FURNITURE DESIGN

Stuart Lawson

AN INTRODUCTION TO DEVELOPMENT, MATERIALS AND MANUFACTURING

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Laurence King Publishing

For ROBM&C

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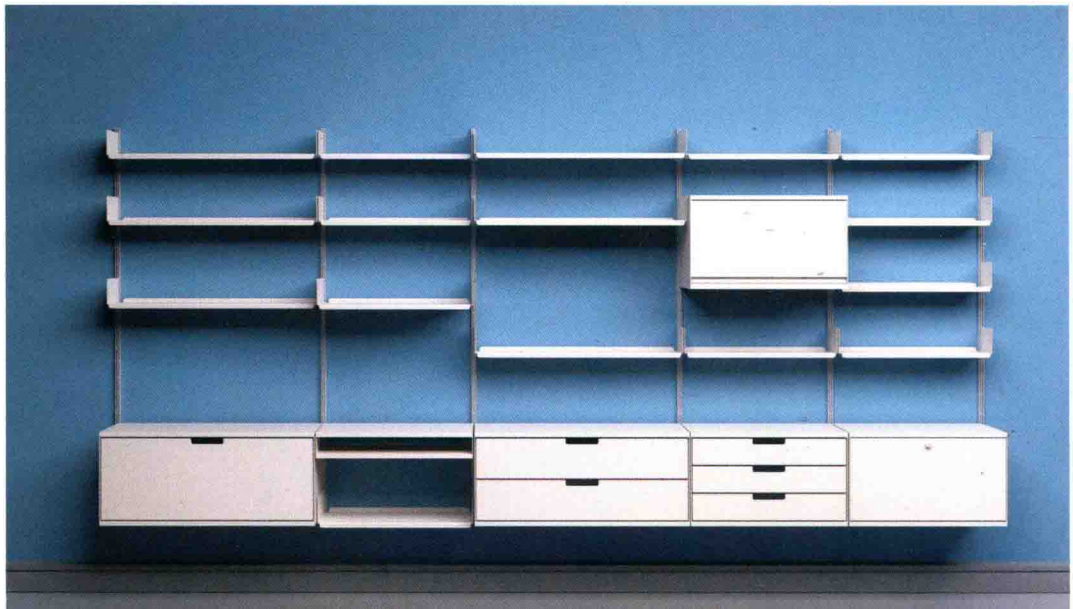
Introduction

Intended to inspire and inform in equal measure, this book is primarily written for students of design seeking to balance real-world process with guidance about design methods and material and manufacturing specifications for industrial production. No single approach to concept origination or design development is prescribed. Rather, the book's commentary and content aims to engender expansive and reductive thinking around function, aesthetics, material selection, manufacturing and component geometry. This book also provides an insight into furniture design for those considering a tertiary education in product and industrial design.

Below: **Between its inception in 2003 and its launch in 2009, Studio 7.5 produced 30 different prototypes in the development of the Setu Chair for Herman Miller.**

Bottom: **Dieter Rams's 606 Universal Shelving System for Vitsoe + Zapf was launched in 1960 and uses extruded aluminium, folded steel and a laminated timber-board substrate.**



