16 Applying the Framework to Housing

This opening chapter for the second part of the book applies the process of choice determined by the earlier chapters. It then outlines the basis of a case study that will be used to introduce how this process has led to the common forms of house construction in the UK at the beginning of the twenty-first century.

The need for an integrated approach

The previous chapters suggest that proposed construction solutions have to be evaluated through a number of areas of analysis. There is a danger that this leads to the view that each area of analysis can be considered independently and they can be carried out in a given order to make the final choice. This view is not correct and it is hoped that this text has not given this impression. The first few chapters of the book are designed to give a holistic feel to the process of choice before the detail of analysis of construction is introduced.

In reality each project has its own balance of priorities set by the client and its own context that determine the appropriate approach. The emphasis is on evaluation as a holistic process, not satisfactorily complete until all the areas of analysis show acceptable predictions. While each analysis is largely independent, it is always being undertaken in a growing understanding of the outcomes of the evaluation as a whole. Early proposals need to be provisional until the outcomes of each analysis have become clear. This leads to the need to have techniques to establish approximate solutions for each analysis in order to see whether an overall solution is possible, as well as detailed design information to make the final choice.

This text is based on a framework, not a sequence. The process has been thought of as dynamic, open and iterative, moving towards a solution but without prescribing the route. The choice has to be made within a framework that indicates the range and scope of issues that have to be taken into account, a framework that can be used to establish the possible complementary, possibly competing, factors that will determine the success of the construction in technical and social terms.

It is difficult to reproduce this process in the pages of a book. It is, by its very nature, one that has to be experienced to fully understand how what sounds like a chaotic process is controlled and rational, and yet creative choices are made in practice.

This text has set out to explain a basis for the technical and rational aspects of the process and maintains that it is only through this understanding that the creative and innovative can be put into practice.

In order to continue to apply this approach the chapters that follow are written from the perspective of a case study. The case is the choice of construction for houses for the UK at the beginning of the twenty-first century. This chapter introduces the context in which these choices are being made, the nature of the environments, physical and social, and identifies the aspects of design, appearance and the resource base that will condition the choices to be made.

The basis of the case study

The study is focused on the house, a single-occupation dwelling with its own ground floor and roof, and therefore does not include flats, although the house could be detached, semi-detached or terraced. This description could include specialist accommodation such as sheltered housing, so the study will be further limited to family occupation. Given the time and place specified for the case study, the notion of a family, its members and their relationship is changing. Because the house is still the aspiration for many of these families, this text assumes that these changes will not significantly affect the construction of what these families are seeking, although there may be changes in the performance requirements with new patterns of use within the house.

While this description of a house will allow a broad understanding of the needs of the user, it says nothing about the resource base or industrial structures to both design and build houses. This case study will focus on the decision-making of the speculative, volume house builders as they construct the majority of houses built in the UK at the beginning of the twenty-first century. The methods of building they adopt will make resources available and therefore even the more bespoke individual development will tend to choose the same technological solutions. The more innovative designs may need to develop other technical solutions. These designs may have to adopt an approach more like that suggested in Part 3 of this book for commercial buildings, where solutions are more diverse.

The two ideas used so far to define this case study – family and industry (demand and supply) – have set much of the scope of choice. The depth of understanding that is necessary, of each of these ideas, should not be underestimated to appreciate why certain construction solutions will be chosen.

This was the thrust of some of the earlier chapters of this book, where it was suggested that it is necessary to understand something of the physical and social environments within which choices are made. This will include an appreciation of house design and the resource base available to the house-building industry.

Physical and social environment

The case study is set in an advanced industrial society on a highly populated island in a temperate climate. The social values include the distribution of private wealth with equity and respect for all members of society, with a growing awareness of environmental impact. This gives a high level of demand for housing, with limited land and high prices on the open market but a need for social housing.

These few facts start to create a picture of the context in which the choices will be made. Many of the details will emerge in the chapters that follow, but even this short description can lead to some more observations. Advanced industrial societies often have a great deal of legislation and regulation. We can take advantage of factory production and transport of component and prefabricated sections of buildings from almost anywhere in the world. We are, however, having a huge impact on the environment. The need for housing on our highly populated island means that we are increasingly building on previously developed land, brown-field sites, and have a problem in dealing with our waste. Our concerns for equity and social justice, with a fair standard of living for all, set relatively high performance levels for construction. The temperate climate defines our weathering problems and indicates that water penetration and winter heating are major concerns for house construction. There are now concerns that the levels of human activity we wish to sustain are causing environmental changes that threaten our ability to maintain this progress. Environmental concerns must take their place with economic and social considerations to ensure sustainable development.

