LEGALLY SPEAKING:
From PDFs to IPD to BIM: Lessons on Today's Technology-Driven Construction Project

By Matthew J. DeVries

With today's technologies, the construction project is being performed quicker, more efficiently, less costly and even safer than ever before. Whether you are now using email to communicate with your project team, whether you have implemented building information modeling ("BIM") into the design and construction process, or whether you have gone entirely paperless with PDF drawings and contract documents, there are a few lessons to keep in mind to ensure success when using new technologies.

Benefits of a Paperless Project. Paperless success involves more than simply scanning every project document and putting it into a digital file cabinet. That would be nothing more than moving the archived documents from Building A to Building B. The successful protocol will involve using new technologies, such as project management software and other web-based programs to consolidate project documentation; to increase efficiency in project communications; to establish a good audit trail; and (if necessary) to prove liability and damages in the event of a dispute.

The new tools available to improve record management are limitless. Web-based systems allow the entire project team access to the same pool of construction documents, including design drawings, photos, schedules, change orders, requests for information and numerous other reports. Document control can be enhanced by tracking revisions, storing the master files and streamlining the review process.

A Real Dispute. The design and construction of a life-sciences building at a major university recently highlighted some of the disputes on a technology driven project. According to an ENR report, this is the first known claim related to the use of BIM by an architect. On the project, the architect and its MEP engineer used BIM to fit the MEP systems into the ceiling plenum. When the contractor was about 70% through assembly, it ran out of space in the plenum. It came to light that the design team failed to inform the contractor that the extremely tight fit of components depended on a specific installation sequence. In the end, everyone sued: the contractor sued the owner, the owner sued the architect, and the insurance carrier sued the MEP engineer.

Lessons Learned. The settlement was confidential and there is little information about the identity of the parties, the amount of settlement and the terms of the agreement. But, based upon growing trends in the use of technology on construction projects, as well as best practices generally, here are some lessons learned when using BIM:

- **Communication within your own team.** As a construction lawyer, I find that most construction disputes are 90% fact driven and 10% law driven. This may be a generalization, but lawsuits are about losses and responsibility for those losses. The parties' contract or the applicable law may allocate the risk to one particular entity, but often the dispute is fueled by the facts of the case. Here, it becomes imperative that your own project team members (from estimating, to scheduling, to field conditions, to contract management) regularly talk with each other to avoid miscommunication.
- **Communication among the project team.** On the life-sciences project discussed above, the "design team never discussed the installation sequence with the contractor, and the contractor wasn't sophisticated enough to understand the importance of assembling the components in a certain order." As you would suspect with integrated projects, clear and regular communication among all project team members can help avoid problems stemming from design to construction.
- **Communication per the contract documents.** If you follow construction industry trends related to contract documents, you know that both the AIA and

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ConsensusDOCS have a working set of documents focused on integrated project delivery. You can find a comparison of the two groups of documents related to IPD by simply Googling the following terms: ConsensusDOCS AIA IPD. In the end, you should make sure your written agreements conform to your understanding and expectation of how the parties will communicate, what information will be communicated, and what happens in the event of lack of communication ... or a dispute.

The technologies available to today's construction project make it easier and more affordable to process, collect, refine, store and review the project's data. However, this is only one part of the solution. The real lesson is to use these technologies to communicate expectations, intentions, and conditions to help ensure success.

About the Author: Matt is a member of the Construction Service Group in the Nashville Tennessee office of Stites & Harbison, PLLC. Matt is a LEED Accredited Professional and he is the founder of www.bestpracticesconstructionlaw.com. You can reach the author at mdevries@stites.com.