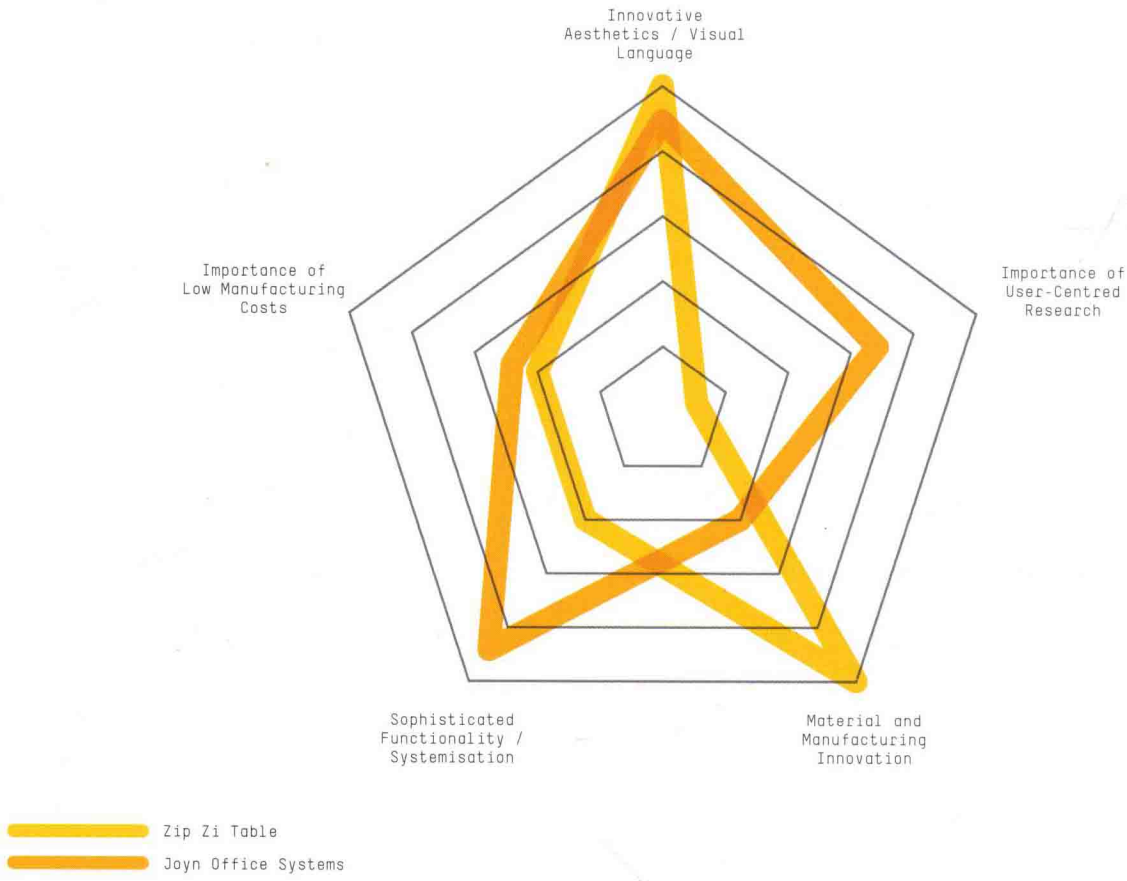
Joyn Office Systems (single desk), Ronan and Erwan Bouroullec for Vitra, 2003.

Furniture Design: An Introduction to Development, Materials and Manufacturing is primarily focused on industrial design for volume and mass production for the simple reason that nearly all furniture designers are employed within this realm. In addition to having keen and creative rationales, designers need a good understanding of materials and manufacturing parameters to communicate productively with engineers and ultimately to produce designs on brief and within budget for a client. *Furniture Design* is by no means an exhaustive guide to design and manufacturing, but as a companion for designers it provides an easy-to-access resource of furniture-design knowledge.

While choosing a material or a manufacturing process can be a rational and objective exercise, there is nearly always more than one solution to creating a form, structure and aesthetic, or to reducing costs or improving interaction. It can be revelatory for aspiring design students to discover that creativity exists in nearly all aspects of their design and development process, and that the designer's role is just one part of a long line of expertise that helps bring products to market.

The inspiration behind an idea and the focus of a brief will invariably be different, depending on the 'job' – if one exists – and the designer. The two example projects illustrated above and overleaf are both visually and technically innovative, but their designers had very different concerns during the course of each product's development. Both clients were high-end brands and so costs could be relatively high (but not rampant). The Joyn desk is manufactured in fairly high volumes and the Zip Zi table in low-volume batches. A designer would not necessarily approach the process using a graphic like the one that appears on the next page, but the need to conform to some kind of rationale is inherent in the subsequent development and, therefore, consciously or otherwise, the designer is guided by such parameters.

