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Crime Lab

Under the Microscope

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This article will examine the impact of the two largest accreditation programs—ASCLD/LAB International for the accreditation of forensic laboratories and the NAME Inspection and Accreditation Checklist for coroner and medical examiner facilities. If you are not currently accredited or are planning a new facility, this will help to address matters to communicate with your design team in order to design with accreditation in mind.

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Laboratory Accreditation Standards and Their Impact on Your Building Project

There are a number of laboratory accreditation programs that impact forensic facilities—ASCLD / LAB International, ILAC, ISO 17025, ABFT, NAME, and ABMDI to name a few. Many of these organizations concentrate their accreditation on the processes and protocols of the physical work performed along with written metrics for standards and calibration. However, citations that impact the physical built environment reside within these texts as well as implications of process and protocol items that likewise must be accommodated.

We'll take two tracks that examine the impact of the two largest accreditation programs—the ASCLD/LAB International / ISO 17025 program for the accreditation of forensic laboratories, and the National Association of Medical Examiners (NAME) Inspection and Accreditation Checklist for the accreditation of coroner and medical examiner facilities. If you are not currently accredited or are currently accredited and planning a new facility, this article will help to address matters to communicate with your design team in order to design with accreditation in mind. But first:

Choose Your Own Adventure
Are you a Medical Examiner or are you a Forensic Laboratory?

Medical Examiner

Many of you may be intimately familiar with the information that is in the NAME Inspection and Accreditation Checklist and Policies and Procedures manual. Unlike the forensic laboratory accreditation requirements, the NAME Checklist has a number of specific requirements that impact the design and construction of a new facility.

While there are many checklist items that pertain to the facility, we will concentrate on those that are Phase II accreditation standards. Phase II standards are those that, "… are considered essential requirements." All Phase II requirements must be met for accreditation; no deficiencies are allowed in the Phase II category.

The majority of the Phase II checklist items relating to facility design pertain to the following categories: space, infrastructure, and decedent handling. The following are examples of each:

Space requirements are cited time and again in the checklist. Is there enough space for employees? Is there enough space for records? Is there enough space for decedent storage?

Space is tricky to calculate. Unlike standard forensic laboratories where a rule of thumb exists for square footages of the laboratory per employee, there is no such equivalent rule for medical examiner facilities.

The method that we employ is a mathematical calculation based on the number of decedents and building the numbers

from there. Taking historical data on the number of autopsies performed per year and projecting that data forward, we then apply the metric of autopsies per year per pathologist to determine the total number of pathologists. (Note that the Phase II requirement is 325 autopsies per year per pathologist while the Phase I requirement is 250. For estimating, we typically utilize the 250 number to accommodate unanticipated growth.) From there, the number of pathologists results in the understanding of other quantities such as supporting staff and necessary storage.

This is a simplistic overview of the actual complex calculations, but it is critical in determining the future space needs of a facility.

It is also important to make note of an additional Phase II requirement explicitly called out in the checklist which requires specific room types needed in the facility: break/dining area, meeting conference area, and library. While the conference and break areas would most likely be planned in any such facility, the library function is often scrutinized and considered discretionary, especially when the project budget is exceeded. Make sure that your design team and facility staff are aware that this and other similar checklist items are a requirement and not a frivolous request.

Infrastructure requirements are cited several times throughout the checklist. It is important that the engineering staff on your project be familiar with not only the medical examiner facility type, but also with the NAME accreditation checklist, as there are numerous Phase II citations that pertain to mechanical, electrical, and plumbing engineering.

From a mechanical standpoint, the facility should be designed for both the effective ventilation of morgue odors from the autopsy and autopsy support spaces as well as ensuring that odors are undetectable in public and office areas.

Within the autopsy area, special engineering considerations for supply and return of ventilation air should be taken into account. Fresh, one-pass air should be supplied from the ceiling of the autopsy space in a smooth, laminar fashion. The air should be returned down low in the room with no return air grills on the ceiling to disrupt the laminar flow and churn the air. By supplying high and returning low (particularly on either

side of the docked decedent table), air that is travelling past the breathing zone is the cleanest air while pushing away any odor from the decedent down past the body and into the return air duct.

Electrical engineering is also critical to the autopsy area. One Phase II citation is for adequate lighting. "Adequate" is an ambiguous word, particularly when applied to autopsy lighting, as it can be handled in multiple ways. Some facilities utilize surgical or exam lighting that provides intense light to a focused area. In opposition to this focused light, some facilities may prefer that the overall ambient light in the autopsy space be relatively bright throughout the room. This can be handled with general ceiling fixtures. Again, defining "adequate" is necessary to assist the engineer in his or her design. One way to do this is to take a light meter reading in an existing space to determine a light level range that you would like to achieve and then discuss further how to accomplish this.

From a plumbing perspective, the NAME checklist requires that all fixtures have backflow prevention devices and that all sinks and drains, both in equipment (such as a sink station) and in the facility (such as the floor drains), are adequate not only for drainage but also for handling particulate. All drains should have some sort of clean out for catching particulate that are easy to access for regular maintenance.

