Tips, Tricks, & Traps to Avoid

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Air Barrier, Sealants, Coatings & Waterproofing

- **Trap to Avoid** - The NFPA 285 wall assembly testing is now being enforced in many places where it has not been enforced in the past. Hospitals should make certain architects designing their buildings build exterior wall assemblies with Air/Vapor Barriers and Insulation assemblies that have been tested to this code so their walls do not need extensive and expensive redesign at the last minute. Walls meeting NFPA 285 are safer and can reduce or slow fire spread though a structure allowing the additional time to contain and thus fight the fire.

- **Tricks of the Trade** - When building below grade such as basements and tunnels, current waterproofing technology like CCW MiraPly allows for installation of dependable waterproofing membrane in blindside applications. Blindside applications include waterproofing under basement and tunnel floor slabs as well as in walls on tight construction sites where the waterproofing is installed against the concrete forms. We often see waterproofing excluded or value engineered from these areas, which in some cases suffer water intrusion after construction with no way to install a waterproofing system effectively.

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Air Filtration

- **Tip** - What is the best way to assure that your facility is receiving the best IAQ, and more importantly, the level of filtration that you paid for? By specifying and using a filter that has a MERV-A rating that is equal to the required MERV rating. Why? Because many high efficiency filters begin to fail as soon as they start loading with dirt. The MERV-A rating protects you and your customers and assures that the filter will work as specified the day you take it out as the day you installed it as new.

- **Tricks of the Trade** - An effective way to meet the demands of budget cuts is to consider all costs attached to a purchase. For example, if you spend $100 on inexpensive pre-filters, the attached energy costs will be a minimum of $400 and as high as $700 per year. However if you invested more money (twice the price) into a higher quality energy efficient air filter, you could cut your energy costs in half and have enough energy dollars left to pay for your filter budget.

- **Tip** - What is the best rule of thumb about when to change your air filter if you base the change on pressure drop? Measure your initial resistance to airflow and multiply that number by 2.5. This is a best practice based on the cost of the filter, energy, labor, disposal, etc. For example, at 400 FPM the initial pressure drop of a high capacity pleated MERV 8 filter is .22” w.g. The optimum change out pressure drop is .55” w.g. (Assumptions are running 24/7 with a kWh rate of .05 to .10 cents).

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Concrete – Moisture Control

- **Tip** - Many concrete finishers will overwork the concrete surface to produce a very slick, smooth finish that is dark in color. This adds finishing time and cost to the concrete surface. This is not required and will create a surface that is dense and impermeable, making it difficult for flooring adhesives to adhere compared to a permeable surface.

In your concrete specification, add a section for finishing concrete that is to be covered with resilient flooring with the following language:

**Finish**: Smooth, hard, hand steel-trowelled finishing is preferred. Machine-troweled finishing free of trowel ridges is accepted.

1. Produce a tight float finish; the machine equivalent of hand wiping the surface with a steel trowel.
2. Avoid burnished and polished concrete surfaces that may impede mechanical bonding of subsequent coatings, toppings, underlayment, absorption of flooring adhesives, and floor finishes.
3. Finish to specified tolerances. Do not burn or overwork concrete.
4. Do not blacken or burn concrete surface with power trowel.

- **Trap to Avoid** – Verify the moisture testing on the concrete is done properly. Most technicians are not ICRI certified. This certification covers the proper techniques for moisture testing per ASTM-F2170, *The Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using In-situ Probes*. The most common mistake is testing before the building is climate controlled.

An improper test procedure leads to improper test results. If they are higher than the actual moisture level, you may elect to have a moisture mitigation applied to the concrete costing $3-9 per square foot. If the readings are lower than actual, you may elect to install flooring that will be subject to a moisture related failure in the future which will lead to removing the failed floor, moisture mitigation then replacing the floor. Costs associated with a flooring failure are difficult to predict since there may be lost revenue in addition to the repairing the flooring.

- **Tricks of the Trade** - On smaller projects with a fast turnaround (<6 months), utilize a rapid drying concrete with high early strength to take 1-2 weeks out of the schedule. The high early strength will allow the general contractor to get on the slab with equipment and materials in 2-3 days vs 7-10 days for conventional concrete. The rapid drying will eliminate any moisture mitigation on the project. This saves 4 days or more plus the COST of moisture mitigation system.

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Facility Information Management

- **Trap to Avoid** - Static Information – Hospitals and healthcare organizations spend considerable time, money, and effort with in-house staff and outside consultants developing information for:
  - Facility Condition Assessments
  - Electrical Assessments
  - Life Safety Assessments
  - Valve locations
  - Air Handler distribution

  Far too often, all of this information is developed and delivered for a specific project or need, and then abandoned.

  Healthcare organizations should put processes into place that will make information like this dynamic – so it’s always accurate and up to date. The next time a hospital needs to make informed decisions, facility details are at the ready, without the need to recreate a study or re-validate findings.

- **Trap to Avoid** - Information Silos – Every organization has individual departments that are tasked with specific objectives. Frequently, this results in a one group creating a standalone information database for their project. Moreover, it’s often the case that a separate department will eventually need access to that data; but without a global approach to information management, they may not even know it exists. The key to success is:
  - Use a central database that houses all facility information on one place
  - Provide authorized levels of access to anyone who needs it.

