Information Overload:

In Construction, New Data and Technologies are Everywhere

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It was not so long ago that building codes were simple, could all fit on a bookshelf, and could be owned for a modest sum. Building plans for individual projects were drawn or printed on large-format paper, and specifications were printed letter-size so they could be carried to and from the project site.

Contracts and their addenda were simple, and sometimes were not even in writing. These documents roughly defined what was going to be built. As a project unfolded, we had RFIs (Requests for Information) and their responses, payment applications, change orders, correspondence printed on letterhead, periodic inspection memoranda—and the best builders maintained a daily log and formal meeting minutes. That was about it. The entire file for a large project could fit on a conference table. We could see the whole thing right there in front of us.

And the construction itself was simple: Buildings were like sticks and stones stacked neatly; not like sophisticated, manufactured giant machines.

TECHNOLOGY TODAY

Times are changing, and, since the 1990s, there has been an explosion of complexity. Even residential remodeling projects have more data than we can print and put on the conference table, so we can no longer see and know everything. The tsunami of data includes electronic documents in myriad file formats, including PDF, numerous image formats, CAD, BIM, text file, Word, and Excel.

Some formats are industry standards, but some are proprietary, including virtually all building design and financial data. Communications are from many sources, including meeting minutes, letter mail, fax, email, text messaging, social media messaging platforms, and more. Many of these data sources have password protection.

Building codes, standards, manufacturers' instructions, plans, specifications, and documents of many types have turned into an endless series of links to even more information sources so that no person or organization can possibly read all the referenced information related to a complex building project. Some of this information—especially those from trade organizations or standards-setting bodies—referenced by the building code and project specifications requires payment for access.

And no organization is great at file management. Electronic files are always a mess. There is no prevailing mechanism for version control of files, so each party deals with this in its own way, if at all. We often end up with innumerable versions of only slightly different files, and there is no simple way to identify duplicates. This is all true for any single party to a construction project.

In addition to the volume of data, different electronic data requires different specialized knowledge just to access, let alone understand, it. Take, for example, CAD (Computer Aided Drafting) or BIM (Building Information Modeling) files from the designer, or financial data from the innumerable variety of commercial systems in use today. In addition, some of the most sophisticated firms have developed their own information systems, where the information is functionally inaccessible without the cooperation of that organization, which may be a party to the claim.

Volumes are being written regarding the many aspects of building today becoming dramatically more complex than ever. We expect buildings to be energy efficient, high-tech, low maintenance, infinitely durable, and cost effective. It is a tough business.

CONSTRUCTION TECHNOLOGY AND CLAIMS

When a complex building project turns into a claim, we end up with files from many parties. This creates a functionally ungovernable swamp of data. Considering many top lawyers and expert consultants cut their teeth in the 1990s and before, some are woefully ill-equipped to quickly and cost-effectively turn these "project piles" of data into usable, shareable project files.

This makes it easy if a party wants to play hardball and make life difficult and expensive for opposing parties. But, even for parties with no ill-will, there is an ever-expanding volume of files that will have to be included in the discovery process, as well as costs for discovery and document review. There are also indirect impacts such as the potential for evidence spoliation when the data is not sufficiently maintained when claims arise. These issues are likely to expand and increase the amount of time the process will take, increasing costs. Sophisticated parties will be able to "cherry-pick" from a large and difficult-to-comprehend dataset to support their arguments, ignoring evidence that might detract from their case. The buried "Pinto memo" may never be found by parties that lack resources and sophistication.

FILE AND PROJECT MANAGEMENT SOFTWARE

The market's response to this explosion of data has been proprietary, cloud based, multi-platform file/document and project management systems from industry giants such as Procore, Autodesk, and others. The idea is that these systems become a "single source of truth" (SSOT) for all information. The answers to all of the "who, what, when, where, why, how, how much, and how many" questions should be in the system, somewhere.

Systems can store all of the different media types. The data is input by various devices, including office computers, preferably in a native digital format or, as a last resort, scanned or photographed. In the field, data is input from laptops, smartphones, and tablets, including text, photographs, video, and proprietary formats for marked-up documents. Contracts, correspondence, daily logs, and meeting minutes can all be managed, stored centrally, and shared easily.

The most complete, sophisticated, and integrated systems include features for:

Scope of Work: Plans and specifications, in their evolving versions, have a place in the system, in addition to a tool for plan markups, sharing, and RFIs and their responses. Inspection checklists, photographs, notes, and delivery to applicable parties is integrated.

Budget and cost controls for the prime and subcontractors, including documenting changed conditions, time tracking, and tools for comparison of plan to actual. Payment applications can be made directly.

Schedule tools for Gantt, CPM, and pull planning, and updating the plan compared to actual.

Unfortunately, the data is only as good as the input. GIGO prevails: Garbage in, garbage out. So far, the files we have seen in claims are frustratingly incomplete. When depositions of project players are taken, we learn about workarounds being used in the field. We find out about paper processes, finances tracked in a legacy system, side agreements, communications via text or social media apps, undocumented telephone calls, emails that do not make it into the system, photographs on personal devices, and more.