Decedent handling is a unique portion of the design of a medical examiner facility. There are several citations within the checklist which pertain to the safe and respectful handling of a decedent. This begins in the drop off and intake area which should be designed with adequate screening to prohibit a casual observer or photographer from being able to witness this transfer. If the transfer occurs outdoors, consideration is needed of the type of screening necessary to prevent views into the area. This may include a canopy to prevent neighboring buildings from viewing the area from above.

Forensic Laboratory

If you have been through the accreditation process or through the Assessor Training program, you know the in-depth complexity of the International accreditation standard. On the surface, the majority of the accreditation standard is specific to the documentation and application of policies and procedures but there is also information that will impact the

design and construction of your new facility or facility renovation.

As you may know, the International accreditation standard through ASCLD/LAB is a combination of ISO/IEC 17025:2005 and the supplemental regulations by ASCLD/LAB which go hand-in-hand with the ISO standards. In addition, you may also have DNA audit documentation and your own requirements specific to your laboratory. If you have a breath alcohol group, you may also have the added impact of Test and Calibration.

Digging into the ISO documentation the most applicable section is *5.3 Accommodations and environmental conditions*. This is the prime area where the text points to the facility in its role in supporting forensic science. *"Laboratory facilities…shall be such as to facilitate correct performance of the tests and/or calibrations. The laboratory shall ensure that the environmental conditions do not invalidate the results or adversely affect the required quality of any measurement."* There are numerous facility design criteria that could impact the environmental conditions such that it could hinder testing.

For example, Trace is working with exceedingly small items of question: hairs, fibers, paint chips, and similar items are small and often lightweight. It is the weight of these objects that can be adversely impacted by facility design. How is the mechanical system supplying air into the laboratory? Where are supply diffusers located relative to the bench? What types of diffusers are specified? If the mechanical design is not mindful of such environmental concerns, you may end up with both sub-par working conditions and a compliance issue.

Also under section 5.3, sub-section 5.3.2 states, *"Tests and calibrations shall be stopped when the environmental conditions jeopardize the results of the tests and/or calibrations."* Exemplifying this is the post-amplification suite in DNA. The heat impact of the instruments in this room can be substantial and yet it is critical that temperature fluctuation in the room be tightly controlled to substantiate the findings of the instrumentation. Overheating can skew results and bring your findings into question. Similarly, it is important to track the environmental conditions to be able to provide proof that temperature fluctuations are not impacting results. How is the mechanical system designed to take this tight degree of

control into account? How can you use the building management system to provide reports of system integrity? Again, this space should not be treated like a general lab area. The project should have forethought in design to manage these critical requirements. Balancing the critical requirements is the need to maintain a comfortable working environment for the staff; just pumping additional cooling in the room to combat heat output is not a viable solution as this makes an environment that is too cold to be acceptable to staff. Knowledge of forensic facilities, critical thinking, and creative design on the part of the engineering team is essential.

A simple but often overlooked item is the need for storage for manuals, calibration and use logs, and maintenance documents within or adjacent to instrument areas. Section 5.5.3 prescribes that this information be "*readily available for use*". The more well thought out and designed the storage solution, the easier it is for the end-user to access ... and assists with statutory compliance.

There are also items listed in the ISO accreditation standard, which are suggested but not required, that impact facility design. One important example is found under Section 4.7 Service to the Customer. Note 1.a. discusses a manner in which to cooperate with the laboratory customer by providing that customer, *"…reasonable access to relevant areas of the laboratory for the witnessing of tests and/or calibrations performed by the customer."* That customer may be the police, lawyers from either side of a lawsuit, or other similar entities. While not required, how does one respond to such an accommodation? One concept is providing a review room in the front-of-house off of the lobby area, where analysts can meet with clients to review evidence and/or testing, either from a CCTV feed or from direct viewing of an item. Placing such a room off of the lobby allows for this cooperative service but does not allow further penetration into the secure laboratory area. You may not wish to address this issue since it is not required, but deciding how you are going to address items such as this in a new facility or renovation plan is important.

It is important that your complete team—architecture, laboratory, engineering, and even your contractor, if possible—have a good grasp and understanding of the accreditation standards that will impact the project. If you have an accreditation expert on your staff, assign them to work directly

with the design team to create a plan for your project which addresses all possible compliance issues. Your expert should be the compliance gatekeeper. Ask them to participate in project reviews at each milestone, specifically making a comparative review to the applicable accreditation standards. If you are unsure about the application of an accreditation standard, do not hesitate to contact the accrediting body for a clarification.

These are only a few examples of the potential planning issues that lurk within the pages of laboratory accreditation standards. This should provide you an overview to help you form your thoughts on how the built environment and the standards are often intertwined.

"It is not wise to violate rules until you know how to observe them." - T.S. Eliot

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