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by Stephen G. Revay

This issue celebrates the one-year anniversary of the reopening of our Washington D.C. office under the leadership of Tom Martin, President of Revay & Associates USA Ltd. Tom had been introduced to the readers of the Revay Report in 1994 (Volume 13, Number 1) when he first joined us in the same capacity. Unfortunately, Tom left us after we sold the company but returned shortly after we bought the company back. Tom is a Professional Engineer with a Masters in Structural Engineering (1976). He worked 10 years for a large construction company as estimator, senior estimator and eventually project engineer. In 1984, he started an engineering consultancy specializing in scheduling, cost control and claims analysis. In this capacity, he was accepted as an expert witness both in Federal and State courts, as well as before the ASBCA.

Tom is assisted in the Washington office by Paul Baillie, a U.K.-trained quantity surveyor, with extensive overseas construction experience. Paul has been working in the USA for the last twenty years as a claims consultant and as a contract administrator. Anne Mills handles administration. Jim Candlish, an electrical engineer, who is acting as the Deputy Director of Construction for the Northend Electrification Project in Boston, has 25 years experience in the transit industry. Recently, Susan Klucinskas and Jack Houck joined the Washington office. Jack Houck, also an electrical engineer, has extensive knowledge and experience with petrol chemical refinery and process plant design and construction. Jack will be heading up a contracts team during the modernization and expansion of the Francisco I. Madero Refinery, located in Madero, Mexico. Susan is a Professional Engineer (Quebec) with 11 years service with RAL as claims consultant, the last three of which were in the USA.

Additionally, Tom and I are proud to announce the opening of a RAL USA office in Atlanta, Georgia. Ron Downing, a Vice President of RAL USA, will be managing this new office. Ron has 23 years experience in the management of power, process, industrial and environmental construction projects, and in the analysis and preparation of construction claims for contractors, design firms and owners.

Finally, let me introduce Paul Levin of the DC office of RAL USA, the author of the lead article of this issue. I first met Paul in 1983. He is a frequently sought after speaker, and an accomplished author. Paul is not only analyzing the history of construction disputes as a claims consultant, but by looking to the future, he is also trying to find ways to facilitate a speedy and perhaps less acrimonious resolution of construction claims. Contractors have not been known in the past to adopt new techniques without tangible proof of the potential for saving costs and increasing profits. To this extent Paul's recommendation, set out in this article, may be argued to be a step ahead of current general practice, nevertheless if one considers the explosive growth of the e-commerce in general, then adoption as a construction tool cannot be far behind.

We welcome Paul amongst us and hope that his forward-looking approach will underscore the future of RAL USA.

THE DOT-COM INVASION: What It Means to You and the Construction Industry

Internet construction services are growing at a furious pace. Literally hundreds of new vendors have cascaded upon the A/E/C market and millions of dollars are being spent in a frantic rush to market. Not all of these firms are surviving the heavy financial demands necessary to make it into the industry, every day sees new rumors of strategic alliances, consolidations and bankruptcies.

What we can determine from such activity is that a revolution is taking place. Whether you are a contractor, owner, architect or engineer, consultant or lawyer you will no doubt soon be seeing important changes in the way project information is being developed, stored, disseminated, digested and managed.

We all know that e-mail is already replacing the fax as a primary communication tool. A more recent and evolving trend however is the side-stepping of traditional stand alone project control tools and management software by web based **a**pplication **s**ervice **p**roviders or ASP's.

The disadvantage of traditional systems was the limited access to data; if you don't have the different software packages necessary installed on your computer you cannot access the information. Now instead of each project player owning and learning software, it will become more affordable to pay a monthly subscription to a system that is constantly being updated and readily accessible to each project user via simple web browsers (e.g. Internet Explorer or Netscape). Collaboration on a project takes on a whole new meaning as information (reports, plans, proposed revisions, RFI's, schedules, progress photographs, minutes of meetings, etc.) can be published to a central depository or project specific web site for all team members to view and update.

