

**American Bar Association
Forum on the Construction Industry**

The Context of the Evolution of Design and Electronic Tools

**Bruce R. Gerhardt
HDR, Inc.
Omaha, Nebraska**

**October 25 & 26, 2007
Hyatt Regency Newport Hotel & Spa – Newport, RI**

© 2007 American Bar Association

I. New Courses: Changes in the Process of Design

Design was simple when people built their own homes and other structures. Whether igloo, adobe hut, sod house or log cabin, you had all the information and skills you needed (hopefully) in your own mind. You didn't need to hire an architect to provide plans to a professional builder, who in turn needed to communicate ideas with suppliers, who in turn needed to communicate with manufacturers of various materials.

But somewhere in time someone's ideas and wealth surpassed their ability to do it themselves. Perhaps it was a king who with the tax money collected decided that a fitting monument should be constructed to commemorate a glorious reign, or that a tomb of sufficient splendor should be built to aid the journey to the afterlife. The idea was separated from the skill. The roles of owner, designer, and contractor were born. Construction lawyers must have soon followed, followed closely by the claim consultant.

A. The Evolution of Physical Media

The first method of communicating construction plans probably was a system of markings directly onto the earth. Lines scratched in the earth showed the location of walls and doors. Sticks or branches may have been stuck in the ground to indicate corners or height. But the first large project would have disclosed serious problems. Some projects would take lifetimes to build. The size of some projects would make physical reference points impossible. Different craftsmen would need different information. The plans would need to be more complicated, and they would need to be preserved in a way that could span generations.

To this day, we look in awe at the architecture and construction of ancient Greece and Egypt. How could civilizations that many millennia ago design and construct projects that rival,

in their complexity and beauty, what we build today? And of those things we build today, what will still be there in several millennia for those future civilizations to admire?

1. *The Building as the Medium.* Some mystery of the design of ancient buildings was resolved by Lothar Haselberger, an architect and engineer who is a Professor in the Department of the History of Art at the University of Pennsylvania. In 1979, he was visiting the ruined temple of Apollo at Didyma, Turkey. Although construction on the temple had begun around 330 B.C., work was never completed and much of the temple ruined in an earthquake in the 1500's. He noticed thin shallow lines etched into the marble of the bottom of some walls. He found thin straight lines, circles, quarter-circles and other shapes. When transferred to paper, the lines revealed the drawings for the temple were etched into the walls of the temple itself, mostly in full scale. Planned imperfections, which create an illusion of perfectly straight rows of columns from certain sight lines, were designed into the temple. Other temples were found to have similar plans, although most were probably removed by the polishing of the marble in the final phases of construction and by the wear of the centuries. Similar etchings have since been found in Egyptian projects and medieval cathedrals.¹

2. *Architecture as Art.* Before the 18th century, most architectural drawings consisted of ink lines and ink and watercolor washes on "laid" paper. Laid paper shows a weave from thick and thin wires that run perpendicularly in the paper press. As the artistry of the ink and watercolor improved, the paper manufacturing technology improved to rag wove papers. High end architecture with watercolor used this paper into the 1930's, until less expensive

¹ Lothar Haselberger, Architectural Likenesses: Models and Plans of Architecture in Classical Antiquity, 10 *Journal of Roman Architecture* 77 (1997).

machine made paper completely replaced hand made paper. This was the end of the Beaux-Arts period, when architectural schools emphasized the artistic beauty of architectural drawings.²

3. *Tracing Paper.* The artistic emphasis waned and was replaced by utilitarian needs. Tracing paper became prevalent, as the translucence allowed copying from other papers and overlaying of design options. Various methods were using to create tracing paper, and some shorthand references are still used. “Vellum” was one method of creating tracing paper by impregnating it with oil or resin. “Parchament” used a brief immersion in sulfuric acid followed by a neutralizing bath. Tracing cloth or “linens” became the standard during the 20th century, and final working drawings in ink were traced from the originals. These were suitable for blue-printing. Many older architects will recall working with linens. By the 1970’s this expensive medium had been replaced by polyester film, coated with acetate or other materials, and commonly referred to as “Mylar”.

