PART 1

ROADMAP TO SOLVING DETAILING PROBLEMS

CHAPTER 1

THE DESIGN/DETAILING PROCESS

1-1 INTRODUCTION

Detailing is that part of the project delivery process that lies roughly between initial conceptualization and final construction documentation. It is the point where the grand ideas of the designer meet the hard realities of construction fact. Although detailing is not spelled out as a separate design activity on proposals and invoices, happening mainly during design development but also during schematic design and construction drawing production, it is one of the most important aspects of a designer's skill set. Detailing is really "designing a detail."

Good detailing has many advantages. In addition to improving and enhancing design, it can reduce construction costs, minimize the designer's liability, and speed the production of construction drawings. Detailing can also be a valuable link for outsourced work, either onshore or offshore, because it provides the vital aspect of good communication required for successful collaboration with outside production assistance. A design office can also use detailing as a training vehicle for young designers and as a way to create a signature style.

In many ways detailing has a schizophrenic nature. It is pure design as well as technics, intuitive as well as analytical, holistic as well as compartmentalized, left brain as well as right, fun as well as hard work, and quickly inspirational as well as time-consuming. The best detailers are those who can simultaneously occupy the worlds of creative designer and knowledgeable technician, switching from left brain to right brain as they work.

1-2 WHAT IS DETAILING?

Detailing can be thought of as a subset of interior design in general. It is a *creative process* of problem solving with constraints and choices aimed at translating broad design concepts into construction reality. Sometimes there are more constraints than choices and sometimes more choices than constraints. It is the designer's task to know how to make the best choices and attempt to make constraints into assets. It is not just a technical activity but also a creative process.

Although detailing means different things to each designer, there are three basic things detailing does. First, it is a way fitting the pieces together. There must be a way of physically

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and visually connecting the various components of an interior space or architectural feature. For example, a doorframe must attach to a wall opening in some fashion regardless of how simple or complex the detail may be. Second, detailing solves functional problems, responding to the specific needs the interior space is trying to fulfill. For example, providing a moisture-resistant, durable surface is something a bar countertop must do, but there are innumerable ways that such a surface can be created. Thirdly, detailing is one of the most important ways to enhance the overall design intent of the project. The basic elements and principles of design, as well as broad design concepts, can be reinforced with the design of the smaller-scale details that make up a space.

Detailing as a Wicked Problem

Like interior or architectural design in general, detailing is a type of wicked problem. The term *wicked problem* was coined in 1973 by Horst Rittel and Melvin Webber. Rittel was a theorist of design and planning at the University of California, Berkeley. Webber was an urban planner and professor of urban and regional planning, also at UC, Berkeley. Although the term often refers to very large-scale economic or political problems, like ending world hunger or improving the healthcare system, a design problem is also a perfect example of a wicked problem. An interior designer must understand the nature of wicked problems to be a good detailer while maintaining a practical business orientation toward completing a project on time and on budget.

There are several aspects to wicked problems that Rittel and Webber identified that are characteristic of interior design and architectural problems. Some of these are the following, in no particular order:

- There is no right or wrong solution. Given the same basic design or detailing problem with the same client, program, and constraints, 10 different designers will come up with 10 different solutions, all of which may be acceptable and generally solve the problem. Even with a very narrowly defined detailing problem, such as a wood doorframe placed in a wood stud partition, there may be one very *common* solution used by all designers in most situations, but never *just* one.
- There is no definite stopping point. Every designer has experienced the situation of wanting more time to improve the solution. Because there are so many variables to design problems, there are always more alternatives to explore or research to be done. However, the realities of interior design, including the designer's budget, dictate that the best solution be selected at a particular time to complete the project. Often, this is the area where designers lose their business sense and spend more design time than they have budgeted.
- Constraints and resources to solve the problem change over time. In spite of the most detailed program and understanding of a problem, many things can change during a project. The client may change the budget or project requirements, new materials may come on the market or become scarce, construction costs may rise, or building codes may change. The designer is almost always shooting at a moving target.
- Often, a solution is required to fully understand the problem. Although various types of modeling, such as three-dimensional drawings, physical models, or full-size mockups may be used, the true test is to build the facility and see how it works. Modeling or even existing, similar facilities only provide a partial view of how the proposed solution will work.