This new generation of service providers is not unlike the "timeshare" idea of software that was seen some 30 years ago; however there are important differences. ASP's today are armed with powerful and expensive data centers with improved security, backup power and 24 hour support services. Project information can now be obtained anywhere and at anytime that you can access the net — even with wireless devices and at a fraction of the cost of traditional methods.

Determining the actual benefits of all these miraculous-sounding new services can be confusing, to say the least. The purpose of this article, is to help you make sense of it all and determine which services maybe be useful for your construction needs. By mapping categories and subcategories (the basic contours of this relatively uncharted terrain), commenting on trends, reporting insights and making some predictions, we hope to aid your own explorations in this fascinating terra incognito. As it will be seen, these tools are not only effective for the management of projects but are also beneficial in claims avoidance and dispute resolution.

Services available

Services available to contractors over the Internet fall into three basic categories:

- Collaboration/Project Management

  Collaboration services allow various parties to the contract — typically the owner, A/E, contractor, and subcontractor — to share project drawings and documents via the Internet. Web-based project management services provide online forms and templates to produce, log, transmit, and track documents.

- E-Commerce

  Often referred to as B2B (business-to-business), e-commerce services facilitate business transactions over the Internet. These transactions include the buying and selling of goods through exchanges, catalogs, and auctions; solicitation and collections of bids; and other forms of procurement.

- Information resource sites

  These provide content or act as information gateways that provide links to other services and sources of information. In this category, we include construction portals.

Additional services found in some or all three of these categories include drawing viewer and mark-up programs, web-cams, plan-rooms, bidding services, permit application services and time tracking.

COLLABORATION / PROJECT MANAGEMENT SITES

Collaboration sites offer the most potential for the construction industry in terms of business streamlining. There are three main advantages these sites offer over traditional processing methods:

- Time savings come in the form of instant communications and shorter turnaround time on document processing. One of the biggest selling points all the vendors rightly point out is that RFI's can be initiated and processed in hours instead of days. The RFI is initiated and processed electronically, and the resulting solution, including marked-up drawings or sketches, is broadcast to all affected parties. Correspondence, schedules, submittals, and change orders receive similar treatment.
- Improved workflow results from an efficient processing system that logs, distributes, routes, and assigns due dates to documents. Document deliveries are confirmed. As due dates approach or are missed, reminders are automatically issued. This helps both to expedite activities as well as ensure that documents reach the intended destinations.
- "G & A" (general and administrative) savings alone more than pay for the costs of implementing a collaboration site, according to vendors and many users. Users save on costs of travel expenses, overnight couriers, long-distance phone calls and faxes, and multiple extra sets of drawings and sketches. Not only can you reduce or eliminate the costs of these services, you also avoid the tremendous overhead costs of preparing, administering, and tracking the related documents.

Lately, ASP's have a tendency to market their services as "be-all, end-all" collectives of construction services — one-stop shops for the contractor community's collaboration, e-commerce, and research needs. The firms include the big names (such as Bricsnet, Buzzsaw, Citadon, Constructware, e-Builder, Struxicon, PrimeContract, and Viecon) that continually advertise in construction publications. Each of these companies offers its own variations on collaboration tools, e-commerce, information services, and online communities. Most focus on the A/E and or construction phases, while a few encompass the complete building life cycle, from planning to facilities management.

Some examples of ASP collaborative site services offered by these firms can be viewed by visiting: www.Buzzsaw.com; www.Constructware.com; www.Bricsnet.com; www.e-Builder.net; www.Citadon.com; www.Harddollar.com and www.Primecontract.com

Initially the choice of one system or another was made by general contractors looking for fast practical systems that best served their particular needs and gave them maximum control. Some larger contractors or groups of contractors have tried to standardize on a single system. However, more and more architects, engineers, and owners have begun specifying systems to be used on their projects. Construction players should expect to be required to use different systems on different projects — at least for the near future as the systems evolve and preferences are established.