There is limited value in this text in exploring these ideas in detail, as this is not the purpose of this book. The more significant aspects have been introduced in the previous chapters and the reader should become increasingly aware of

the importance of these factors as the following chapters develop the basis of choice for the construction of houses.

The resource base

With high levels of house-building activity the supply of materials and factory-produced components is good, but there is a shortage of site labour and the traditional trade skills in particular. To meet demand considerable attention has been paid to specifying components and prefabrication, including modular and even volumetric systems to limit site operations (although these will not be discussed in detail in the chapters that follow). Machinery is readily available for materials handling. The introduction of cordless hand tools has influenced fixing and jointing processes, often now the focus of the site assembly processes. Money for housing is readily available where risk is low, although the resources for social housing are more limited and highly regulated.

Design and appearance

The basic design and appearance of the house is well established. The pattern of living is sufficiently common for the major rooms of living room, bedroom, kitchen and bathroom to be easily identifiable, with some circulation space including hallways and staircases. While there is increasing variety in the number of rooms in a house and some creative internal layouts can be observed, the size of the rooms has generally been reducing, particularly in the volume housing market where the whole building footprint and plot size is reduced. This has led in some cases to habitable space extending into the roof.

Externally the brick house is still a dominant form. Rendered finishes may be used, although they still maintain the sense of masonry construction. Roofs are pitched with tiles or slates to give the characteristic shape to either bungalows or two- and three-storey houses. There is then a variety of window forms, including bays and oriels often used to gain variety in housing estate design. It is not possible to generalise on the designs for the individual client, where expression in materials such as glass and timber may be featured along with a willingness to include aspects associated with sustainable development.

Internally finishes are plain but need to accommodate a variety of building services. Energy saving has featured in the regulations over recent years and has had a large influence on detailing, and this is likely to continue with increased environmental concerns. In the single dwelling fire resistance is only nominal within the dwelling, but walls between dwellings (party walls) and the roof finishes that are continuous between dwellings are subject to more stringent regulation. New regulations on soundproofing and air infiltration with the possibility of the need for performance testing and the introduction of robust detailing are also changing the construction of and specification for houses.

Environmental concerns are affecting the balance between passive and active technologies as well as the choice of the components, materials and detailing itself.

Common form

The conditions established for the case study have given rise to the common form introduced in Chapter 3. This will be developed in greater detail in the chapters that follow. With the overall form established it is possible to take an elemental approach to floors, roofs, walls, foundations and services. Each element contributes a major group of functions and is easily recognised by the basic construction solutions. However, the question arises as to what order they should be considered in. It has already been established that no one element can be fully selected without some reference to the probable form of the others. In this case the elements that can be discussed knowing least detail of the other elements are the floors and the roof. These transfer loads to the walls, and so it is necessary to discuss these before walls can be fully investigated. It is then

possible to complete the structure by looking at foundations where the loads from a house are relatively low and the site conditions are unlikely to dominate the choices for the superstructure. Finishes will be discussed with each element to cover all the analysis of the passive construction. This leaves the active services, although aspects of them will have inevitably been introduced by their need to be integrated with the other elements.

Summary

1. The framework identifies the areas to be considered but does not suggest the sequence in which the areas of analysis should be undertaken. The nature of each project will determine the key choices, with no single choice being confirmed until all areas have been considered, at least in outline.
2. The case study approach to be used in the next five chapters concerns the choice of construction for a house in the UK to be built at the beginning of the twenty-first century.
3. The physical and social environment in which this case study is being considered is represented by the needs of the family in an advanced industrial society, on a highly populated island, in a temperate climate, in a society that strives for social equity and has a growing environmental awareness.
4. The advanced industrial society gives high labour costs and shortages but provides the infrastructure for factory production and prefabrication as an alternative to traditional craft-based construction.
5. Given the design expectations of the users of housing, a well-defined format for the house has emerged for the speculative and social housing market, although much of the detailing within this format will be evolving and must be confirmed for each project.