  This promotes collaboration, helps fulfill a company’s corporate mission and objectives, and drives economies of scale across the entire organization.

- **Tip** - Use Best-in-Class Solutions – All too often healthcare organizations try to make a rigid solution work to meet a specific need. This is most often seen with Computer Maintenance Management Solution (CMMS). Trying to fit space management, EOC rounds, Above Ceiling permits, etc. into a CMMS often results in inefficient processes that break down. Utilizing a flexible, best-in-class solution to address space, EOC, permitting, etc., and then integrating it seamlessly with existing CMMS, will enable an organization to get more value from the solution, and make the best use of time.

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Facilities Operations – Inventory Management

• **Trap to Avoid** - When it comes to stocking your facilities inventory, most hospitals focus on the convenience and insurance from having the items on hand, in case they may need them. But you have to balance that convenience with the costs of carrying inventory items in terms of time, money, and space. There are two approaches to this situation. With a simple replenishment model, hospitals just estimate what they think will need to stock on the shelves, and re-order when they run out. However, there are exposures in this approach:

  - Through our Consulting Services research, we have seen that only 50% of the items hospitals currently stock on the shelves are not need that often.
  - We have also found that 25% of the time, people cannot find what they are looking for, because it is in the wrong place, or just lost in the clutter.

That is the exposure in the simple replenishment model. If you simply buy the stock you think you need, and you use it up, you perpetuate these challenges.

• **Tip** - The “Best in Class” approach revolves around “true” inventory management, not replenishment. Hospitals do that by actively identifying and measuring inventory usage, and inventory levels, in an ongoing basis. They make adjustments to stocking levels, and add new items to shelves based on planning. This helps ensure the right items, are in the right places, at the right time. When they do this they find they can reduce their overall investments in relation to time, money, and space. In hospitals where these “Best Practices” are in place, they are able to save 25% per year in their inventory costs.

In order to take advantage of these potential cost savings, you need to first identify those items that you will need for convenience and insurance. You need to understand exactly how you use your inventory, understand their criticality, lead time, and supplier availability to determine the risk associated with not having the item in stock. Put your inventory into 4 buckets:

• **Fast items** – items that are high moving and stocked for convenience. You can justify stocking them because they have high, consistent demand.

• **Slow or non-critical** items – items that are not frequently used. You might decide to no longer justify keeping them in stock.

• **Inactive items** – items that take up a lot of space and cost a lot of money. They have not been used for 12+ months. It is best to remove them from inventory as this should not affect service levels.

• **Critical items** – items needed for emergency.
Next, analyze your inventory levels needed by identifying correct min/max’s to have in stock and return, or dispose of, excess inventory. For items no longer stocked, make sure you partner with a supplier who carries a vast inventory of products, so they can get them for you on an “as needed” basis.

Then on a regular basis, monitor the differences between what you are stocking and consuming, to make adjustments based on “real” usage. You will then see the 25% value that can occur from removing excess product expense (carrying costs), waste, and risk (stock outs).

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Fire Stop & Barrier Management Protocol

Managing barriers in today’s healthcare facility can be a real challenge. There is a multitude of processes related to barriers and in any given week, a variety of trades and hospital personnel come in contact with them. The traditional approach to handling compliance issues is totally reactive. This approach is costly and really doesn’t provide a true compilation of work being performed. Getting contractors back to make repairs after the fact is difficult, often leaving the facility to repair these infractions themselves. Improper penetrations in barriers continue to be one of the top 10 citations by inspection professionals. While code requires anyone penetrating a barrier to seal them to a specific standard, this is often incomplete, disregarded or misunderstood by those doing the installations. Maintaining the eSOC and PFI’s can be costly, not to mention making repairs to something that has already been paid for. So how do healthcare facilities get a handle on this perpetual nightmare?

- **Tip** - Take a proactive approach to managing barriers by implementing a Barrier Management Protocol. Start with a Standard Operating Practice for permitting of anyone entering a barrier.

  The BMP would also document all barriers and penetrations, report deficiencies and ensure quality control throughout closeout inspections. Ideally, this system would also allow for documentation of other processes in the barriers, such as dampers, doors, and extinguishers.

  The BMP should provide an accounting of who, what, when, where and how installations, maintenance and inspections in each barrier are being performed. Exact locations of these applications should be documented, providing the facility with a roadmap moving forward. These programs can be on an analog or fully electronic process. With tightened budgets, increased regulatory requirements, and reduced staffing, maintaining these barriers by implementing a comprehensive barrier management program saves time, money, and resources.

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Abuse or Impact Resistant Gypsum Board Assemblies

- **TIP:** Because the places most at risk for wall damage in medical facilities are high traffic areas, scheduling callbacks to repair walls, can be both a logistical and infection control challenge. Specifying abuse or impact resistant gypsum board will reduce the risk of damage to walls when gurneys, wheelchairs or people come into contact with them. Remember that the corners should also be abuse resistant. Polymer modified corners are more durable than traditional metal and paper corners and typically need less joint compound for finishing.

