Keeping Building Departments Ahead of the Curve

by Robert C. Wible

At no time in the past have code officials and their staffs been under greater pressure to function effectively and efficiently. The deep downturn in the economy has meant reduced revenues through building permit fees and property tax revenues, and the progress of those projects which are proceeding are being closely monitored by owners/developers with significant return on investment concerns. At the same time, the ongoing threat of natural and man-made disasters has exposed the critical importance of effective enforcement of up-to-date building codes and the need for more rapid disaster response and recovery programs, and building officials in a growing number of jurisdictions are facing pressure from elected leaders to align their programs to support community environmental and sustainable/green building initiatives. As a result of these pressures, regulatory efficiency is no longer just a good thing to do: it has become an imperative.

Since the summer of 2001, the Alliance for Building Regulatory Reform in the Digital Age, a public/private partnership of which ICC is a member, has identified and developed materials for building officials that include best practices and tools to help them to assess their administrative and enforcement processes and, if necessary, employ information technology (IT) to improve the effectiveness and efficiency of their building regulatory programs. This article draws upon the work of the Alliance at FIATECH and feedback from a recent joint ICC-FIATECH survey of building officials on the application of IT.

Growth and Benefits of IT

Surveys conducted by the Alliance in 2004 and 2005 estimated that approximately 10 percent of the nation's nearly 40,000 jurisdictions that adopt and enforce building codes use information technology in one or more areas of their administration and enforcement programs. The majority of those jurisdictions applied IT to either permit processing or to scheduling inspections, the latter through the use of interactive voice response (IVR) systems, a technology that has been around since the 1980s. Another study conducted by the Alliance with funding from the Institute for Building Technology and Safety documented jurisdictions ranging in size from the Township of Cobleskill, New York (population 4,600) to the City of Los Angeles, California (population 3,695,000) achieving savings in manpower and processing time equivalent to the total costs of acquiring and installing such technology within one year.

Most recently, a joint ICC–FIATECH survey conducted this fall of state and local building departments documents increased IT usage across the nation. The results indicate that more jurisdictions now apply IT not only to permit processing and inspection scheduling but to the complete range of administrative processes, including electronic plan review. The following examples are drawn from that survey and other Alliance studies and white papers.

Online Permit Applications and Processing

The ICC-FIATECH survey confirms that online permit processing remains the fastest growing IT application for building departments, and jurisdictions that employ it report 40- to 50-percent savings in both customer and staff time versus traditional over-the-counter permitting systems.

Ventura County, California (population 760,000) saved more than $1 million over six years and preserved three staff positions by streamlining and applying IT to its permit application process. Cobleskill has reduced staff processing time for permits from one hour to fifteen minutes and customer wait times from three hours to less than one, and eliminated the need for customers who live in New York City to make the 350-mile round trip to the township to pull permits for their vacation cottages.

The State of Oregon has begun a ten-year project to build the nation's first statewide electronic permitting system. When completed, it will link all 130 city and county building departments within the state and enable customers to conduct building department activities 24 hours a day, 365 days a year. It is estimated that the system, which is being funded by a 4-percent surcharge on building permits issued within the state, will save customers over $1 million each year in time alone.

Electronic Plan Submission, Review and Storage

Virtually nonexistent five years ago, electronic plan submission, tracking, review and mark-up, and storage has taken off in response to demand from the construction community, yielding as much as 60-percent savings

over traditional processes through shorter review times, greater accuracy and reduced travel.

The Osceola County, Florida, Building Office, which began putting electronic plan review in place in late 2007, is saving more than sixty hours per month in staff time and is projecting annual savings of tens of thousands of dollars in printing costs and thousands of hours of driving plans and plan rewrites to and from the county office. Maricopa County, Arizona, reports that its electronic plan review has reduced the average duration of the process from between eight and fifteen weeks to less than one week. Other jurisdictions now conducting electronic plan reviews include Atlanta, Georgia; Bend, Oregon; and the City of Lincoln/Lancaster County, Nebraska.

Scheduling and Conducting Inspections

The use of IVR systems to schedule inspections is one of the earliest applications of IT in building departments, dating back to the early 1990s. Recent advances in "smart phone" technology have enabled a growing number of jurisdictions to expand their IVR systems to conduct, report and post the results of field inspections, significantly improving turnaround time and increasing customer satisfaction.

Shelby County, Tennessee, which includes the metropolitan Memphis area, has used IVR to reduce inspection scheduling times by over 80 percent and reduce re-inspection processing time from two or three days to same-day service. The county has also applied IVR to automatically notify utilities providers when services should be activated, and includes a Spanish-language module in all of its systems.

