Chapter 18

Problems in CAD practice

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CAD's greatest promise is as a creative, interactive tool, and planning and construction will be more complex as the need to expand information grows. Our tools not only shape our products, they shape our lives. Technology can influence everyday life and also affect the structure of our society.

Architecture is an information-intensive profession, and throughout the world information-intensive activities are being changed by technology. The use of computer-aided information processing in planning and construction brings about a period of dramatic change, and the dimensions of technological change will be breathtaking.

In the years to come, CAD will be an expanding field in the architectural office, but how long will it be before architecture is routinely produced on a CAD system? There appear to be three issues:

(1) cost;
(2) time;
(3) quality.

18.1 Cost

The cost of a CAD system should be compared with a company's expenditure on salaries, and any measurable improvement in quality and productivity will be worth the investment. It has been shown that as the efficiency of hardware and software grows, prices of goods and services fall. To realize an optimal system the required applications must be determined, and if we look at the process of decisions we see that

(1) the application directs the software;
(2) the software directs the hardware.

The costs decision is simplistic: we can no longer afford to ignore this technology. For many people CAD is a logical beginning.

The pressure on management to order a CAD system is often very great, but the investment decision must be rational and given careful consideration. A complete cost/benefit analysis must precede this decision. However, as the cost of CAD is usually equivalent to salary costs it is the more worthwhile expenditure.

There are significant differences between CAD systems and equipment, i.e.

(1) resolution,
(2) speed,
(3) versatility,
(4) three dimensions,
(5) colour graphics.

However, it is a question neither of choice nor of investment: it is only a personal problem.

18.2 Time

Architects are knowledge workers, but our collective body of knowledge is filled in the minds of people. Most of us like the tools of our trade and like to draw. Most architects are intimidated by microcomputer technology; others simply do not want to change.

Acceptance of CAD will be slow as long as these people control the process and resist changes. The application of CAD to architecture is more constrained by the number of people experienced in computers, who can be hired or retrained from existing staff than by costs or the development of new technology.

Timing is a great problem. The clever firms are moving, but cautiously. To move too fast will squander money, produce operational inefficiency and will not be cost-effective. Before establishing computers and CAD systems it is essential that training of architects will begin long before the initial installation of the systems. However, firms who do not train a generation of people experienced in computers will become outdated.

18.3 Quality

The most important reason for using CAD is improving quality. How many times have we looked at something we have just finished and thought: 'If only I had the time to do it again, I could have made it better'. With CAD, we can.

The architectural profession has used CAD as a production tool, but this is a misconception. Computer applications classically follow two phases:

(1) A process is identified as being automatically based on a simple 1:1 concept. Anticipated savings are not realized but the process hints at new opportunities.
(2) The process is adapted to the new technology. Quantum leaps in productivity and quality are made. Performance is achieved that could not be replicated manually at any cost.

Architects are hired to solve problems, to design buildings, but the greatest cost is not the cost of design, it is the production of working drawings. We do not spend money in solving the problem but in documenting the solution. With word processing and data processing on microcomputers there is no documentation problem. The problem is worked out on the screen. When the producer is ready he simply pushes 'Print'.

Surely the same will be true for design? When CAD becomes a creative interactive tool we will begin our design work on the screen. Work will continue in increasing levels of detail and when the design is ready the rest will follow quickly.

By far the greatest promise of CAD is that it will aid in improving concepts. Our buildings will be better. We can produce more designs from

more perspectives. We can link creative, intuitive thinking with solid analyses. We will test more alternatives. We will investigate everything more carefully. In future if we wish to solve problems as efficiently as possible there is not doubt that we must invest in a CAD system. Computers will be used from the first design through to construction.

The functions of the architects will change:

 (1) in the design phase, where the computer helps to develop alternative designs;
 (2) in the production phase, where the computer can work alone;
 (3) in the building management phase, because the stored data will help architects.

In future the computer will surely make new criteria in distributing projects (profession and operation, storage of data, etc.). Instruction and training are unavoidable, and new procedures and methods must be learnt to manage and use the technology. New views of the heterogeneous fields of information processing and CAD application must be obtained.

Therefore we must use the experience of other workers because it is cheaper to build up on the experience of others. We will be better architects and our profession will be more satisfying. But the winners will be our clients, and that is as it should be.