- **TRICK:** Often the area prone to abuse or impact is only the bottom 4’ of the wall. Therefore, specifying fire-rated impact resistant gypsum board on the bottom portion of the wall only reduces the risk of damage, and saves money. Fire ratings for the entire wall can still be achieved, by using fire-rated gypsum (Type X) that is not abuse or impact resistant on the upper section of the wall. If mold resistance is needed, a similar method using mold resistant type X with the abuse/impact board (which is always fire-rated) can also be specified.

- **TRAP TO AVOID:** When designing abuse or impact resistant gypsum board assemblies, do not specify light gauge (25 gauge) steel studs as this is a false economy and will eventually lead to installation failures. Additionally, the ASTM Classifications for Soft Body & Hard Body Impact Tests for these boards use the heavier 20 gauge steel studs as part of the tested wall assembly.

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Life Safety, Fire Protection, Engineering

- **Tip** - Get All Parties Involved Early – Many times projects go through the Concept, Programming, and even sometimes the Schematic Design phase without having the code, life safety, or other healthcare specific consultant on board to review the proposed plans. Design issues identified at this late stage can often be costly for the architect and/or end client because it typically requires reworking the floor plan or the program layout. Early involvement can be as simple as a few concept meetings to look at egress plans, existing conditions, occupancy concerns, effects of multiple codes of record on the project, and separation - compartmentation concepts.

- **Trap to Avoid** - Renovation projects many times involve utilizing existing compartments and existing life safety features. The architectural team for the renovation will typically utilize an existing life safety plan or fire protection features plan as a base for renovations. This is especially true when the renovation is not a full floor gut renovation. The potential pitfall is that many of the fire protection features plans are identifying what is considered to be required but not necessarily what is actually built. Often these plans have been adjusted over time to identify existing requirements without being based on the original floor plans. By doing this, life safety features that were originally provided and should be maintained are no longer identified. Remember that the Life Safety Code requires any existing life safety requirement that is beyond the requirements for an existing occupancy and would be required for new occupancies must be maintained. It cannot be reduced to match existing requirements.

- **Tip** - Know and document all codes of record and AHJ’s applicable to the project- Most healthcare related projects involve the local building/fire official(s), the State Department of Health, the Joint Commission, and the Center for Medicaid Medicare Services. Many times, the codes of record and modifications for each of these jurisdictions are not the same. Any work must balance between the most restrictive items between these codes or an equivalency/waiver must be obtained or utilized. Additionally, any equivalencies/waivers/variances that are sought on a project may require multiple submissions as each of these jurisdictions do not automatically recognize an equivalency/waiver/variance from one another. This will most likely involve early discussions with the AHJ’s as stakeholders in the project to clearly identify the required path that this project must follow.

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Hospital Bed Storage Solution

Storing empty hospital beds in corridors is one of the top causes for Joint Commission citations and has plagued hospitals for years. Even if a hospital is lucky enough to have a room to store hospital beds – the situation is seldom ideal. Finding and gaining access to a specific bed often involves climbing on and over several beds to locate the correct bed. Once the right bed is found, then the task of clearing a path begins, so it can be retrieved from storage. This time consuming process leads to damaged hospital beds and exposes employees to injury.

A better solution is to stack spare hospital beds in a secure vertical arrangement. Not only does this save valuable floor space, it removes a potential life safety issue from hospital corridors. Using a storage rack for hospital beds can improve the efficiency of a hospital’s maintenance department, and increases the number of beds available for patient use at any given moment. This has the added advantage of reducing the need for extra hospital beds, freeing up capital for other uses.

Hospital bed stacking is based on Last In - First Out picking (LIFO). The first bed is pushed onto the lift then raised, thus opening the space underneath it for the next bed. One person can do the procedure by simply pushing a button. Line one wall of a storage and maintenance space with vertical storage racks to store beds that are ready for use and on the other wall use storage racks for hospital beds awaiting service and repair. This reduces bed handling, improves inventory control, and improves cycle time to change out beds.

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HVAC Air Distribution Solutions

- **Trap** - Leed/VOC and duct sealants- current practices has the duct work being sealed and then wrapping the ends with plastic wrap to prevent debris from entering the duct work. Sometimes, the sealant is still wet and in sealing the ends with wrap will cause a terrarium affect within the ductwork causing fungi and mold growth. No or low VOC ductwork will support mold and fungi growth. You need a sealant not with zero VOC but with enough VOC's that mold and fungi will not propagate/grow on the sealant.

- **Tricks of the Trade** - Longevity of exterior duct sealing, UV and O3 can have a detrimental effect on exterior duct sealant. Sealant degradation can lead to water infiltration and loss of sealant efficiency in keeping the ductwork sealed. We have found by combining systems of a water based sealant as the main seal on the ductwork, followed by wrapping with a 30 mil foil faced tape for UV resistance will create a system with long-term performance in system efficiency.

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Lighting

- **Tip** - Always do a mock-up of the LED lamps you are evaluating. What is on paper may not translate to the performance you are looking for. Do not evaluate product just based on number metrics without seeing the lamp perform.

- **Tricks of the Trade** - Do not be fooled by high CRI product, 90CRI+. When compared side by side a lower CRI lamp can have better color rendering and be more cost effective.

- **Traps to Avoid** - Review warranty carefully. Some companies have warranties longer than they have been in business. A warranty does not prevent defects from happening, it’s just a “promise” to correct a defect. A good track-record for quality can be more important than an extended warranty.