Mobile Field Inspection Technology

Over the past five years, the use of devices such as ruggedized laptops, tablets and mini-computers, PDAs, and now smart phones to conduct field inspections has been the second-fastest growth area in the application of IT to building departments. These devices are credited by jurisdictions like Phoenix, Arizona, and San Dimas, California, with increasing the speed and accuracy of inspections by up to 30 percent. In addition, the use of ruggedized laptops was widely reported to have been a

major factor in the completion of more than 120,000 residential safety/damage assessment inspections in less than seven weeks in the City of New Orleans following Hurricane Katrina and the use of that data to speed completion of insurance forms.

Green Benefits

Communities that receive and mark up plans electronically and then grant online access to architects, engineers, owners and builders are realizing significant "green" benefits. An example jurisdiction that issues 3,000 permits a year eliminates 312,000 miles driving to and from building department offices to drop off and pick up plans, saving 20,800 gallons of gas and 457,600 pounds of carbon monoxide emissions (along with 12,480 hours of drive-time and $57,200 in fuel costs), and 192,000 pounds of paper (approximately 239 trees).

New Applications

In the aftermath of the devastation caused by Katrina, the State of Louisiana adopted a new uniform statewide building code based on the *International Building Code*. To assist in the effective and efficient administration of the code and the establishment of new building departments, the Louisiana State Uniform Construction Code Council commissioned the Alliance for Building Regulatory Reform in the Digital Age to develop an IT Roadmap for the state. Issued in the summer of 2007, the Roadmap assessed the existing uses of IT by local jurisdictions and laid out several approaches that the state might take to assist local governments in applying IT to their code administration and enforcement programs. The project also provided new building departments with a template for setting up their programs.

In addition, taking a cue from the use of remote field inspection technology in New Orleans, the Alliance held discussions with jurisdictions on the West Coast about undertaking a project to demonstrate the use of diverse hardware and software to conduct safety/damage assessments and have the resulting data roll up to a central database and populate appropriate government forms. The Los Angeles Basin Chapter of ICC, together with Robert Wible & Associates and the State of California Office of Homeland Security and Office of Emergency Services, successfully secured funding from the U.S. Department of Homeland Security to pursue the project, and in late August 2008 a pilot demonstration was

conducted in Los Angeles using seven different types of computers and a smart phone. An expanded demonstration of such interoperability including PDAs and smart phones was then conducted November 14 in Southern California as a part of the state's Golden Guardian exercise of response and recovery to a 7.8 earthquake along the southern portion of the San Andreas Fault.

Preparing for the Future

Building Information Modeling (BIM) is the digital representation of elements of a building from building design through materials, systems, assemblies and other components in a format that is uniformly readable by each system used in the entire life cycle of a building from design through construction, operation, maintenance, renovation and demolition. BIM is one of the major innovations speeding construction and eliminating areas of conflict and confusion.

Organizations including the National Institute of Building Sciences and several trade groups are working on various components of BIM standards necessary to make an interoperable database available to the architecture, engineering and construction and facilities management industries over the next four to six years. The Alliance, ICC and the Associated General Contractors Association of America BIM Forum are investigating what actions need to be taken now and in the immediate future to make certain that BIM data will be readily useable in conducting electronic plan reviews (including those in three and "four" dimensions, integrating real-time construction scheduling) and by inspectors in the field. In addition, several software vendors that provide electronic permitting and/or electronic plan review services to state and local governments are involved in looking into ways to enable their software to receive and use BIM data.

When these efforts are completed, architects, engineers, contractors and building owners will be able to assess the degree to which their BIM contains code-relevant information and ascertain whether or not the building will be in compliance with local codes and standards, and building departments will be able to view projects at any stage of design and construction to expedite plan review and better facilitate field inspections. Further, it will facilitate the exchange of critical information should the need arise during or after a disaster.

ICC's SMARTcodes project is an important early step, and a number of jurisdictions are working with the Alliance and the Code Council to prepare to use BIM and/or SMARTcodes in the near future. The State of Wisconsin has initiated a project to accept BIM data in the summer of 2009 for state construction projects, and its Department of Commerce is working with ICC to demonstrate the applicability of SMARTcodes plan checking tools to future statewide code compliance. Mecklenburg County, North Carolina, and Clark County, Nevada, are looking into making similar future use of BIM and ICC's SMARTcodes tools.

Conclusion

Even in these difficult economic times, return on investment information and input from jurisdictions that have successfully applied IT to their building regulatory programs may be used to successfully make the case for obtaining funding for the acquisition of IT. Approaches include permit fee surcharges, lease/purchase agreements and the sale of bonds.

First, however, it is best to make certain that your processes are as efficient as they can be. As observed by then-president of the National Association of State Information Resource Executives and State of Kentucky Chief Information Officer Aldona K. Valicente in her address to the Alliance at its formative meeting in the summer of 2001: "If all you do is put IT on a bad regulatory system, all you will do is spend a lot of money on making a bad system worse." ◆

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