

ROME WASN'T BUILT IN A DAY: DESIGN OF AN ARCHIVAL CONSERVATION LABORATORY

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One of the fundamental mandates of the National Archives is to preserve records of permanent value created by federal agencies nationwide. In accordance with this mandate, the National Archives has a strong conservation and preservation program centered in Washington, D.C. In 1987, expansion of the preservation division into the regional archives system began a new endeavor to place conservation laboratories in sites selected from among the eleven regional archives. The Pacific Sierra Region in San Bruno, California was chosen as the location for the first regional laboratory both because it had a suitable space and because there are five National Archives and Records Administration facilities on the west coast. The author was given the responsibility of designing the archival conservation laboratory and of serving as an on-site supervisor of the renovations. What follows is an account of the general principles used in planning for the lab, a description of some of the solutions specific to the site and the anticipated work flow, and a final note on the triumphs and pit-falls of the project.

An overview of the range of conservation treatments to be performed and the number of personnel to be employed is a requisite preliminary step in the design of a new laboratory. It is within this context that the underlying criteria for all future decisions are developed. Although book conservation and rebinding was not included in the plans, the scope of conservation activity remained quite large. Based on the size of the room (ca. 850 sq. ft.) and the nature of the anticipated work flow, the number of full-time employees was determined to be three after an initial period where one person would be working alone. The design of the laboratory space was influenced by the fact that provisions had to be made for at least three work stations, and that the space should remain as flexible as possible to allow for changes in the configuration as needed for large projects versus small and for the eventual addition of co-workers. Therefore, the main element of the design was a central open core equipped with movable furniture on locking wheels or castors.

An initial evaluation was made to survey the room and record all measurements and specifications, during which various professionals were consulted to help weigh the needs of the conservation laboratory against the existing mechanical systems. Throughout the process of evaluation and consultation nothing should be taken for granted in this regard. The conservator should maintain a healthy dose of skepticism toward quick or easy solutions and should be very stubborn about what changes are truly needed. Careful records should be kept regarding any existing mechanical, plumbing or electrical systems and notes made regarding needed

modifications and additions. Examples of this are to record the number, location and capacity of existing electrical outlets and switches. The ventilation system should not be overlooked as it is important to maintain an adequate number of air exchanges per hour as well as provide for any chemical exhaust system that may be installed. If a specific requirement can be identified, measured, and located, it should be recorded in some way. This preliminary work to develop the specifications for the lab may seem overloaded with a lot of details, but as the plans for renovation or new construction evolve, each detail will prove to be important to someone involved in executing the plans, whether it be the plumber, the electrician, the industrial hygienist or the conservator.

Once the existing versus the required systems were analyzed, the final sketching of the modifications to those systems were drawn directly on the walls and floor of the room. Locations for large, immobile equipment were also sketched out on the floor. This exercise provided a means of visualizing the changes that would be made to the room and the placement of the large equipment, as well as a means for critically evaluating the plans.

After the plans were finalized, a detailed schedule for the renovations and modifications were developed. It is important to decide what step in the renovation process should be done first. Should the painting be completed before the plumbing, or vice versa? Careful thought must be put into the schedule, particularly if it includes equipment installation, so that any installation of equipment need not be undone later to accommodate needed modifications. For example, new sinks should be installed after the modifications to the plumbing are completed. The renovation schedule for the conservation lab was organized in five phases. First, the electric wiring, lighting and the rough-in plumbing were done as well as painting the room and installation of the floor tile. The second phase of the renovation included the installation of the counter units and sinks, and the third, installation of the fume hood and the ducting from the fume hood to the exhaust system. The next phase was simply touch-up painting and an inspection of the installations and hook-ups followed by any necessary adjustments. The fifth phase was the installation of a deionized water system.

Approaching the design and construction of a laboratory in an organized way and breaking the project down into component parts makes the task less overwhelming and helps to assure that seemingly minor but, in reality, very important details will not be overlooked. Also, the more time devoted to the preparatory plans and drawings and the more detailed they are, the easier it will be for the contractors to know exactly what is required of them. The drawings will serve to supplement the verbal plans and phased schedule and to provide a quick way to remember all the details and to check on the progress of the construction.

Due to the straightforward nature of most of the installations

only a few aspects will be discussed here. Some considerations in the choice of flooring deserve mention. Samples of various types of flooring were tested for visibility and solubility. Visibility is the ease of spotting a small but important piece of paper that has fallen from a lab bench to the floor. A poll was taken among colleagues to determine on which pattern of tile a small strip of Japanese tissue approximately 3/8" x 1/8" was most visible. For solubility, a drop of alcohol and one of acetone were placed on the samples. After three minutes the samples were examined for any solvent action. The test was repeated several times. It seems that some of the components that make resilient flooring flexible can leach out with common solvents. Also, pressure over time from heavy equipment will leave indentations in the tile. The floors that are best for human comfort are not necessarily appropriate for a conservation laboratory.

The fume hood installed in the laboratory is an oversized, double sash hood. The interior dimensions are 40" x 60" with the sashes at the long sides. The custom-made hood not only can accommodate some of the larger archival documents, but also allows one person to work at either side of the hood without manipulating the document, or for two people to work simultaneously. The face velocity of the hood has been tested by a representative from OSHA and meets all health and safety standards. The building did not have to be retrofitted with ducting or with a dedicated exhaust tower. When the Archives addition in San Bruno was built in 1981, plans included a conservation lab. As a result, the exhaust system including an explosion proof blower located on the roof was installed at the time of construction. However, seven years later, the system required inspection to insure that it met current federal, state, and local regulations and that the blower was strong enough to create the 100 CFM face velocity at the fume hood. Specifications on the blower and the exhaust system were sent to the manufacturer of the fume hood and to the federal safety office at the General Services Administration. Although the system met all requirements, it was tested, as mentioned above, once the fume hood itself was actually installed.

The water purification system chosen for the laboratory is designed to provide analytical grade deionized water at one megohm resistivity with a flow rate of four gallons per minute. The feed water first passes through a 35 micron cartridge filter and then through an activated carbon filter. There are two large DI tanks with a recirculation pump at the second tank. The pump prevents quality loss during periods of low or no usage. The deionized water passes through a calcium carbonate tank followed by a five micron filter and then into a glass lines water heater that is maintained at 130 degrees Fahrenheit. A gauge near the tap indicates the temperature of the purified water being used which can be regulated by a mixing valve. The temperature of the water at the tap ranges from about 68 to 110 degrees Fahrenheit. If need be, the calcium carbonate tank may be bypassed. The system is economical and requires little maintenance. The renovations needed to transform the room into an archival

conservation laboratory involved working with four different crews of contractors. Coordinating the different groups in a timely fashion was a challenge. The tendency of contractors to work according to their own peculiar agendas underlined the idealism of the initial time estimate placed on the project. Unanticipated delays in receiving the correct supplies and equipment also effected the initial completion date. Another set-back was the installation of 120-volt light fixtures in a system designed for 277-volt fixtures. Ideally, the mistake should have been caught before the fixtures were installed, but unfortunately either the specifications outlined in the laboratory plans or the labels on the boxes were not read. This incident caused more than a two week delay in the progress of the renovations.

The final phase of contractor installation was completed in mid-April, three months after the projected completion date. Although the laboratory was not finished by the target date, a three month delay is not considered unusual for a project of this size. The key to a successful outcome is in the planning stage. The drawings and specifications must be highly detailed and a specific phased work schedule outlined. It is only by paying close attention to the minute aspects of a conservation laboratory and then to how the parts fit together and function as whole can the successful outcome of the design and construction be assured.