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Application of Computers in an Engineering Firm in Switzerland

H.R. Schalcher

1. Introduction

Our engineering firm was founded in 1928 and has its main office located in Zurich. The total staff includes approx. 50 professionals, draftsman and construction supervisors. Our services cover structural and civil engineering, sanitary and mechanical engineering as well as construction supervision for all kinds of building and civil engineering works.

2. In-house computer facilities

Since 12 years we are collaborating with Olivetti Ltd. Switzerland. Therefore we are using today in our head office the third generation of Olivetti hardware and software. It's the mini computer system Olivetti P 6060 with an internal storage capacity of 48 K bytes, floppy discs and a printer. Most of the software was developed by Olivetti except some programs for special applications in structural analysis, which were created by our engineers.

3. External computer services

To solve the more complex problems we have direct on-line access to very large CDC computers of a private service center.

4. Fields of application

The most important application of the computer in our office is in structural analysis, e.g.

- geometrical values of cross sections,
- beams and floor slabs,
- linear and space frames,
- finite elements,
- foundations,
- retaining walls.

In addition, the computer is used for

- detail design of reinforced and prestressed structures,
- hydraulic calculations,
- survey and alignement of roads and railroads,
- building physics.

It is obvious that such an application is not very design oriented. The design process is only supported by computers through evaluation of different alternatives of structures or other important elements of the project.

Furthermore we are widely using our computer for administrative purposes, such as project budgeting and control, accounting, etc.

5. How is the computer used in practice?

The computer in our head office is operated and maintained by one of our engineers who is specialised in this field. He offers to his colleagues a walk-in service. They only have to prepare the input, whereas our specialist is responsible for producing the output and for advising the engineer for the interpretation of the results. This method has proved to be feasible and efficient for our office, because our engineers do not use the computer very often. Therefore

they are not trained enough and they are loosing their skill of operating the hardware quickly.

6. Special problems and future trends

Why are computers not more frequently used in our office? The main reasons for this unsatisfactory situation are:

- Most of our engineers have left the university 10 to 25 years ago. These professionals are not trained in computer application, they are not informed and to a certain extent they are even afraid about the actual and future development.
- Due to these facts most of these engineers oppose to learn about computers and how to use them in a design office. They are also against buying hardware and software, because they consider such equipment only as a very expensive toy for scientists and theorists.
- Under these circumstances it is also very hard for the junior engineers, who are familiar with computers, to apply their knowledge in practice.

On the other hand it is evident that the young generation grows up in a computerized environment. A comprehensive survey carried out in Switzerland in 1982 on the high-school level has shown the following results:

- 90% of the high-schools offer to their students a training in computers and their application (43% are compulsory courses).
- More than 600 computers and terminals for the students are already installed on that educational level.
- 80% of the students are using BASIC as programming language.

With regard to the technical universities the break-through of the computers has already happend: Every student in any technical discipline has to follow courses and practical exercices in this field.

Taking into consideration the sharp decrease in size and price of computers during the past five years and the development of software that facilitates more and more the application of the hardware, it is foreseeable that in the near future, computers will take design offices by storm and change the daily work of the professional engineer considerably. What can then be done to close the gap of information and understanding between the younger and the elderly engineers?