

itself. The following points should not be taken to represent a comprehensive list of discrete properties of the design situation; indeed they are often closely interrelated and there is thus some repetition. Taken together, however, they sketch an overall picture of the nature of design as it seems today.

## Design problems

### *1 Design problems cannot be comprehensively stated*

As we saw in Chapter 3 one of the difficulties in developing a map of the design process is that it is never possible to be sure when all aspects of the problem have emerged. In Chapter 6 we saw how design problems are generated by several groups or individuals with varying degrees of involvement in the decision-making process. It is clear that many components of design problems cannot be expected to emerge until some attempt has been made at generating solutions. Indeed, many features of design problems may never be fully uncovered and made explicit. Design problems are often full of uncertainties both about the objectives and their relative priorities. In fact both objectives and priorities are quite likely to change during the design process as the solution implications begin to emerge. Thus we should not expect a comprehensive and static formulation of design problems but rather they should be seen as in dynamic tension with design solutions.

### *2 Design problems require subjective interpretation*

In the introductory first chapter we saw how designers from different fields could suggest different solutions to the same problem of what to do about railway catering not making a profit. In fact not only are designers likely to devise different solutions but they also perceive problems differently. Our understanding of design problems and the information needed to solve them depends to a certain extent upon our ideas for solving them. Thus because industrial designers know how to redesign trains they see problems in the way buffet cars are laid out, while operations researchers may see deficiencies in the timetabling and scheduling of services, and graphic designers identify inadequacies in the way the food is marketed and presented.

As we saw in Chapter 5 there are many difficulties with measurement in design and problems are inevitably value laden. In this sense design problems, like their solutions, remain a matter of subjective perception. What may seem important to one client or user

or designer may not seem so to others. We, therefore, should not expect entirely objective formulations of design problems.

### *3 Design problems tend to be organised hierarchically*

In Chapter 4 we explored how design problems can often be viewed as symptoms of other higher-level problems illustrated by Eberhard's tale of how the problem of redesigning a doorknob was transformed into considerations of doors, walls, buildings and eventually complete organisations. Similarly the problem of providing an urban playground for children who roam the streets could be viewed as resulting from the design of the housing in which those children live, or the planning policy which allows vast areas of housing to be built away from natural social foci, or it could be viewed as a symptom of our educational system, or the patterns of employment of their parents. There is no objective or logical way of determining the right level on which to tackle such problems. The decision remains largely a pragmatic one; it depends on the power, time and resources available to the designer, but it does seem sensible to begin at as high a level as is reasonable and practicable.

## Design solutions

### *1 There are an inexhaustible number of different solutions*

Since design problems cannot be comprehensively stated it follows that there can never be an exhaustive list of all the possible solutions to such problems. Some of the engineering-based writers on design methodology talk of mapping out the range of possible solutions. Such a notion must obviously depend upon the assumption that the problem can be clearly and unequivocally stated, as implied by Alexander's method (see Chapter 5). If, however, we accept the contrary viewpoint expressed here, that design problems are rather more inscrutable and ill defined then it seems unreasonable to expect that we can be sure that all the solutions to a problem have been identified.

### *2 There are no optimal solutions to design problems*

Design almost invariably involves compromise. Sometimes stated objectives may be in direct conflict with each other, as when motorists demand both good acceleration and low petrol consumption. Rarely can the designer simply optimise one requirement without suffering some losses elsewhere. Just how the