' in refining their high-concept ideas into practical designs. They were able to focus on the task of creating a building that would meet the dual, and sometimes conflicting, objectives of preservation and accessibility.

The third event was the establishment of staff Discussion Groups to outline programming in greater detail and to express our concerns for and visions of the new building. Written reports were forwarded to the project architect who reviewed the reports with one or two Department employees. We determined which consultants we wanted to use and expressed our interests to the architects and the state's building authority.

Our staff understood that there would be many compromises; however, we determined that in regard to the HVAC system there should be hard and fast guidelines. We knew that our location in the Deep South would pose a challenge and that insistence on extremely low temperature and humidity might increase the chance of having a system that could achieve proper conditions but not maintain them or would cause an unreasonable increase in energy costs during the years of operation.

Bill Lull, of Garrison/Lull, was contracted to review the design documents for our building. Lull toured our existing facility and met with our staff and the architects and engineers. Although the schematic plans had established the footprint of the building and the arrangement of the interior spaces, he was able to work with our staff and the design professionals to improve the plan. Ideally, the services of an environmental consultant are secured prior to the design document phase.

The Winter Building is more than three times larger than the Capers Building and has over 39,000 s. f. of archival storage space. It has six floors and is built into the side of a ridge so that some areas are below ground or partially below grade along the north and south slopes. The sub-basement is a mechanical area; the first floor is at ground level on the eastern side and serves as a receiving area and, for the most part, a stack storage area; the second floor is devoted to stack storage; the third floor is at ground level on the western side, serves as the main entrance, and houses the public areas of the building; the fourth floor houses archival work areas and offices; and the fifth floor houses administrative offices and the staff lounge.

Our staff had measured collections, made twenty-year projections for collections growth, and broken down the figures according to type of media and preservation standards. We generated statistics for ideal media-specific archival zones but we understood that the cost of establishing even a few separate zones within the stacks would be prohibitive. This prepared us for the notion of having only one zone so long as the temperature and humidity did not fluctuate beyond the accepted range, ventilation was adequate, the system was reliable, and the environment was the best for the greatest volume of materials and acceptable for the remaining collections.

Lull recommended four distinct zones; however, we were only able to incorporate three of these in the Winter Building. There is one zone at 60°F and 40% RH for the archival storage area that houses the majority of our collections which consist of paper, books, and photographs. He also suggested a 68-72°F and 40-60% RH zone for archival office spaces and public research spaces, areas where collections are exposed for a relatively short period. The third zone is in nonarchival office areas where the temperature and humidity may exhibit greater fluctuation. Lull also pinpointed "offending spaces" such as the Isolation Room and provided for their separate ventilation. (It is our plan to construct the fourth zone, a smaller "cool" storage vault as a part of

building renovations associated with the State Records Center. This cool zone will be about 40° F, have 35% RH, and will house microfilm, motion picture film, and film negatives.)

We had already determined that we wanted as few as possible of the HVAC mechanical components in or on top of the building and the architects had met this objective by designing a mechanical plant apart from the main building. However, the engineers had designed the system within the repository as if it were a regular office building with little regard for archival concerns and the necessity of maintaining conditions twenty-four hours a day, seven days a week, for the next twenty years. Our refusal to proceed without resolving the HVAC issue and a comprehensive meeting while Lull was on site had the effect of putting all of us -- administrators, archivists, architects, and engineers - together, in the aforementioned mining cart, looking desperately for a safe place to land.

Lull's archival perspective helped settle these HVAC issues for us and his mechanical perspective redirected the architects and engineers from the familiar construction methods to which they were accustomed and toward the unfamiliar, exotic, if you will, demanding solutions necessary for an archival repository. In our case, it is the use of desiccant wheels to remove humidity from air drawn into the building, a technology not unique but rare enough that ours is the only building with this type of system in the state.

Lull was able to communicate the overall concept, describe the basic design for a system that could accommodate our needs, provide detailed information about system components, and even commiserate with the engineers about the difficult job ahead. They decided to extend the sub-basement to accommodate both the added equipment for the multiple zones and the mechanical equipment that would otherwise have been housed on each floor and simply run ductwork up through the mechanical rooms of the lowest four floors.

Another, less obvious, aspect of the HVAC system, the waterproofing and insulation methods and materials were revised as well. This meeting also allowed us to express our concerns about potential damage from leaking pipes and volume boxes with hot water reheat coils. The engineer revised the plans by running pipes and locating volume boxes above areas, usually in corridors, where there should be little or no collection material or expensive equipment.

Lull's suggestions solved the environment maintenance and energy cost issues by allowing for the use of familiar methods and materials where appropriate but insisting on the use of uncommon methods and materials where necessary. Furthermore, his unsolicited reinforcement of one of the staff's ideas convinced our administration of the need to hire a Facilities Manager for the new repository.

During the meeting, the engineers bought into Lull's recommendations almost immediately and they impressed him as being more than capable of meeting the challenge. We used Lull's follow-up report to devise questions for the architects and engineers and to check plans as they were made available to us. The architects and engineers used the report to assist them in making the revisions.

Our staff was able to read the plans well enough to determine that mechanical systems had been changed as expected but we could not verify that the right parts and products were specified or that the construction specifications would result in the HVAC system we were expecting. Lull was able to verify the engineers' hits and misses and was instrumental in ensuring that designs and specifications for products and installation were correct.

The architects, engineers, and designers who worked on our project spent an inordinate amount of time and energy learning about our unique building needs, responding to our comments and questions, and meeting with our staff and consultants. A groundbreaking ceremony was held in February 2000 and the architectural team continued to meet with us throughout construction to refine the details. The Winter Building was opened to the public in November 2003 and we have been delighted with both the beauty and functionality of the facility.

The construction of an archival repository and an appropriate HVAC system requires an uncommon knowledge. The services of an experienced consultant are, in almost every case, essential. Essential: to ground archivists' unfeasible expectations and keep us from flying off the track; to prevent architects' and engineers' over-reliance on familiar methods and materials; and to bridge the gap between our disciplines with communication and verification that may lead to the creation and maintenance of a successful archival environment. If you are embarking on a building project, you have my sincere wish for a happy landing.

Forrest W. Galey is a graduate of Mississippi State University and was employed by MDAH as Graphic Records Curator and Head of Special Collections prior to holding her current position as Special Projects Coordinator. She served as a liaison between the Division staff and the architects and builders of the William F. Winter Archives and History Building throughout the design, construction, and occupation phases of the project.