Feedback has been favorable towards collaborative sites which have been the primary focus of interest for contractors. ASP's allow companies to cut in house software costs appreciably as well as reducing server-related support costs, including all routine maintenance, product upgrades distribution and installation, version control, and data backup and recovery. Note, however, that a more expensive high-speed Internet connection is virtually essential for using an ASP. Some contractors have indicated that the time and cost savings of using project collaboration are dramatic enough to justify picking up the tab to bring subcontractors on board. Also noted are various indirect savings including improved quality and customer service.

On the other hand, Joe Stoddard, editor/publisher of Construction Business Computing (www.cbczine.com), has reservations. He notes that the savings can evaporate if the systems are too complex or the demands too rigorous: "My readers increasingly report a problem with owners or architects forcing them to use this or that portal for contract compliance. What you end up with is a project manager trying to use 10 different systems on 10 different projects — a huge inefficiency. In my opinion, the collaboration services that will be around five years from now will all have one thing in common — they'll allow contractors to share project information across many platforms without dictating any particular application or format. Right now, we're sharing at the document level — for instance, a CAD viewer allows you to redline many drawing file types. Down the road, we'll be collaborating at the data level. Applications from multiple publishers will share the same project data via XML (eXtensible Markup Language) or some other 'middleware' yet to come down the pipe."

A word of caution is to be advised on making choices as the system you select today may not necessarily be there tomorrow. Before choosing an ASP it is important to verify their service record with other clients, their financial stability, and what procedures have been taken to protect your project's information. For a review of ASP provider qualities, look at www.asptip.com as well as www.cyberplaces.com.

B2B — e-COMMERCE

E-commerce refers to the buying and selling of goods and services over the Internet. Included in this broad category are sites that advertise jobs to bid, sell materials, rent equipment, hold auctions and house plan rooms.

Over the past 12 months, business-to-business (B2B) e-commerce sites have generated the most buzz — in terms of advertising, investments, start ups, and total number of vendors. Many sites have emerged to handle the sales of materials, equipment, and supplies. More than two dozen sites exist to handle construction equipment alone!

Yet, so far, the general contractor community has greeted this proliferation of B2B web-sites with one earth-shaking yawn. We need to take a closer look at the reasons for contractors' indifference and explore the real promise of B2Bs, which should not be ignored.

Most general contractors see e-commerce more as a curiosity than as a priority. Many are not very attracted to on-line central purchasing since either the subcontractors do most of the buying, or their project managers and superintendents prefer to buy what they need locally for quick delivery and better service.

Of all the e-commerce functions, bidding jobs is perhaps the one that most directly benefits average contractors — and one area that most are excited about. Electronic plan rooms provide the ability to view and/or download plans and specs for take-off and bidding. Announcements of jobs for bid and

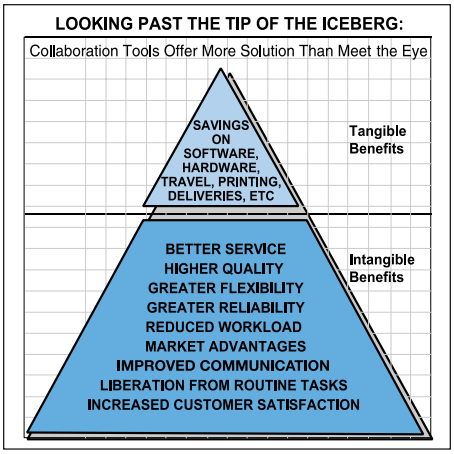
A WORLD WIDE WEB OF POSSIBILITIES

Types of Internet Services for the Construction Industry

COLLABORATION
- Generic and construction-specific collaboration sites
- Web-based project management — workflow capabilities
- Drawing and viewing tools
- Job-site web-cams