Consistency of execution is the hallmark of organizational maturity in any business. The struggle will continue in construction claims because the spectrum of maturity is wide: Some project players are sophisticated, and some dramatically less so. Some parties now mandate the use of sophisticated software systems, but reaching a level of consistency in execution remains a struggle. The use of these systems creates a dramatic improvement in the availability of project data, but the explosion in volume is outpacing that improvement.

The level of sophistication of contractors, lawyers, and consultants in using these platforms is a driver of cost and effectiveness in the claims process. Sophisticated players can search electronically to find critical information that might otherwise remain buried but for the luck of someone combing through thousands (or millions) of records.

BIM AND OTHER ELECTRONIC DESIGN TOOLS

BIM is basically CAD that is supercharged. According to Wikipedia, BIM is "a process involving the generation and management of digital representations of physical and functional characteristics of a facility. The resulting building information models become shared knowledge resources to support decision-making about a facility from earliest conceptual stages, through design and construction, through its operational life and eventual demolition."

BIM is meant to begin with the designer, be added to by the builders, and maintained through the life of the building by the owner's maintenance personnel. 3D BIM is a three-dimensional model. 4D BIM (adds scheduling or "time." Think: Einstein's Space-Time Continuum). 5D adds costs (budgeting, estimating, and actual costs for construction). 6D BIM includes all aspects of lifecycle management (maintenance and improvements).

Litigation that includes issues related to BIM has already begun. One example was a case involving a failed attempt to apply fully-realized 3D modeling on a $60 million public works project. The intent was to model the construction before building it on-site, including all key subtrades modeling their own work in the shared BIM, hosted and coordinated by the construction manager.

Things did not go well. Many parties did not have the in-house sophistication to model their own work. A single trade contractor made a BIM-related $5 million claim that did not resolve until after depositions. The parties hoped to streamline the project and allow sharing of information, but it turned into a problem for everyone.

At the much more practical level, the market has delivered, and we are seeing, in claims, the use of enhanced PDF file systems, such as Bluebeam. The simple versions of these applications are limited to graphic communication and on-screen quantity take-off tools for estimating. This alone is very powerful compared to estimators using rulers and colored pencils, which are inherently flawed by relying on humans to accurately measure and calculate.

At the high-end, these systems allow a SSOT for plans and specifications where the drawings are no longer large format printed plan rolls; day-to-day use on site is with hand-held tablet computers. There has traditionally been a problem of making

sure the workers on-site have the most current plans. With a system like this, everyone always has the current version. These systems have built-in tools for the contractors to communicate questions and answers to the designers and one another.

However, these systems may limit the ability to "see the big picture and the details" the way we can with large-format printed plans. And, of course, this does not solve the problem of mediocre designs. We see claims where the workers are on-site with current plans on tablets, but the one-dimensional details they are trying to build in our 3D world are no better than they were in the 1980s.

Once these projects reach the point of litigation, we have to work backward through time, through these proprietary programs, as well as through traditional RFIs, change orders, and correspondence for each and every issue. The amount of sophisticated investigation can become cost prohibitive for all but the most expensive issues.

IMAGING TECHNOLOGY

In 2007, the iPhone was introduced with its usable camera—a hinge-point in society and business. Now, smartphone and tablet-based applications are virtually everywhere in every industry, and indeed are used daily in construction and construction claims. The power to document is obvious. The difficulty of gathering, organizing, interpreting, and using this tsunami of data is where all the difficulty (and expense) lies.

Drones with still and video cameras have become all the rage in many industries. Although they are now commonplace in construction projects, and gaining popularity in forensic investigations, we are only starting to see projects in claims that have course-of-construction drone footage. Privacy concerns and having proper FAA authorization will be unfolding considerations in litigated matters, let alone coverage issues.

Like all video, drone footage is tough to use in analyzing claims, as even though it is easy to capture video, the reviewing and editing is cumbersome and requires specialized skills that few lawyers or expert consultants have. At some point soon, the data captured during construction will be searchable by date and specific locations, but we have yet to see this in claims.

Matterport is a proprietary camera+software combination that gained popularity in the real estate industry for allowing creation of virtual walk-throughs online. For construction, and especially claims, Matterport is a tool to document the conditions of a property at a given point in time. The camera is expensive, and specialized training and a subscription to the service are required, so widespread use is not likely.

For projects that are halted for some reason, Matterport is perfect. The system can capture almost every square inch of a building interior, at the rate of approximately 1,000 square feet per hour, depending on the complexity of the building. This is far faster than a thorough forensic investigation can be executed, and the ability to "walk through" afterward allows us to gain insights that we might miss by only taking photos.

Sometimes, technology can genuinely make things better, faster, and cheaper. However, if not managed effectively, increased technology results in increased complexity, thereby increasing the likelihood of claims. Success in any complex endeavor requires key players to see the forest and the trees—the big picture and the details. If new technology helps us tame the complexity, then it is good. If it only increases complexity, then sometimes the old ways are better.

The more successful organizations will likely be those that mature to cope with sophisticated technology and increased complexity. Accordingly, insurers, legal counsel, and expert consultants will need to develop along with the increasingly sophisticated construction industry. The toolbox for construction companies and those that support them will need to expand to include a carefully developed data and technology strategy that is deployed early in every large construction claim.

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