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Energy Management – Intelligent Facilities Solutions

- **Tip** – You get what you specify. If the language in your contracts reads something like this: “The BMS system will interface with the Nurse Call system.” You will get very little functionality from your BMS provider.

“Shall be capable of” are the four most dangerous words in a construction specification. While not all contractors and vendors play this game, remember **specified ambiguity** gets you **delivered ambiguity**. You should use what are called “Use-Cases,” a term that comes from the IT software industry, which are worded descriptions of what you require your BMS contractor to deliver. Here is an example of one that would allow you to do patient area setbacks in a greenfield project.

**Patient Area Setback** – Setback control and energy saving algorithms shall be implemented in the healthcare environment through the Integrated Control Platform and the Admission, Discharge, Transfer (ADT) systems via Health Level Seven (HL7) protocols in the patient rooms. By understanding the bed configuration of each patient unit and tracking when patients are admitted, transferred or discharged, major temperature and air exchange adjustments occurs real-time when a complete room is unoccupied. Further integration with Nurse Call and Bed Management systems delivers additional savings by minor temperature adjustments when patients are scheduled out of the room for therapy or testing. All changes shall be tracked in the Integrated Control Platform for compliance and can be overridden in case a need arises. The integration with the Nurse Call system shall be able to override process. Additional integration shall be installed with the Nurse Call system to allow the air exchange rate and pressurization of a room to be altered based on scheduling requirements. Rooms designed with this functionality are also capable of immediate triage configuration should a crisis or pandemic situation develop in the community.

- **Tip** - Hold the construction and design chain accountable for the operating results of a facility. No engineer or architect has ever intentionally designed an inefficient facility. Nor has a construction manager intended to build one. Then how do buildings that are designed for high-performance end up performing poorly?

More and more owners are re-writing their contracts to hold design and construction teams accountable for the operating results. This is a natural step in the collaborative construction environment we’ve seen mature over the past several years. Technology and efficiency experts (such as Schneider Electric) can play a more significant role in sustaining the efficient design through the early stages of facility lifecycle.
• **Trap to Avoid** – Remember Value Engineering is good for the GC not the Hospital. If you are not part of the process of setting the standards and requirements for your new building, you are at the mercy of the GC and all the people in the food chain who are trying to squeeze dollars out of the construction process. Realize that the cost of building the facility is only 25% of the total cost of building and running the facility. The other 75% of your costs is to operate that facility. You need to be sure that those technologies that can improve your lifecycle costs don't get “value engineered” out of the bids.

• **Tricks of the Trade** - Predictive maintenance is the best type of maintenance strategy. Why? Reactive maintenance is conducting repairs after a failure occurs. This is the most costly of all maintenance strategies, it bears the highest risk and is the most disruptive to daily operations. Preventative maintenance is typically based on a time-oriented regime regardless of the condition of the equipment. Predictive maintenance is based on diagnostic evaluations. It is the least expensive strategy and is a proactive approach to maintenance. What happens is predictive maintenance tools monitor the condition of in-service equipment either continuously (online) or at periodic intervals. Conditions that can be monitored in electrical equipment include:
  
  • Transformers (monitor temperature, insulation breakdown)
  • Tap Changer (operating time)
  • Circuit Breaker (opening, closing, available magnitudes of incident energy),
  • Switchgear (temperature of connections, insulation condition),
  • Motors (starting time, number of operations, power, insulation breakdown),
  • Cable connections (insulation breakdown).

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Elevators, Dumbwaiters, Car-Lifts

- **Tip** – When designing medical office buildings and clinical care facilities consider making at least one elevator large enough to allow the transfer of a patient in a bed between floors. This will provide the ability and flexibility to put an Ambulatory Surgical Center above the ground floor.

- **Tip** – As healthcare providers seek to put outpatient care facilities closer to the population they serve, traditional office and retail buildings offer a creative alternative. Since rental rate for space on a building’s lower floors is significantly less than space on the ground floor or higher floors, consider installing a separate elevator and entry for patients. In addition a lower rental rate this has many advantages:
  - Provides patient convenience and privacy
  - Expands the potential number of possible buildings for consideration,
  - Allows for extended hours of operations
  - Offers a work around for when a building’s existing elevators do not meet healthcare requirements.

- **Tip** – Always call your elevator service provider if an entrapment happens. This can avoid liability claims on how the incident was handled. It also averts damage to expensive equipment by others.

- Tip – In most cases due to building codes, elevator lights stay on even if no one is riding the elevator. By installing an auto/off/auto/on lighting device, you can meet strict building codes and reduce your energy consumption by as much as 50%.

- **Tip** - Creating a healing environment requires paying attention to all that patients take into their bodies, including the air they breathe. With over 80,000 chemicals in use today, it is difficult to know what we are exposing our patients and our employees to within healthcare facilities without product oversight. To avoid potential toxins, it just makes sense to specify materials that have been certified against Cradle to Cradle’s Healthy Materials and/or the Living Building Challenge’s Declare programs.

- **Tricks of the Trade** – When space is tight consider using side-opening doors, this will allow you to comply with NFPA requirements for accommodating a stretcher.