E-COMMERCE
- Business-to-business (B2B) for construction equipment
- Business-to-business (B2B) for materials and supplies
- Plans and permits sites

INFORMATION RESOURCES
- Topic-specific sites
- Information-only portals
- Trade association portals
- A/E-specific sites
- Employment sites



those coming down the pipe can help contractors plan for new work and growth. More importantly, management of the bid solicitation process can be automated with notable cost and time savings. Invitations for bids (IFB's) and addenda can be broadcast by e-mail, and responses can be acknowledged and tracked. Also, bids can be electronically received and analyzed. All these advances can greatly reduce bid-day headaches.

The whole process is just tidier than the old way — with fewer communication gaps. Instead of dealing with thousands of faxes and phone calls, it is possible to search for subcontractor information by category online, and if more information is required one can communicate by e-mails, which are more easily tracked and organized than phone calls and faxes.

Whatever kind of e-commerce you engage in — whether you are involved in bidding, visiting plan room sites, buying, selling, or renting — your business will typically be done through one of three forums: exchanges, catalogs, and auctions.

Exchanges. Exchanges bring together multiple buyers and sellers looking for specific goods. For most small purchases, the time and risk involved in open exchange probably outweigh the benefits. To take part in exchanges, you must have a computer with reliable Internet access, know where to go, and have time to wait for the responses and process the transactions. But for large purchases, such as expensive equipment, or at times when the local suppliers don't carry what you need or can't meet delivery requirements, online exchanges can be lifesavers.

Let's say you need a truckload of two-by-fours. Using traditional processes, you would get on the phone to your local supplier, check the price, and place an order. But if the supplier was out of stock or couldn't deliver by the deadline, you were out of luck. Today, you have many more options by going online. Through an exchange, you can post an online classified ad. You can look for buyers or sellers of equipment or materials, or even issue a formal request for quote (RFQ). Here, the Internet's vast audience offers a tremendous advantage to finding exactly what or whom you're seeking. You may find a local contractor with excess inventory, a lumber mill from across the country already shipping to your region, or any number of other local and regional sellers. You might even be contacted by other local contractors about teaming up to make a larger purchase. If, say, you needed only a half truckload of two-by-fours, you might find another buyer looking for a half truckload and save money by sharing a full load.

Example sites include: www.Digitalepc.com, www.Citadon.com, www.Lumberlinx.com and www.Buildpoint.com

Online catalogs. Akin to their hard copy counterparts, online catalogs are simply databases of products with price lists. Using online catalogs is not much different from using printed catalogs or going to your local retailer. The prices are listed and set, and if the product is in stock, you just order it.

However, the Internet medium provides a couple of significant advantages over printed catalogs — immediate access to a wider range of catalogs, more up-to-date pricing information (including, in some cases, the supplier's real-time inventory status), and the ability to search rapidly through the entire database with key word searches and other uses of search-engine technology. It seems likely that using online catalogs will offer more time and money savings and a better selection than you would have if you dutifully maintained and ordered from your own set of printed catalogs or Sweets guides.

Example sites include: www.Buildnet.com, www.Tradepower.com, www.Toolup.com and www.Equalfooting.com

Construction equipment auctions. Online construction equipment auctions function very much like e-Bay (currently one of the more popular on-line auctions for consumer goods). They allow leftover materials and equipment that might otherwise sit and rust in the warehouse to be auctioned to the highest bidder. These auctions are already common, and the Internet's wide reach expands the range of available offerings as well as their geographical markets. Using digital cameras, equipment owners can easily post images of their merchandise. A variety of protections for buyers and conveniences for sellers are available. Look for insured inspection reports, networks of certified inspectors to inspect equipment on-site at the sellers' locations, and one-on-one customer service to ensure that what you see on the web-site is what you get. For big-ticket items such as construction equipment, an active auction market already flourishes.