4. *Blueprints.* Reproduction of drawings has always been a critical need. Tracing was traditional until the 1870’s, when the introduction of blueprinting processes revolutionized the duplication process. Either “blueprints” or “diaz prints” are frequently used terms for the various processes that use light sensitivity of certain materials to create an image, although in the 1950’s the diazo process technically replaced the blueprint process. Depending upon whether the translucent original was a positive or negative image, the “blueprint” would be the reverse at the same scale and size. By around 1900 the blueprint shop business had developed to support architects and engineers, and print making was “sent-out”.

² Lois Alcott Price, The Fabrication of Architectural Drawings to 1950, paper delivered to the Architectural Records Conference (May 3 – 5, 2000, Philadelphia, Pennsylvania).

Diazo prints create a brown line drawing on a translucent support, and are called “sepias.” Additional prints are easily created from sepias. The “Photostat” process was also used in the first half of the 20th century to create negative images, although Kodak in 1953 created a method of making positive images. Lithoprints were used to create large numbers of copies, but the technology was eventually replaced by electrostatic prints, or “Xeroxes”. Photocopying, currently pervasive in offices, is probably the zenith of the “blueprint” or paper technology era.³

B. The Electronic Revolution

Perhaps somewhere there is a “paperless office.” But like the Loch Ness monster, it seems to be more talked about than seen. Paper technologies continue to be used in design, and many of the 20th century technologies such as diazo, mylar, sepia and photocopying are still in use. But the computer revolution arrived in construction as elsewhere. A first application was computer aided design and drafting (“CADD” or “CAD”).

1. The Digital World. When computers arrived, drafters moved from the drafting room with rows of drafting tables to cubicles with computers. Some lament the unintended consequences that have accompanied the change.⁴ What CAD allowed was the designer to create the original drawing in a medium that permitted easy changes, almost limitless layering, and great precision (or the appearance of great precision).

While CAD was in common use in the 1990s, ever since there still is the issue of creating hard copies. The ability to take CAD drawings in the field is evolving, but not yet fully

³ Tawny Ryan Nelb, Architectural Records Processes – 1950 to Present, paper delivered to the Architectural Records Conference (May 3 – 5, 2000, Philadelphia, Pennsylvania).

⁴ See Grant A. Simpson, FAIA and James B. Atkins, FAIA, Your Grandfather’s Working Drawings, AIArchitect, (August 2005).

practical. Thus CAD originals have to be transferred, or “plotted”, on some material. This could be velum, mylar, or plain paper. Early plotters were slow and messy. Today ink jet plotting is quicker and cleaner, but somewhat complicated.

Rather than individual lines being drawn, CAD usually allows the details to be “clicked and dragged” from recent projects or detail libraries. Production is increased, attention to detail is not. A computer screen makes it more difficult to see the “whole story” of a building or project, making review for constructability more difficult. “Red-lining” and feedback are more often done on-line, eliminating the traditional feedback the junior draftsmen (“cubs”) had with the chief draftsman. The ease and efficiency of CAD has a trade-off in isolation of the designers from routine and daily interaction with other designers.

2. *E-Mail*. The ubiquitous e-mail has had a profound effect on the design of projects, and like CAD, the technology is a two edged sword. E-mail allows a written conversation to occur over time as people are available, and allows the attachment of documents and drawings. But e-mails have also replaced a significant amount of personal interaction between the various participants in the construction project. Relationships and communication that developed over the course of a project that could span several years has been replaced by the impersonal and often rash exchange of e-mails. It has allowed the dissemination of volumes of materials to many people instantaneously; while at the same time it can overwhelm recipients with irrelevant material. The volume of communication has increased with e-mail, while the amount of collaboration and discussion has decreased. But as a technology it must be given due credit for altering the way in which construction projects are executed. RFIs, change orders, field communications and other traditionally paper based systems have evolved to the electronic realm.

3. *Project Websites.* After CAD and e-mail, the next evolutionary stage of using technology in construction was probably the development of project websites. Project websites allow for the on-line and digital sharing of documents and information to facilitate the exchange of information during design and construction (sometimes termed “mediated communication”). One estimate is that a \$200,000,000 project will generate about 150,000 pages of documents for the general contractor⁵ (probably not including drafts). Add the owner, designer, subcontractors, suppliers, and other, and the amount of paper generated is staggering. Project websites can reduce the amount of physical paper generated and the need to physically move that paper between parties. Schedules, directories, calendars, e-mails and photos, contracts and even real-time on-line meetings can also be accommodated. Beers Construction in Atlanta estimates that project websites have cut communication costs by 60%⁶. Others have reported significant reductions in RFI and shop drawing response times.