- **Tricks of the Trade** – If you’re trying to get every square inch of leasable space out of your facility eliminate the elevator machine room (10 to 100 sq.ft.) by opting for a machine room-less design. Some versions event have the elevator control system inserted into the jam of the elevator doorway. This configuration minimizes the amount of room required for the elevator system, and provides
enough space back to the building to accommodate an additional storage or patient room.

• **Tricks of the Trade** – Keep an up-to-date set of guidelines and a “select or limited” group of people who can call in your “request for service-callouts.” By limiting who is authorized to call in the requests, you avoid false calls (running on arrivals) that are normally billable by your service provider.

• **Trap to Avoid** – Failure of obsolete parts can lead to lengthy down time and unexpected operating costs. Ask your service provider to give you a list of obsolete parts in your equipment.

• **Trap to Avoid** – Do not assume that hydraulic elevators are not a sustainable option. While petroleum-based biodegradable hydraulic fluids are available, there are other choices. Enviromax™, which made from canola oil, is the elevator industry’s first high-performing vegetable-based fluid. It is rapidly renewable, readily biodegradable, and has minimal effects on the environment. When tested for aquatic toxicity by an independent laboratory the results exceeded government standards. It is the only biobased product certified by United States Department of Agriculture.

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Commercial Roofing Systems

- **Trap to Avoid** - Assuming that a white or highly reflective roofing membrane, providing an ENERGYSTAR rating or LEED point is the proper solution for every building. Each roofing system is different and needs to be designed based upon its’ unique requirements.

  **Why** - Installing a highly reflective white roofing membrane in northern climates can actually produce a heating penalty, prolong the presence of snow & ice, and may lead to increased levels of condensation below the membrane. The roof system, not just the roof membrane, should be specified based upon all the factors applicable for the specific building type, usage, and climatic conditions.

- **Trap to Avoid** - Assuming that the roofing system warranty, issued by the manufacturer, equates to the expected service life of the roofing system.

  **Why** - While a warranty issued by a reputable and financially stable roofing manufacturer is a great start and provides a sense of security for a building owner, many components are required to ensure a roofing system meets and/or exceeds its’ expected service life. Sound design, qualified contractors, high quality materials, inspections, and ongoing preventive maintenance programs all contribute to an increase of service life.

- **Tip** - If there is a possibility your new roof is known to, or at some point will, act as a “platform” (whether for scheduled maintenance traffic, a rooftop solar installation, future construction work, etc.), extra care should be taken in the system design.

  **Action** - Specify and install a system cover-board to provide additional durability and support. The minimal additional installed cost will outweigh the future cost of repairs to damaged membrane and insulation.

- **Tip** - When undertaking a re-roofing project, remember, an energy savings strategy is a holistic approach which involves several roof system components and not on a single component.

  **Action** - Depending upon the year of the initial roof installation, upgrades to air & vapor barriers, insulation R-values, details, and roofing membranes may all provide opportunities for energy upgrades.
• **Trap to Avoid** - Focusing on the initial installed cost of a roofing system versus the cost of ownership.

  **Why** - Far too often, a roofing system is chosen based upon the low bid and/or low cost solution, ignoring the simple fact that it must perform 365 days per year protecting all of the assets within the building, while ensuring the continuity of ongoing operations. Cheapest first cost is not always the most economical in the long run.

• **Tricks of the Trade** - Assign a "roof monitor" for the building, who grants access and keeps track of visitors to the rooftop.

  **How** - If a building owner can monitor rooftop traffic, and the visitors know they are being tracked, there is a better chance that problems associated with damage to the roofing system will be avoided.

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Aluminum Storefront Entrances, Curtainwall, and Windows

- **Tip** - Coordinate your Aluminum Storefront Entrances, Curtainwall, and Window specification with the Glazing Specification. Make sure that the U-value, SHGC, and VT specified in the Aluminum Storefront Entrances, Curtainwall, and Window specification is achievable with the glass that is specified in the Glazing Specification. A different framing system or insulated glass unit could be substituted. This may throw off the budget for the project or may affect the design of the HVAC system.

- **Tricks of the Trade** - Utilize Glazing Contractors when you need assistance in budgeting a project. A Glazing Contractor will be able to provide budget pricing for all aspects of the fenestration – aluminum framing, glass, labor, equipment, etc. Projects are now designed with LEED in mind. Products such as sunshades and light shelves could be valued engineered out of a project due to costs, which were not properly budgeted, thereby affecting the LEED certification.

- **Traps to Avoid** - Avoid using “boiler plate specifications”. Fenestration systems today are asked to do a lot; provide high thermal efficiency, mitigate the effects of an explosive event, minimize the vulnerability of wind borne debris in hurricane force winds, and provide greater resistance to sound transmission. Writing a specification that contains specific project requirements is critical to minimize RFI questions and obtaining proper bid scopes.

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Modular Interior Wall Systems

- **Tip** - Ask for speed to market, a standardized brand across multiple locations, and controlled level of fit and finish. With the recent move to off-site primary care, ambulatory care and freestanding emergency centers speed to market and control of one’s brand is critical. Contractor A will build differently than Contractor B, so by manufacturing everything in a controlled setting you guarantee identical aesthetics and, most importantly, a consistently high level of fit and finish. Clean and rapid tilt-up construction also enables the hospital to open up faster and begin generating revenue sooner. Controlling the cost of construction across various markets is also very important. See #4 (Traps to Avoid: Standardize your pricing) to ensure you are taking advantage of cost benefits associated with manufactured construction.