Example sites include: www.Rentmaker.com, www.Gsaauctions.gov, www.Ironplanet.com and www.Ironmax.com

INFORMATION RESOURCE SITES

The final major web-site category we need to talk about is the construction services portal. Most portals started out as directories of resources for construction-related products and services. Portals are usually subdivided into various sections and categories, most with links to relevant web-sites. In addition to construction products and equipment, users can locate construction-related professional services, trade associations, government agencies, utilities, and courts. Other functions added by portal sites include sections for posting or seeking jobs, online education and training services, industry news, and other resources, such as a free estimate service from the RS Means database.

Each site's usefulness is directly proportional to its number of users. As contractors, architects, engineers, and owners begin to prefer certain sites over others, the ones they choose will become more useful, while the other sites will naturally fall by the wayside. In two to three years, it's likely that 70 percent of Internet-enabled contractors will end up using fewer than a dozen of the major portals that exist today. We should see multiple competing e-commerce sites increasingly begin establishing relationships with one or more portals.

A few well-known examples of these are the Blue Book (www.thebluebook.com), ConstructionZone.com (www.c-z.com), ENR (www.construction.com) and Construction Net (www.constructionnet.net).

Other sites include: www.concrete.com, www.constructionweblinks.com and www.infrastructureworld.com.

BENEFITS OF WEB BASED TOOLS FOR AVOIDING AND RESOLVING CONSTRUCTION DISPUTES

At the origin of many construction disputes are changes and delays. Changes may be the result of incomplete or erroneous design as well as differing site conditions. Delays may be the consequence of such changes as well as other disruptions (weather, access problems, late deliveries, interference with other trades, etc.). The advent of the Internet and particularly interactive collaborative project sites permits the rapid posting, exchange, organizing and archiving of information and documentation that should help to avoid and resolve construction disputes. The key ability being the better organized and better documented one is, the better prepared one can be to avoid or resolve a dispute.

Documents posted to a web-site allow all parties up-to-date access to submittals, drawings, correspondences, requests for information (RFI's), change orders and punchlists in a relatively secure environment where access can be controlled through specialized accounts and passwords. A single set of shared documents reduces factual disputes and insures everyone is looking at the most current version.

Anyone involved with large construction projects is familiar with documentation issues — the RFI wars, late notices, changes and late shop drawing review and a variety of other paperwork matters that are commonly known for causing delay. The internet provides the ability to reduce paperwork processing from days and weeks to minutes and hours.

An example would be a web based system for handling RFI's. This allows any member of the construction team to post new RFI's, the system facilitating the workflow by assigning RFI identification numbers and routing questions and responses among the owner, A/E, GC and subcontractors. Much less time is lost in the administrative processes of sending documents back and forth while (mis)communicating among the parties. Similar processes are available for submittals, change orders and other construction documentation.

Having workflow tables such as these on a web site allows all parties to check the status of various activities. Approval logs show

where a document is in the approval process, correspondence logs tell if responses have been sent and addressed; change order logs show what's paid, what's payable and the status of each. Having everyone sharing the same reference tables and same documents eliminates the confusion and the need to issue status reports. With such information it is possible to quickly determine what issue is delaying which party and who has to act. Measures can then be taken to alleviate the delay before it worsens into the cause of a claim.

Drawings can be posted and viewed by simple browsers enabling parties lacking CAD software or expertise to view them and participate in the interactive resolution of problems. This is a vital tool in the prompt resolution of design problems and spatial conflicts in the field. Interactive collaboration can provide significant productivity gains — saving time, reducing errors and avoiding disputes.

Having schedules posted to the internet opens interesting possibilities for identifying delays at their outset and mitigating impacts. Short look ahead schedules or fragnets can be posted for various subcontractors and these schedules consulted by all parties. Site computers (including handhelds) can download and update the schedules with actual progress as well as append any notes or photographs to affected activities that might ultimately be useful in later delay analysis. This kind of real time access to the schedule information can greatly help in the early identification of problems and early warnings of delay issues. This gives the parties the opportunity to take actions to mitigate the delay. It also helps to enforce self-adherence of the schedule, since information is graphically posted and is easy to understand. Schedule information is no longer buried in thick computer printouts in the back office but becomes available to measure and compare planned versus actual progress in real time.