4. *BIM.* The newest technology that is being hailed as the next “revolution” in design is building information modeling, or “BIM”. To some extent, BIM has been around for a while. What it really represents is the full and integrated use of functions that already exist in design software. Like Microsoft Word or Excel, many functions and abilities of software are never fully utilized to their true potential. BIM uses certain capabilities in design software to produce a “model” of a construction project beyond two dimensions (the traditional “blueprint” or even layered CAD), and produced three dimensional models with more dimensions possible (i.e, time, budget, sequencing, etc.) The result is a model with expanded usability to the designer, contractor and owner. Coordination, staging, capital budgeting, and resource allocation are a

⁵ Larry Stevens, Bricks n’ Clicks, PC Magazine, June 2001 at ____.

⁶ *Id.*

few examples of activities that can be managed much more efficiently in a BIM environment. But most importantly, BIM is seen as a technology that will require full integration and cooperation across among all stakeholders to deliver on its full potential. This integration and cooperation may be the largest challenge that determines the extent to which BIM does, in fact, revolutionize the construction process.

C. Collaboration and Integrated Projects: Moving Cheese or Fad Surfing?

The mantra of BIM is that it will require collaboration and an integration among the various parties to the construction process to an extent never achieved before – and that this is where the true value of BIM will be realized. But the challenge will be large to an industry, and its legal advisors, who move very slowly from traditional and well understood roles and responsibilities, to new models that have uncharted waters for liability. All forms of changes, from design-build to construction management at-risk, to multiple primes, to “lean project delivery,” have encountered various amounts of resistance, adaptation and acceptance.

The long running best-seller business book “Who Moved My Cheese?”⁷ deals with the very fundamental response all people have to change. Change in a business environment is no less threatening or disturbing than in our personal lives. To the extent BIM re-orders the relationships among designer, contractor, sub-contractor, owner, supplier, and others – there will be resistance from many in the process. Some will adapt early, some will adapt later. Those that wait to the end may face the unenviable position of watching the rest of the herd thunder away, and wondering where their cheese (or clients) went. A quote popularly attributed to Charles Darwin is: “It is not the strongest of the species that survive, or the most intelligent, but the one most responsive to change.”

⁷ Spencer Johnson, *Who Moved My Cheese?* (Putnam Books 1998).

Others may view BIM as merely the latest fad that will fail to live up to the hype. Most people in organizations have been through a variety of programs: TQM, Six Sigma, 360 degree management, re-engineering, management by wandering around, etc. Most still have dusty binders on their shelves to show for it, along with the lost hours of training and meetings. Eileen Shapiro in “Fad Surfing in the Boardroom”⁸ points to the management desire to find the “instant answers” by riding the crest of each successive fad. Is BIM the latest fad that the construction industry is riding? In time, we will know the answer. But in the meantime, some owners will “pull” construction teams into BIM. Some designer or contractors may “push” the model. As construction lawyers, we will need to go along for the ride and be prepared to maximize the potential of BIM for our clients and their projects.

D. The Lawyer’s Role in Enabling Change

The construction bar may represent one of the groups in the construction process most resistant to change. There is a natural aversion in the legal profession to change when it causes our clients to be operating in environments where the rules are new and there is no precedent to understand liability. Further, few of us (very much including the author) have the technical background or experience to be able to easily understand new technologies and be able to quickly make recommendations to our clients about how to practice in this new environment. A prominent construction attorney wrote an article in 2003 entitled “Technology: A Looming Liability Crisis on Construction Projects.”⁹ But unlike the “saboteurs” in the industrial revolution, construction attorneys cannot be the one throwing our wooden shoes into the

⁸ Eileen Johnson, Fad Surfing in the Boardroom (Harper Business 1995).