- **Tip** - Put those walls to work. Choosing manufactured construction over drywall lets you easily put your walls to work as more than space dividers. Use your prefabricated wall system to support cabinetry, medical equipment, hand-washing sinks, and technology. Stop drilling holes to fasten your equipment to the walls; instead, rely on the wall’s modular internal structure to support the tools you need. Those supports are moveable and easily accessible, so you are not patching and repairing surfaces when equipment needs to be moved. Surface tiles are also easily removed, letting you access and move your imbedded technology, medical gases, and hospital grade electric without creating drywall dust. As an added benefit, this approach helps environmental services clean and disinfect more efficiently by getting cabinetry off the floor and minimizing horizontal surfaces.

- **Tricks of the Trade** - Build in adaptability and accessibility for change in the future. If there is one thing we do not know, it is what tomorrow’s technology will bring. Advances in medical and audiovisual technology are changing how you do business. No one has a crystal ball, so the best way to prepare for this is to build in the flexibility to adapt to these changes, whenever they come and whatever they are. If you need to change a monitor, take the old one off and clip in the new one. The contracts for the soap and towel dispenser change again? No problem. Need to add another outlet? Pop off the tile, run the new line, mill a new hole in the tile in the shop, and place the tile back on the wall. Need to check for an RO line leak? Just take the tile off and look. Accessibility to your ceilings has always been important, and now easy accessibility to the walls is equally available. Manufactured construction allows for quick and clean changes without having to fuss with drywall. Conventional construction modifications and remodels take time and require ICRA attention due to drywall dust. Remove this from the equation while adding benefits that allow for future adaptability and complete accessibility to your walls.
- **Traps to Avoid** - Standardize your pricing. Manufactured construction lets the client know the true cost of their interior build-out down to the penny, no matter when the project is being executed or what jurisdiction the project is in. The price does not fluctuate over time, unlike conventional building materials. What will drywall cost in a year? The costs stay the same no matter where the project is: NYC material costs will be the same as Syracuse or Buffalo. A direct line-item comparison to conventional drywall construction costs will not give you an accurate picture, because a manufactured construction solution impacts many CSI divisions and will include additional items such as medical gases, healthcare grade electric, technology, and data already integrated in the factory setting. Get all the parties involved and together early in the project (Integrated Project Delivery) to see the true impacts on cost and scheduling. Costs of electrical, data, med gas, flooring, ceilings, labor costs, and even the reduced number of dumpster pulls and cleaning and protection of the site should be reviewed. Typical manufactured construction installations cost less or are cost neutral when compared to building out that space conventionally. Integrating all of these elements and devices breaks the linear process of conventional construction and shortens the time frame. On a conventional construction job site, one trade must wait for the other to complete their task before they can begin their work. When one trade falls behind schedule, so do the other trades. Manufactured construction dramatically reduces this risk. In conventional construction, 30% of the costs of the project often goes toward material and a whopping 70% goes to labor. With a pre-engineered solution, these pools are switched: 70% goes toward the tangible elements in the space, something you now own. Another perk? As manufactured construction solutions are not permanently fixed to the building, they depreciate as if they were furniture!

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Modular Prefabricated Components

- **Tip** – Take the time to visit the modular/prefab manufactures facilities before contracting. Seeing the facility first-hand will reveal several critical considerations including QA/QC processes, plant capacity, production efficiency, staffing, etc. As you will see, plant capacity and production/quality processes will vary from company to company. Make sure to review each manufacturers portfolio of completed work, financial strength including bonding capacity (do not be afraid to ask for financial statements), and take the time to interview the management team to determine the company that is the best for your project.

- **Tip** – You cannot start too early when considering prefabrication. While this may sound obvious to most however many components that are not typically considered for off-site prefabrication can be included in the project if they are considered early enough. One of those components is modular patient bathrooms that if incorporated early into the design can not only help reduce onsite waste related to the bathroom construction by up to 50% but can also reduce the overall project schedule and help control job cost. It is important to review this option and include it into the early documentation – as early as schematic or design development. Fully complete prefabricated patient bathroom units should be incorporated into the Specifications (typically Division 13) to ensure all bidding trades understand their scope of work.

- **Tip** – One of the keys to a successful prefabricated component is standardization. The more standardized the design, the more efficient the manufacturing process and therefore, the more cost effective to the hospital. Make sure to maximize the standardization of both materials and layout. This does not mean everything has to be the same or in the case of bathrooms, the modular manufacturer does not dictate the design and finishes. Modular bathroom manufactures provide custom bathrooms as per the design and specification of the owner and architect.

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Flooring

- **Trap to Avoid** – Often, flooring contractors are pushed to install floor coverings before achieving proper jobsite conditions. A good example is when the building is not yet climate controlled. Without proper jobsite conditions all moisture testing is unreliable. This can create major problems for all resilient floor-covering products. While this is frequently an attempt to get the project back on schedule, it is a great disservice to the end user. Since the problems produced by premature installation typically, do not occur until after the end user has accepted the project.