With the schedules used, noted and saved on the web, including daily reports or correspondence, a trove of information becomes available for establishing a chronology of events. This information becomes a key source of data for developing as-built schedules which can then be compared to a baseline to determine the duration and impact of various delays and either put forward or defend against a claim.

Collaborative project sites may also include full time web cameras that allow immediate viewing of actual construction activity as well as recording and archiving of real progress in a single secure repository. Other forms of digital imaging can also be tied to the schedules and daily reports to provide a singular and authentic record of progress for substantiating or defending against claims.

Documentation is the crucial element in assembling the facts to substantiate entitlement as well as impacts and costs resulting from a particular problem. Documentation includes all data collected during the course of the job, such as correspondence, daily diaries, daily reports, field notes, marked up drawings and schedules, estimates and cost reports. Both successful proof of causation and successful recovery of costs are directly related to the degree actual records are available to support the claim.

Another benefit of the tools used to generate and track this vast amount of information is the ability of retrieving select documents when needed to research and support a claim. For example, all items associated with a time frame or a particular issue can be retrieved, sorted and presented for use in developing a chronology to identify causes and effects of certain events. This could include information scattered in a number of different files such as correspondence, meetings, transmittals, daily reports, schedules, payment records, inspection reports. Being on a web based database would allow all parties immediate access to the original document, helping to eliminate confusion generated by multiple copies and superceded documents. To the extent that sufficient documentation is already available on a collaborative web site, the less frequently disputes will arise to issues of fact or accuracy of the data, making it easier for parties to focus on the issues of entitlement and equitable adjustments.

Finally, in the event that a dispute is not resolved through negotiation, then having such documentation already in electronic form will substantially reduce the prohibitive cost of collecting, coding, assembling, copying and analyzing such information by other parties to the dispute resolution process such as consultants, attorneys, arbitrators, etc.

A FINAL WORD OF ADVICE

Certainly, no amount of information technology will ever make a construction project complete itself. The roles of the owner, architect/engineer, general contractor and subcontractors are vital to the success of the project. That doesn't mean, however, that traditional ways of doing things will always suffice. The most successful and innovative projects are always those where the project participants are visionaries — open to considering and adopting new ideas that can enhance their business. The new IT tools that the Internet offers may initially seem overwhelming in their sheer abundance, but the benefits they promise are likewise abundant.

Given the richness of these opportunities, construction players are well advised to be at once adventurous (exploring the new possibilities as far as they can) and patient (taking enough time to find the best ways to harness the technology). Perhaps partly because of the fierce competition among the dot-coms right now, vendors are quite focused on service — knowledgeable technicians are exceptionally willing to go over all of your questions at length, either in-person, over the phone, or by e-mail. So explore the field, think, and ask questions, but do resolve to try out at least a few of these new services. The best way to learn what can help you is by actually using the tools — putting them to work for you.

By **Paul Levin**, BSCE, MEAd. Levin has served the construction industry since 1969 in various engineering, construction management, and publishing capacities. He has written articles or contributed to AGC publications as well as *ENR, Construction Business Computing, and Construction Claims Monthly.* Recent publications Levin has authored include *Construction Contract Claims, Changes and Dispute Resolution* published by ASCE Press and *The Guide to e-Commerce and Web-Based Project Management in Construction,* published by wplpublishing.com. Portions of this article are adapted from "The Dot-Com Invasion: What Every Contractor Must Know!" from the November 2000 'Constructor' magazine, with permission. Editorial contributions by Gerald McEniry of Revay and Associates' Montreal office are appreciated.

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