⁹ Richard Alexander, Technology: A Looming Liability Crisis on Construction Projects, The Daily Journal of Commerce, May 20, 2005 at ____.

machinery in the hopes of stopping the change. As the author of the article noted, it is incumbent that the industry generate form contracts to address the responsibilities as changed by new technologies. And it is incumbent on construction attorneys to enable our clients to embrace the new technology, not to present all the reasons why new technology should not be used. As Robert Townsend, a former CEO of Avis said: “Deals aren’t usually blown by principals; they’re blown by lawyers and accountants trying to prove how valuable they are.”

II. The New World of Electronic Discovery and Projects: Uncharted Waters

A. The Big Bang of Electronic Discovery: The Ever Expanding Universe.

Ever since the first trial lawyer learned that people tend to say stupid things in e-mails, “electronic discovery” has seemed to have exploded. Certain that a “smoking gun” exists somewhere in an erased hard drive or thrown away laptop, lawyers and their clients have helped propel a new multi-million (billion?) dollar industry that looks to tap into any electron associated with the litigation. Construction projects and litigation are no exception to that rule, and as the design and construction process is increasingly digitized, electronic discovery will be a routine consideration for future projects.

1. E-Mail. E-mail between project participants now captures in electronic form the myriad of discussions that occur. Before e-mail, only important conversations may have occurred by letter, or have been document by meeting minutes or a conversation log. It was up to the participants to make a judgment call about whether the conversation was worthy of a permanent record. As e-mail replaces a large percentage of phone calls, almost all discussions (however mundane) are recorded for posterity. This is helpful when a discussion that was not considered important at the time turns out to be, with 20-20 hindsight, important. But it also creates reams of unimportant information that either becomes part of the project records by

default or that must be sifted through to delete inconsequential e-mails. The best practice would be to delete e-mails daily that don't need to be retained, but human nature seems to be to hoard almost all e-mail in case something later turns out to be relevant. But in terms of being able to re-create the development of almost any decision or issue on a construction project, e-mail represents a fundamental change in what is available to the construction bar and will continue to be a fundamental source of data.

2. *Meta-Data.* A burgeoning area of information gathering is in "metadata". Metadata is data about data. For example, in Microsoft Word data is captured and saved with the document about the author of a document, date and times of creation, revisions, versions, comments, and other information. Other software (as well as e-mail) will also capture and record information about the use of the software, and can be a source of information. It provides the "story" about the document at issue. For CAD drawings, metadata can provide a history of the drawing. Revisions made, by whom, and when. The evolution of a design or detail can be traced. Metadata from e-mails could show the routing of an RFI among everyone in the various companies, not just the "official" wording from each. If a contractor's bid is in issue, metadata associated with the bid preparation software may disclose revisions, prior versions, and persons working with the estimate. Metadata in essence doubles the information available concerning an electronic document – thus the discovery universe expands further.

3. *Storage Mediums.* The first place that lawyers wanted access to for digital discoveries was the hard drive. It was the hard drive that held all the incriminating information – the smoking gun e-mail, the erased (but recoverable) incriminating memo, the altered spreadsheet. But the world of hard drives, back-up tapes and floppy disks has given way to an ever expanding variety of storage devices that hold a wide spectrum of data. Flash drives, portable hard drives,

cellular phone SIM cards, digital camera memory cards, DVDs, CDs, and mini digital video tape are all current examples of where construction project related data could reside. As technology advances and costs decrease, we are only likely to see a continued expansion of places where relevant information may be stored for indefinite periods of time.

4. Project Tools. Depending upon the type of digital tools used for construction projects, construction counsel will be faced with the task of determining what data has been stored, where it is stored, and how to access the information. As the sophistication and complexity of project tools increases, the amount of time and money that will be required to access the information will increase as well. A very standard construction project today would include e-mail correspondence, CAD drawings, specifications in Microsoft Word, digital photos of the construction site, and a schedule prepared and modified by a software package. More advanced projects might use a web camera to record construction progress, a project web-site to facilitate collaboration, external project websites, geographic information system data (“GIS”), virtual modeling and building information modeling. Each project will have some combination of the above digital tools used by some or all of the parties to a construction project. The volume of information will require the effective counsel to learn, plan and selectively retrieve the information needed for their case.