- **Tips** - To ensure proper installation the general contractor and flooring contractor must comply with the manufacturer’s installation instructions. The installation guidelines for most resilient manufacturers are similar and consistent with general industry standards. However, if an issue arises - not complying with manufacturer’s specifications often leads to a subpar installation. Identifying potential installation issues early in the project can allow all parties to work together to resolve those issues and avoid costly problems.

- **Trap to Avoid** - Not understanding the true differences between price and cost can be a very expensive lesson. So often, flooring decisions are made based around the initial price and not what the material is going to cost in maintaining its appearance. Many Healthcare professionals are now specifying resilient flooring with “No Wax” or “Occupancy Ready” manufactured applied finishes. This allows the product to be in service after installation without any additional finishing expense. In addition, flooring with an “Occupancy Ready” finish allows for years of maintenance free (no Stripping & Waxing) performance when the proper cleaning routines are followed.

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Information Technology Installation – Modular Approach

- **Tip:** Rather than suffer the high cost, disruption, and uncertainty that accompanies planned or unplanned IT work consider a modular “plug and play” alternative to the traditional server room or IDF.

- **Tricks of the Trade:** If you are remodeling, moving an existing operation, planning new facilities, or just upgrading IT hardware the modular approach, such as the Netshelter CX, allows IT equipment to be pre-installed, tested and certified off-site, then wheeled into place. The benefits of this “plug and play” solution include:
  1. New IT equipment can be up and running in minutes rather than days.
  2. Because the units can be preconfigured to include power conditioning, internal UPS, cooling, and many other features - costs and overhead normally included in a general contractor’s scope of work are avoided.
  3. Valuable floor space is saved since there is no need for a dedicated server room with separate air conditioning or venting.

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Solid Surface Material

- **Tip** - Interior wall cladding is an excellent use of solid surface especially in high traffic corridors, operating room design, and environments where ease of maintenance and life-cycle costs are important. You can create seamless wall panels which do not trap dirt, debris and offer more efficient cleaning and decontamination. Investigate new applications and systems. Solid Surface is now used in healthcare millwork and modular cabinetry creating seamless furniture and headboards which are easy to clean and maintain.

Also, get the most out of your designs. For maximum performance in healthcare applications – use rounded edges, seamless designs, and coved joints whenever possible to maximize ease and effectiveness of cleaning

- **Tricks** - Solid Surface can be used in renovation to cover ceramic tile reducing construction costs and limiting down time for patient and operating rooms. Solid Surface shower pans can be custom made to fit existing plumbing, reducing expensive construction costs. For decorative touches in lobby areas and public spaces consider using decorative wall panel systems which interact with both natural and artificial light systems.

Also, not all solid surface materials are created equal – solid acrylic surfaces have the best long-term performance and are the most versatile to fabricate. Additionally, when choosing veined aesthetics be sure that your selection is from a manufacturer that provides veining all the way through the surface – not just surface effects that are only skin-deep and will disappear as they wear.

- **Traps to Avoid** - Remember that dark colors and higher gloss specifications will show more wear and use over time. For high traffic environments consider using lighter colors. Don’t worry…solid surface can be resurfaced to renew the original finish.

Finally, always use a certified fabricator to manufacture your solid surface products. Fabricators trained by DuPont and its partners as certified fabricators are most likely to deliver the results you expect at the price you want. Remember there is a difference between the best overall value and low price - if you’re not careful you may get what you pay for!

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Sound Masking – Speech Privacy

- **Tip** - When dealing with acoustic speech privacy remember to fill the ear of the listener not the talker.

- **Traps to Avoid** - Creating a great acoustic environment is the combination of the ABC’s (Absorbing, Blocking, Covering) not the over addition of one with lack of another. Look at all three contributions before making a change to address the lack of speech privacy.

- **Tricks of the Trade** - Evaluate the design based on potential acoustic and speech privacy concerns before construction. Create a team of industry experts on walls, doors, acoustical ceiling, HVAC, sound/sound masking, and your business to look over the design, as it will function. Talk through the pros and cons of the overall design, materials, technology, and flow to make decisions based on additional knowledge.

- **Tip** - Sometimes the right question to ask your team is “What questions should we ask ourselves?” Especially in the design or development stage. Most project we know ensemble groups of experts; Designers, Product Managers, Property Managers, Project Managers, Consultants, etc. Most of worked on more than your project, it is OK to ask, “What have you seen that we should look at?”

- **Tip** - When designing, evaluating, buying a sound masking system- please make sure that the capabilities of the system match your needs for both the short term and long term. Adaptability to change of walls, furniture layout etc.; adjustability to every devices if the need arises without sacrificing performance; for the hospital patient area the system should be controllable fully via software rather than manual adjustment.
Signage and Wayfinding

- **Tip:** Make sure that long-term maintenance is a primary consideration when selecting a product and vendor for your signage program. The obvious here is to make sure you partner with a reputable and stable sign company, one that will be around to service your project for the long-term, but there are two less obvious aspects to this tip:
  1.) For healthcare facilities, it’s always wise to choose a sign product that is modular so it can be easily updated over time. Ideally, select one that can be updated in-house with a laser printer. There are a number of good systems that offer this feature.
  2.) Even if you select the best possible sign system and vendor, in order for your sign program to look good and be effective for the long term, someone at the facility level has to take ownership in it. Signage maintenance, especially at a large facility, can virtually be a full-time job so there needs to be a sign management plan in place and someone charged with routine inspections, ensuring proper cleaning, fielding new sign requests from the hospital staff and managing reorders with the vendor. If sign program maintenance is left up to individual departments within the hospital, it will not work. The original image of the signs will not be maintained, the information communicated by the signs will not be current and the consistent look that is so vital for a successful wayfinding program will be lost.