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DCD 2012 Cost Escalation Index Table

Use this index table along with the regional modifiers to customize case study costs to a projected date and location.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1994	238	238	239	239	240	240	241	241	241	240	240	240
1995	240	241	242	243	244	245	246	246	246	245	245	245
1996	245	245	245	246	247	248	249	249	248	248	249	250
1997	250	251	252	253	253	254	255	255	256	256	257	258
1998	258	259	260	261	262	263	264	264	264	265	265	266
1999	266	267	268	269	270	271	272	274	274	275	276	276
2000	277	278	280	282	284	285	286	287	288	288	288	288
2001	289	290	292	294	296	297	298	299	299	300	300	300
2002	299	300	302	304	306	307	308	309	309	311	311	311
2003	311	312	314	316	318	320	321	320	322	324	325	325
2004	326	327	329	331	335	337	337	338	339	340	340	340
2005	356	357	357	358	360	361	360	365	368	370	371	376
2006	385	386	386	387	387	389	390	391	392	395	395	396
2007	400	401	402	401	402	405	410	415	415	420	421	422
2008	425	427	427	427	428	430	432	434	434	436	437	439
2009	440	442	442	443	444	446	447	449	449	450	451	453
2010	455	458	458	460	461	462	463	463	465	465	466	466
2011	467	467	467	471	472	473	473	475	476	476	476	477
2012	477	477	477	481	482	483	483	485	487	487	487	487
2013	487	487	487	491	492	493	493	495	497	498	498	498
2014	498	498	498	501	502	503	503	505	507	509	509	509
2015	509	509	509	511	512	513	513	515	517	520	520	520
2016	520	520	520	521	522	523	523	525	527	530	830	530
2017	530	530	530	531	532	533	533	535	537	542	542	542

Select a Design Cost Data case study file, which is similar to a project you have in mind, for a "base." Using the index table, find the "base" index number. Determine a target date for which your project will go out to bid (or the average month of the construction period, for a target date" if it is to be negotiated), and find the index number. Divide the "target" index number by the "base" index number to get a "multiplier." Multiply the cost per square foot by the multiplier to determine the updated cost per square foot. Multiply the updated cost per square foot by the total square feet of your project to get an updated estimated cost. (Use the regional modifier guide on the reverse of this card to determine the cost variations due to area differences.)

DCD 2012 Regional Modifiers

To enable construction professionals to achieve more accurate regional projections, the D4COST estimating program has available over 500 city modifiers. Call 800-533-5680 for more information.

Eastern U.S.		Central U.S.		Western U.S.	
Connecticut	1.12	Alabama	0.83	Alaska	1.34
Delaware	1.06	Arkansas	0.79	Arizona	0.94
D.C.	1.05	**Illinois**		**California**	
Florida	0.78	Chicago	1.25	Los Angeles	1.19
Georgia	0.86	Other	1.11	San Francisco	1.29
Maine	0.88			Other	1.18
Maryland	0.96	Indiana	1.01		
Massachusetts	1.18	Iowa	0.94	Colorado	1.03
New Hampshire	1.04	Kansas	0.97	Hawaii	1.39
New Jersey	1.26	Kentucky	0.93	Idaho	1.00
		Louisiana	0.92	Montana	0.91
New York		Michigan	1.13	Nevada	1.01
New York City	1.48	Minnesota	1.07	New Mexico	0.92
Other	1.19	Mississippi	0.79	Oregon	1.09
North Carolina	0.77	Missouri	1.11	Utah	1.12
		Nebraska	0.86	**Washington**	
Pennsylvania		North Dakota	0.86	Other	1.01
Philadelphia	1.34	Ohio	1.12	Seattle	1.19
Other	1.12	Oklahoma	0.85		
		South Dakota	0.79	Wyoming	0.85
Rhode Island	1.20	Tennessee	0.83		
South Carolina	0.77	Texas	0.84		
Vermont	0.92	Wisconsin	1.15		
Virginia	0.88				
West Virginia	1.13				

To calculate regional modifiers, multiply the "base cost" by the "target" modifier and divide it by the "base" modifier. Example: To adjust the updated cost of a "base" building in Mobile, AL, of $1,001,126 to Colorado Springs, CO, the calculation will be as follows: Select the regional modifier for each state or city (Colorado 0.90 and Alabama 0.80). $1,001,126 x 90 ÷ 80 = $1,126,266.75.