B. Shutting the Barn Door: Amendments to the Federal Rules of Civil Procedure

The growth of information stored in electronic format, and the need to access that information as part of the litigation process, has led to a turbulent period of trying to reconcile the Federal Rules of Civil Procedure (and their state counterparts) and local litigation practices with the digital world. Several important efforts have occurred within the past decade to attempt to provide guidance in this area. But all efforts to varying degrees will suffer from trying to

catch-up with developments in technology and business. Case law and procedural rules may well be resigned to successive revisions that continually shut the barn door after each new horse has left.

1. Sedona Conference. The Sedona Conference is a non-profit organization developed initially to hold focused conferences on anti-trust law, intellectual property, and complex litigation issues, with an emphasis on dialogue. Working Groups were later created for specific areas in a “think tank” type model, with the task of creating documents that provide a “prospective” Restatement type analysis and guidelines for emerging legal areas.¹⁰ The first Working Group was created to address electronic documents and discovery. Their initial product was: “THE SEDONA PRINCIPLES: Best Practices Recommendations & Principles for Addressing Electronic Document Production.” Published in 2004, the Principles had an influential impact on emerging case law and revisions to the Federal Rules. They also provided valuable recommendation useful to the bar and organizations looking to address the complexity of electronic documents and discovery in a comprehensive way. In 2005, the Working Group released information to aid organizations in their management of electronic information entitled “The Sedona Guidelines for Managing Information and Records in the Electronic Age.” Together, for many companies these guidelines became a “best practices” type document used to bench-mark current efforts and to develop further efforts in managing electronic information within the organization.

In June of 2007, “THE SEDONA PRINCIPLES: SECOND EDITION Best Practices, Recommendations & Principles for Addressing Electronic Document Production” was released. The second edition incorporates the amended Federal Rules and case law developments since the

¹⁰ See <http://www.thesedonaconference.org/content/faq>.

original release. The 14 principles contained in the document, along with the discussion and analysis that accompanies each principle, as well as other information, provides one of the most comprehensive, well-organized and thoughtful treatments of electronic documents and discovery available. It should be in the library of every in-house counsel and construction litigator.¹¹

2. *Zubulake*. After the initial Sedona Principles on electronic discovery were published, a series of rulings in 2003 and 2004 in the *Zubulake v. UBS Warburg* case in the Southern District of New York caught everyone's attention. These were the first rulings dealing with electronic discovery in a systematic and very comprehensive way, and resulted from a pitched battle between the plaintiff and UBS over the scope and cost of electronic discovery. Hungry for official guidance, the litigation bar thoroughly reported, analyzed, and discussed Judge Scheindlin's opinions. They were quickly adopted as the best persuasive precedent available for dealing with electronic discovery. The opinions took on more status when at trial the jury awarded the plaintiff nearly \$30 million in the employment discrimination case. Most people believed an adverse inference instruction relating to the destruction of e-mails played a significant part in the jury's 30 minutes of deliberation and resulting verdict. UBS personnel had deleted relevant e-mails despite UBS counsel's directions to preserve such information.¹²

3. *The Amended Rules*. In August 2004 the Advisory Committee on the Federal Rules of Civil Procedure published a set of draft amendments dealing with electronic discovery. The

¹¹ The Sedona Conference publications are available at http://www.thesedonaconference.org/publications_html.

¹² The *Zubulake* case in order are: *Zubulake I* - 217 F.R.D. 309 (S.D.N.Y. 2003), *Zubulake II* - 2003 WL 21087136 (S.D.N.Y. May 13, 2003) (not involving electronic discovery), *Zubulake III* - 216 F.R.D. 280 (S.D.N.Y. 2003), *Zubulake IV*, 220 F.R.D. 212 (S.D.N.Y. 2003), and *Zubulake V*, 2004 WL 1620866 (S.D.N.Y. July 20, 2004).

revised rules were adopted by the Supreme Court and became effective December 1, 2006.¹³

Although many issues will still need to be resolved and case law will refine many areas, the revised Rules provide a framework to deal with electronic information. In the meantime, the Sedona Principles and *Zubulake* will probably continue to provide guidance on many issues.

