DATA AND TECHNOLOGY BY PAUL L. HUME, AIA, NCARB, LEED AP

It's All About the Data

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When I was asked to write an article on the "top technology changes in facilities planning (or design, or maintenance, etc.)" my mind was immediately flooded with ideas such as the methods for determining the best software, best practices for implementation, lessons learned from these efforts over the years, and what's coming next and why, to name a few. However, while the items I just mentioned are important, they are all driven by one overarching thing: **data**. Having started my career hand drafting, then moving to Computer Aided Drafting and Design (CADD), and finally to Building Information Modeling (BIM), it's clear to me that what we are really seeing is an increase in the availability of and the need for data. Specifically, data that can and should be used to make not just the design and planning phases more informed and efficient, but also to improve how buildings are built and taken care of throughout their life cycles.

In the past, hand drawings were essentially visual data, plans, details, sections and notes working together to convey the general intent of the design. However, due to the complexity of materials and product options, a specification manual was required to document all the specifics of items identified in the drawings, including acceptable manufacturers, tolerances, finishes, and so on. In the early 1980's, CADD become available to the design and construction industry (prior to this CADD programs were generally created by companies for their own use and incredibly expensive) and promised the ability to provide more data in the drawings and hopefully improve efficiency. However, adding and extracting that information was tedious and frankly so inefficient that for the most part many continued to produce drawings and specifications by hand. This resulted in a set of drawings (each sheet a separate file) and a set of specifications, all provided in two-dimensional format.

Coming back to the present, BIM offers some truly promising ways in which we can use and access data. During design, the model can be propagated with information such as materials, finishes, furniture and design parameters such as ADA clearances and code requirements. As the design is developed, data such as room area, space volumes, and the number and types of doors can be scheduled accurately. Models from other disciplines can be combined with the architectural model to perform clash detection, which can help reduce conflicts prior to issuing the contract documents. The model can further be used for energy modeling and to optimize/track LEED requirements and ultimately as a design tool to represent what the building will look like three-dimensionally to the owner.

During construction, the model can be used to generate shop drawings, perform construction clash detection and access additional data such as specific manufacturer information. BIM also helps facilitate building construction by allowing the contractors to visualize the building. In other words, they can see the finished product before it's built.

One promising technology is referred to as Augmented Reality (AR). Microsoft HoloLens is a great example of how this technology may someday change the way contractors work by allowing them to visualize what is to be built. Although it is years from being ready for widespread use, it's not a great leap to see how this technology can be used. The following URL shows an example of its possible use: https://www.youtube.com/watch?v=UeorGJNjTpM.

The data can then be used by the owner post-construction to manage and take care of the building. Data can be imported into facilities management software and used in

other ways. The following URL shows what may someday be possible for maintenance personnel: https://youtu.be/XlkSV50bYyU.

To continue to make a case for using post-construction data, the first recommendation of the 21st Century School Facilities Commission's report dated January 2018 is:

"Recommendation 1: The State should conduct a statewide facility assessment that will enable local education agencies (LEAs) to regularly assess school facilities in a uniform manner statewide. The integrated data system, to be known as the Integrated Master Facility Asset Library, should be managed by the State and the State should provide access to all 24 jurisdictions using a cloud-based system. The assessment and integrated data system should be done by an outside vendor initially and, to the extent feasible, draw from existing data sources that document the condition of school facilities in the State. The State and LEAs should continually update the facility data. The LEAs should work with the State to identify the data elements that should be maintained at the State level, utilizing existing reporting sources such as the Educational Facilities Master Plan and the Maryland Association of Boards of Education (for LEAs that participate in their insurance program) for data reporting to the extent possible. Once the initial facility assessment is completed, the results should be shared with State and local officials, including LEAs, county governments, IAC members, and legislators, a group of whom should determine collaboratively how the results should be incorporated into funding decisions."

The impending implementation of this integrated data system further supports the need for owners, architects, engineers, contractors, and now the state of Maryland to develop standards to accurately capture building data for future use and hopefully make things just a little more efficient.

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