OPINION

Beyond initial price: Analyzing true costs of CADD

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For organizations involved in architecture, engineering and construction (AEC), there are two stark realities of computer-aided design and drafting (CADD):

•Organizations without CADD capabilities will eventually not be able to compete with those that have CADD.

•CADD is complex and expensive, regardless of the initial cost.

CADD is part of the ultimate goal of directly involving higher-paid professionals and managers in the design and construction process. This is best accomplished by well-integrated design, drafting and management, from concept through construction.

"Integrated" means combining the more complex and mature forms of design, drafting and management. This is done with common databases and networked or centralized computer systems. Programs may remain separate or be combined into interrelated packages.

The first step toward reaching automation goals in AEC is to make sure all functional areas are running smoothly. Once this is in place, these areas can be integrated. Most likely, design and drafting will be combined first; management will be included later.

As functional areas become integrated, AEC professionals in large organizations will be able to justify their own desktop workstations for performing or monitoring all phases of work.

This kind of a solution is an expensive one; only a few organizations can readily justify costly CADD and management systems.

Fifty percent of AEC firms have fewer than 10 people, 75 percent fewer than 20 and 90 percent fewer than 50. Will the majority of firms be swallowed by larger organizations or will they bet their futures on low-cost systems?

Many AEC organizations are betting on low-cost systems based on microcomputers.

Unfortunately, there are two problems with this approach:

•Many vendors of CADD and management systems are not concerned with your long-range goals; their attention is focused on short-range sales.

•The expense of so-called low-cost systems is much greater than the buyer usually anticipates.

More sophisticated levels of design, drafting and management require capabilities that approach those of a minicomputer. This includes computational and input/output speed, large disk storage, and large-size output devices that can operate at high speed and resolution. Also important is communications between workstations; data integrity, security and backup; and high-level user languages.

When these minicomputer capabilities and overhead are added to micro-based systems, costs tend to exceed original estimates.

In the first year, costs for starting up and operating a CADD system are usually about two-to-four times the purchase price. At the low end ($25,000 or so for one workstation), the cost is usually quadruple the purchase price. At the high-end ($200,000 or so for the first workstation), it is double the initial price.

Spreading costs is a way of deal-

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ing with large start-up expenses. By financing the initial costs over two or three years, they can be absorbed by the organization and then offset by higher productivity.

Other ways to phase into CADD include the following:

•Timesharing a mini-based CADD system for six months or more. The service bureau's workstations could be used for training, initial development and conversion. In-house workstations could be installed later for production work.

•Using micro-based CADD for selected tasks. These include training, familiarization, experimentation, sketches, presentation drawings, detail sheets, non-dimensional drawings such as schematics, and routine drafting.

•Enhancing micro-CADD systems to directly communicate with larger systems. This applies to such jobs as symbol and detail input, viewing drawings, red-lining drawings, minor editing, remote plotting, and inputting drawings, data and text.

•Moving into a more sophisticated CADD system after reaching the limits of timesharing and micro systems. Firms that take this approach need to consider conversion costs if the timeshared or micro system is not compatible with the new system.

Careful consideration must be given to any system, large or small, purchased by an AEC firm. Look to see if the system is designed to be compatible with other systems and can be upgraded to meet the goals of the organization. It's not enough to look at just the purchase price; be sure you know the *true* costs.

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