Rule 34 now introduces the term “electronically stored information” (“ESI”), and adds ESI as a category of discoverable information. The term is intended to be flexible to encompass changes in technology for years to come. In fact, the term “documents” will now include ESI, and discovery shall include ESI unless the discovery documents make clear a distinction between electronic and hard-copy documents. There is a right to test or sample the adversary’s ESI. This is intended as a mechanism to reduce discovery scope and cost, rather than through overly broad requests or multiple rounds of discovery or depositions. The term will likely encompass the various digital tools used (and to be used) in construction. CAD drawings, digital photos, project web-sites, and BIM models will most likely all be deemed “electronically stored information” to which the Federal Rules apply, and for which parties to the construction dispute will need to cope with the problems and challenges inherent in discovery and production.

The format in which ESI is produced has frequently been a disputed point. For example, should a letter be produced as a paper document, a Word document, or a scanned .pdf document? Who decides? Rule 34(b) allows the requesting party to specify the form for production. The responding party may object and propose a format. If no format is specified, the default format is the format in which the ESI is “ordinarily maintained” or that is “reasonably useable.” In any event, a party is not required to produce ESI in more than one format. This could be a difficult

¹³ For a discussion of the individual rule changes described below, see Carl G. Roberts, [The 2006 Discovery Amendments to the Federal Rules of Civil Procedure](http://www.abanet.org/lpm/lpt/articles/tch08061.shtml), Law Practice TODAY (ABA), August 2006, available at www.abanet.org/lpm/lpt/articles/tch08061.shtml

issue for construction projects. Presumably, most parties to the construction and design side will have the ability to use data from the construction project systems that were in use. Third parties may have much more difficulty. An injured construction worker or a project owner may not have the systems to use BIM information in its native format, or CAD drawings in an AutoCad format, for example. Some information in a BIM model may not transfer well to paper without a significant loss of information. How is a project website to be “produced” independent of any documents stored on it? Ultimately, the issues of the case may drive what type of information is produced in what format. A generalized request for “all project information” may leave counsel with volumes of unusable and undecipherable information. Construction counsel will need to become knowledgeable early in the case as to what information was generated by which systems, and where and how that information is stored.

Under Rule 33, a party has the same right to produce ESI as a response to an interrogatory to the same extent it could have produced “business records” before the revisions. But the party receiving the information will need to be able to access the ESI and retrieve the information as easily as the producing party. This may put a burden on the producing party to provide assistance or direct access to its information systems.

ESI is also now included in the initial disclosures under Rule 26(a). Under Rule 26(f), the initial planning conference is also now expanded to include the preservation of discoverable information, any issues related to disclosure or discovery of ESI such as the format for production, and issues regarding ESI production and privilege.

One rule that will surely generate disputes is Rule 26(b)(2)(B). It states that ESI does not have to be provided if the source is not reasonably accessible due to undue cost or burden of the producing party. There is no standard for when the producing party will be able to demonstrate

undue burden or undue cost, and thus case law will be closely followed in an attempt to divine guidance as to where that line may be.

The amended rules also create a “safe harbor” under Rule 37(f). There is much speculation about how safe the harbor will actually be. It provides that (absent exceptional circumstances) a party should not be subject to sanctions if ESI is lost as a result of the “routine operation of an electronic information system.” Again, this rule is likely to be the subject of many fact specific opinions about whether a party was acting in good faith when the routine operation occurred. The rule is, however, an explicit recognition that ESI exists in a managed but changing environment and that entire computer systems need not be “frozen” just because litigation is occurring. A party seeking to invoke the safe harbor will surely be required to demonstrate that it took the necessary steps to preserve relevant ESI, but that some destruction occurred nonetheless.

Under Rule 45, subpoenas now have the same provisions concerning ESI as does discovery between the parties under the above discussed Rules. Thus non-parties to the litigation will face many of these same issues regarding format, cost and burden, and privilege. ESI maintained by non-parties will likely be important to most construction cases.

C. Will the Tail Wag the Dog? Impact of the Legal System on Electronic Projects

As the use of digital tools for design and construction increases, construction lawyers will be asked to provide guidance and advice to their clients about how to deal with the risks that new technology poses. How will the legal profession respond? Will it be an enabler in new technologies, or will it resist the efforts of clients to sail into uncharted legal waters?