- **Tricks of the Trade:** Understand how to cost-effectively enhance the design of your sign program. With more focus on HCHAPS scores and “the Patient Experience,” there has been a trend in signage to incorporate high-end decorative materials for more of a resort-like design at the facility.

  Generally, design firms choose to incorporate materials such as 3-Form, Lumicor, Wilsonart, and Formica into their designs to accomplish this. These are all very good-looking, high-quality materials, but they can often add 40-50% to the overall cost of the sign package.

  As an alternative, inquire with your signage partner or designer about the option of simulating those decorative materials with direct-print technology. Most reputable sign companies have direct-print capabilities and can create looks very similar to the woods, metals, patterns, and other decorative materials being used, at a fraction of the cost. The end result may not be an exact match, with the same degree of durability (as needed for wall coverings, furniture, etc.), but for signage applications, the quality and look will be more than sufficient…and will save you lots of money.

- **Traps to Avoid:** Don’t move forward with a sign project without making sure your vendor and/or your sign designer is knowledgeable about the latest ADA & Life Safety requirements for signs.
ADA
To say that all the requirements are confusing is an understatement, but non-compliant signs can cost you big money should you be cited during an inspection or faced with a lawsuit by one of your visitors or patients. Unlikely, but why take the risk?

The 2010 updated ADA Accessibility Guidelines took effect on March 15, 2011 and became mandatory on a national level for newly designed or altered facilities in March of 2012.

The rules and specific details regarding signs are overwhelming, with requirements such as certain stroke widths for tactile copy, only certain fonts, specific inter-character spacing for tactile characters, very specific mounting locations for ADA signs, specific rules regarding pictograms and more.

Working with a sign company or sign designer who doesn’t fully understand the ADA requirements can cost you in three ways:

1. You could be using tactile and Braille signs when not necessary, costing you approximately 30%-50% more than non-tactile signs.
2. You could not be using tactile and Braille signs when they are in fact required, opening up the risk of a citation or lawsuit.
3. You could be providing tactile and Braille signs but in a non-compliant manner, also opening up risk of a citation or lawsuit. Don’t fall into the trap of thinking ADA requirements are straight-forward or don’t really apply to your project. Have a conversation with your sign vendor or designer on the front end to make sure they have a thorough understanding of all the latest ADA sign requirements. Making tactile and Braille signs compliant will not cost you any more than making them incorrectly but could save you big money and headaches in the long term.

Life Safety
Life safety signs, including signs pertaining to fire exits, stairways, evacuation plans and in case of fire signs, also fall within the overall ADA requirements umbrella but are more specifically regulated by the Life Safety Code. The LSC is updated every three years, but it is up to states and local governments to decide which version of the LSC and what aspects of it they will adopt.

This makes things a little confusing. Further confusing the issue is that enforcement jurisdiction varies from location to location. A safe bet is the local fire marshal, but enforcement could also be carried out by the Joint Commission, the building official, state health care licensing agency, Centers for Medicare and Medicaid Services (CMS), etc. A good starting point to learn more is your local fire marshal, but your signage partner needs to at least have an awareness of the LSC and what signs are impacted. They should also be willing to assist with learning what specific codes apply for the life safety signs in your facility before moving forward with sign production.

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Sharing Lessons Learned

- **Tip** - Plan, Plan, Plan. Without a doubt, in these times with capital being used by health systems to sustain other business components, forming a plan, reviewing it against business priorities continuously and being able to answer that “What if we had funds available, what would you do with them?” question is paramount to the organization. Establish a plan, review it often and be ready to move forward on short notice.

- **Tricks of the Trade** - Stay informed about your business – the real business – how your organization is doing in comparison to other healthcare providers in your markets. Know the statistics – Revenue, Costs, percentages, Patient Satisfaction Survey results, etc. All of these may seem non-essential to our job of providing the environment, but they are a direct line correlation to resources available to us and how our creativity with solutions may positively impact the business. Know your business, not just how to Plan, Design, Construct and Operate the buildings!

- **Traps to Avoid** - Stay focused on the Goal. Too often the “noise” surrounding our workday and short notice distractions can have dramatic effects on long-term goals if we don’t remain focused. Create a visual reference – bar charts, images of the project, stated financial/schedule goals and post them where everyone can see them conspicuously. They serve as continual reminders of the larger picture – that Goal that may seem otherwise too elusive.

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The Owner’s Perspective

- **Tip** - As the Owner, we think we know what we want, but we encourage you to challenge us. In addition, tell us *ahead of time* when critical decisions are needed.

- **Tricks of the Trade** - When it comes to equipment vendors, always make sure you talk to the sales personnel, the engineering personnel, the technical personnel, and the service personnel before buying.

- **Traps to Avoid** - When working in a team, don’t try to hide bad news. Be upfront, honest, and early with the news and let the entire team help with the challenge.

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