Computer use in a small structural engineering firm in New York

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R. Silman

Our firm is a small 15 person organization offering structural engineering services for architectural buildings only. About half of our work deals with renovation, adaptive re-use and preservation of structures. The other portion is mostly concerned with relatively small-scale speciality structures, no two of which seem to bear resemblance to one another.

Whereas this preamble might indicate that computer usage is not meaningful to our practice, quite the contrary seems to be true. Since 1970 we have had a computer in the office and have written many of our design programs. Our initial configuration was an old work horse - an IBM 1130 with 8K memory, punch card input and a bulky arrangement of hardware. On it we ran our own programs for design of structural steel, reinforced concrete and foundations. In addition we had the STRESS program for frames.

Today our hardware is a single micro with 64K memory and 8-inch floopy disc drives. We have converted our former FORTRAN programs from the old 1130 to provide steel and concrete design. In addition we use the SAP 80 program for frame analysis. The design programs in steel and concrete furnish quantities as part of the standard output.

With this equipment on hand we find that its use is relatively limited in our practice. This stems from several reasons:

(i) The computer is generally not useful at all in the design of building alterations or preservation.
(ii) In our engineering of new buildings, we find that it is the detailing which is the most intricate part of our participation, not the basic design of structural members. Making the structure interact sensitively with the architecture is a task not well - suited to the computer. We often consult to very progressive, avant garde architects and spend a large portion of our time fitting details together.
(iii) We do not have large crews working on any one job at one time. Thus it is unlikely that we could reduce manpower very often on any project. Perhaps man hours could be saved if the computer were used more assiduously.
(iv) We try to encourage the development of an intuitive sense in our younger engineers. In our firm they take responsibility for projects at a relatively early level of experience. The computer is excellent at reinforcing early design concepts, but we are more interested in developing the ability to generate concepts than facility with the machine.

We certainly do use the computer in both analysis and design. There is no question that certain complicated problems and many routine design procedures are best performed by machine. This is particularly useful should a client wish to make a last minute change - say in the live load capacity of the floor. It is also useful for comparison between systems.

We have not seriously considered the use of a CAD (Computer Aided Drafting) system at this time. It appears that it would be applicable to so little of our work that it would hardly be worthwhile. Our projects are neither large enough nor repetitive enough to warrant use of CAD.

The word processing function is valuable for specifications and reports and certain other information retrievals. Accounting requirements such as billings and

and job cost accounting make good use of the computer.

In summary, although we would not be without it, we do not feel that our practice is inexorably entwined with the computer.