In the field of risk management, risk may be managed in one of four ways: it may be avoided, reduced, retained or transferred.¹⁴ Some or all of these techniques could be valid responses to the risks proposed by electronic project tools. Avoidance may well be the first reaction of many clients and their lawyers. All change brings some resistance – and change that may alter traditional roles and well understood responsibilities may be strongly resisted. Avoidance does work very well to eliminate the risk – but in this case a large cost looms. Some owners such as the GSA are mandating the use of BIM. Some design and construction firms are early adopters of new technologies, and are seeking a competitive advantage over their competitors who cannot offer the same. A firm that avoids the risk posed by new digital tools to stay with comfortable and known construction tools and models may have a short life span. Firms in the construction business will more likely be seeking advice on how to use digital tools such as BIM – while managing their risk. Then some combination of reduction, retention and transfer is the only option.

The next most likely reaction is transfer, probably by creating contract documents with indemnification clauses to attempt to divert any and all liability to the other parties on the project. The difficulty will be that all parties will probably do the same thing, resulting in a stalemate of contractual documents. A priority of the construction bar should be to develop consensus on appropriate risk transfer and contract documents for projects using digital tools. The AIA has taken a first step with the creation of documents C-106 (Digital Data Licensing Agreement) and E-201 (Digital Data Protocol Exhibit).¹⁵ There will likely be discussion, some criticism, and some acceptance that will be generated by these documents, but that process will

¹⁴ Emmett J. Vaughan, Risk Management 18-20 (John Wiley & Sons, Inc. 1997)

¹⁵ Model Contracts to Aid ‘E-Building’, Engineering News-Record, May 14, 2007 at 10-11.

be invaluable to develop the type of industry consensus (or at least agreements to disagree) that exists for most issues in the non-digital construction project world. The AIA also anticipates releasing integrated practice documents in the 2008-2009 time frame, which should provide a first generation of industry wide “digital ready” contract documents. The AGC has also released ConsensusDOCS 200.2 “Electronic Communications Protocol Addendum,” and ConsensusDOCS 300 “Tri-Party Collaborative Agreement.” AGC is also in the process of creating a BIM rider for contracts.

Retention and reduction are the final risk management tools, which as a practical matter may be the most useful in this context. Risk reduction in this area can probably be best achieved through education of the parties and attorneys of the technologies involved and the developing contractual documents. Likewise, having parties to a project that are all technology savvy, and that have discussed and reached consensus on contractual matters and project protocols, will reduce risk for all parties. In the early stages it may pay to choose your partners wisely. Finally, there will be recognition that some amount of risk just can’t be avoided. With a change in technology and project delivery, and a change in traditional roles, it will take a while for case law to develop precedent and rules to govern our relationships and activities in the electronic construction project. But if the technologies can deliver some of the anticipated benefits of a new model of collaboration and communication, the future of design and construction looks bright and construction law will remain a dynamic and rewarding practice.

III. Conclusion

As CAD did, BIM will probably significantly change the way projects are designed and built. It promises some great efficiencies and advances, but there surely will be some unintended consequences from its use. The charge to the construction bar should be to assist clients as BIM

is adopted to successfully manage the risks that come with BIM. But as BIM leads to a more collaborative environment, risk management will need to be done cooperatively in a project wide effort. Risk in the BIM world cannot be merely shifted to other parties. Perhaps a result of this project collaboration will be more cooperation at early stages among the attorneys representing the parties to a project. If that is the case, we will bring added value to our clients and be seen as a partner to the construction process. In that environment, BIM and other electronic discovery will not represent any special challenge to the construction lawyer. It might result in an easier environment to focus on the cause of the dispute, and less time and money on trying to establish basic facts. Only time will tell, and the attorneys attending the 2027 Fall Meeting of the ABA Forum on the Construction Industry may be amused at the amount of anxiety BIM generated for our meeting and construction attorneys during the first decade of the new century.¹⁶

¹⁶ See Michael J. Ladino, CADD and Legal Liability Implications for A/Es, 28th Annual Meeting of Invited Attorneys (June 22-23, 1989, Baltimore, Maryland). As Ladino accurately predicted: “CADD technology is nothing more than the new design tool of the 1980s. It does not follow that increased liability will attach to the use or failure to use the tool. . . . CADD technology should take its place along side the other technological advancements achieved in this century. If that is the case, we should not expect extraordinary changes in the law affecting A/E liability.”