Few designers work to open, creative briefs; the vast majority of professional commissions are a balance between creative freedom and well-defined restrictions



Relative importance: factors that inform a brief and govern the design process.

Opposite: **Zip Zi Folded Paper, Michael Young for Established & Sons, 2007.**

of function, aesthetics, manufacturing capability and cost. Clients normally have sufficient ideas, market research or company feedback to understand that they need a certain sort of product, in a choice of certain materials and with a manufacturing and shipping cost below a certain price point. They may seek new manufacturing partners for innovative projects, but, on the whole, they will want to stick with their existing manufacturers to manage their risk. Companies with their own manufacturing capabilities are even less likely to step outside of what they know unless there is a clear commercial advantage. Central to any design process is the cost of manufacture in relation to the number of units to be produced and the target retail price. It is also imperative to consider the most suitable materials and approaches to manufacturing.

Choosing the correct manufacturing process for each component is paramount. The investment needed upfront for large-scale industrial manufacture can be significant. Tooling for the likes of injection-moulded thermoplastics or for high-pressure die castings is extremely expensive and can be very risky considering that no sales will have been made of the product. Therefore, for small production runs, such technologies become untenable. Cheaper tooling costs for such methods as the rotational moulding of plastics or the sand-casting of aluminium may enable a project to get off the ground, as may the fabrication of components using adhesives or welding technologies. There are, however, restrictions and limitations when using lower-cost manufacturing technologies, both in visual refinement and in the tolerances available. The options for design and manufacture may at first seem vast, but once a client, a budget, an environment or a sustainability requirement is introduced, the decision-making process invariably becomes more straightforward.

Above: **Impossible Wood, Doshi Levien for Moroso, 2011. This armchair is injection moulded using a thermoplastic composite of 80 per cent wood fibre and 20 per cent polypropylene.**

Top right: **A Pile of Suitcases, Maarten De Ceulaer for Gallery Nilufar, 2008.**

Right: **Plastic Classic, 2009. Pili Wu's prototype combines a ubiquitous Taiwanese restaurant stool with a traditional Chinese loop-backed chair.**

Exploring the content

Chapter 1 provides a cultural and historical context for contemporary furniture design and outlines key functional, technical and aesthetic innovations since 1900. It goes on to study in more depth designers' rationales for seminal works, with a special focus on the furniture canon since the year 2000.

Design briefs and professional practice are covered in chapter 2, which also investigates anthropometrics, ergonomics and the governing principles of primary and secondary research. The chapter concludes with a series of case studies that underline the importance of concept development and testing.

Further case studies in chapter 3 explore material- and manufacturing-centred approaches to design and the issues surrounding sustainable and ethical design. The book's final section is a technical resource encompassing material properties and manufacturing processes, and is intended as a tool for readers to research their ideas' potential and to create basic specifications for manufacture.

Readers should digest this book in any way they like, but the following enquiries suggest the most productive and rewarding ways to navigate it. By cross-referencing the book's content, readers will begin to see how ideas, materials and processes can be allied to create visually and technically innovative solutions.

Precise enquiry

- To research how to establish a project brief, explore 'Research for design' (2a) and 'Ergonomics, anthropometrics and spatial conventions' (2b).
- To find the most appropriate manufacturing process for a project, based on known criteria such as shape geometry, manufacturing volume, possible materials, manufacturing tolerances (the possible accuracy of parts) and achievable detail definition, study the metal, plastic and wood manufacturing subsections in 3c.
- To find the most appropriate material for a project, based on known criteria such as structural characteristics, environmental performance, aesthetic potential, achievable detail definition and durability, study the metal, plastic and wood materials subsections in 3c.

Broad enquiry

- Explore chapters 1 and 2 and sections 3a and 3b and cross-reference the featured designs and commentary with the materials and manufacturing section of 3c.
- Either by browsing 3c or with specific materials and manufacturing processes in mind, refer back to the previous chapters to find examples of a material, manufacturing process or surface finish.

Chapter 1:

A survey of the development of furniture design