Chapter 3
Profiling the Project

3.1 Influences at the Project Level

The design team and the way it works are critical to the outcome of any design project. A well-chosen and carefully managed team is essential, but it is often difficult to create an effective team from the available resources. Design projects have widely varying characteristics, and it is necessary to create a team responsive to the particular set of characteristics. In any particular project, the team composition may need to be modified as the project progresses through its natural phases, but the manager may not have the power or the resources to make the necessary adjustments. The best that can be done is to assess what sort of team would be ideal for the project and match this as closely as possible with the available people and available services.

A first step in this matching process is to consider the characteristics of the project in more detail. One way to do this is to take the four main features of a project as described by Rodwell (1971) and build on these to compile a comprehensive project profile covering the task, the design team, the design tools and techniques available, and the design team output. This may then be used to monitor progress and assist in matching the design team characteristics to the task as the project progresses through its different phases.

3.2 Design Task

The four main characterizing features of a project that Rodwell (1971) identified were:

- Magnitude
- Complexity
• Novelty
• Production quantity.

Project size is an obvious factor, but it has some subtle effects. On a small project, the project plan, and hence the path that the project follows, may be clearly defined and more transparent to the design team. Each of the team members may be involved in a wide range of tasks and they may know the intimate design details of every component.

In a larger project, a higher level of coordination and project planning is required. The "big picture" may not be as clear to each of the team members. Individual team members are likely to be working on single components or sub-assemblies of a much larger system. The design tasks are often more specialized and there are likely to be more resources available to complete tasks to a much greater level of detail. For example, one of us was once involved in a project, which from his viewpoint was a large project, requiring a much larger team than for previous projects. An outside consultant working as part of that design team had exactly the opposite problem. All his life he had worked on large-scale projects, such as blast-furnace design, and from his viewpoint this was a tiny project. So here was a team where one person was trying to come to terms with working on the largest project he had managed before, while another was trying to come to terms guiding the smallest project he had worked on before. The result was not a happy one, as the consultant, who was highly respected in his field, was keen for certain features to be incorporated in the design, which, it turned out later, were on too "grand" a scale within the scope of the project. The author, on the other hand, did not have the experience at the time to assess the full impact of what was being agreed to and had too little "clout" to do much about it anyway.

Projects range from very simple to extremely complex, and it is important to get a feel for where the project lies along this scale. For example, the project mentioned above required a pressurized natural-gas feed system, an oxygen feed system, an excess air system, a slag feeding system, and a water cooling system, all on a large industrial scale but squeezed into a confined space within existing building facilities. This made for a highly complex design problem. Had more space been available the problem would have been greatly simplified and the demands made on the design team would have been considerably reduced.

The level of novelty involved in a project also has a far-reaching influence on the way the team is built up. In many projects the level of novelty is low and it is possible to prove the technology before there is any manufacture. In this case there is little advantage in developing a team strong in creativity. It may be better to have a team with exceptional strength in detail design instead. For example, in vehicle design, many components stay the same from one model to the next and the overall concept rarely changes, whereas the design of equipment to do specialized testing usually involves some kind of completely new concept. The design team for the new car model needs to include staff from many different