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- Every problem is unique. Interior design and architectural projects are, by their vary nature, unique. Even the same building type with the same client and the same program will vary depending on geographical location, budget, or time of construction. When looking at smaller detailing problems, such as how to design and install a kitchen cabinet, there may be identical ways of building the cabinet and mounting it on the wall, but it will still have variations in materials, finish, and hardware.

Although wicked design problems present many challenges to the interior designer, they are also what make the process and the profession valuable, interesting, and enjoyable.

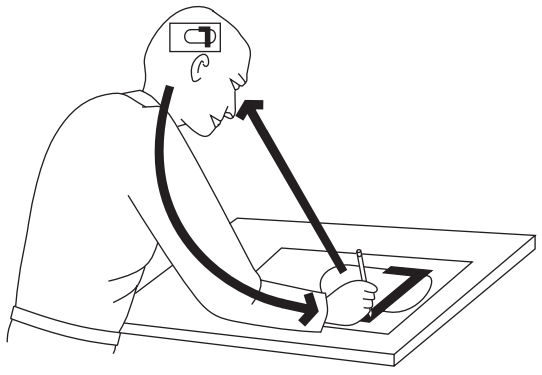
1-3 THE DRAWING-THINKING-DRAWING CYCLE

Like other aspects of interior design, detailing is, for the most part, graphic problem solving. Designers use various types of graphics methods to study and resolve the issues they face. This is a cyclical process in which the designer begins with a thought, no matter how minor or undeveloped, sketches a representation of it on paper, looks at the image, and thinks about it and its implications. See Fig. 1-1. The cycle repeats, with each cycle refining the image until a complete resolution of the issue being studied is resolved. With each cycle three things, or some combination of the three, happen. The designer explores ideas, learns something, or makes a decision.

There are many ways that someone may represent their thoughts, but it usually takes the form of marks on paper, typically tracing paper. When the problem being investigated is a design or construction detail, multiple layers of tracing paper should be used to help refine the design. The first sketch may be a very rough idea of the solution, while successive tracings refine the image, retaining (tracing) those elements that seem to work and drawing new lines to reflect new or modified ideas.

One of the most important aspects of this type of graphic problem solving is that it must be done with the hand and on paper. The problem-solving process works in a unique way when eye, hand, paper, and brain are intimately connected through this technique. Contrary to what some designers may believe, a computer is not a good instrument for this type of work. Like using a sharp pencil, the computer, regardless of the drawing or sketching program being used, slows the process of recording ideas and is too precise early in the problem-solving process. Manipulating a computer generally gets in the way of the rapid, multilevel thought

Figure 1-1 The drawing-thinking-drawing cycle



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that the brain is capable of. Although there are several good sketching programs available, both two-dimensional and three-dimensional, the best method is still marker on tracing paper. No other method can respond to the variety of graphic methods of representing problems that designers use. A computer is most useful when a designer alternates between paper sketching for rough ideas and computer-aided design for exploring three-dimensional models that can be quickly developed and manipulated to view the image from multiple points of view.

1-4 PROCESS TOOLS AND TECHNIQUES

Process Tools

Partly because design and detailing are types of wicked problems with no single answer or algorithm for solving them designers typically use analog representations of problems. An *analog representation* is one that relies on a naïve depiction of something rather than text, numbers, or formulas. These representations are a way of abstracting the problem or issue under study to simplify it and make it easier to solve. In most problem-solving sessions, a designer will use several different representations in quick succession or alternately to study a problem. This is one of the reasons a computer, in the best case, slows the process and, in the worst case, hinders it.

Some of the process tools include the following. A few are illustrated in Figs. 1-2 through 1-5:

- bubble diagrams
- area diagrams
- stacking diagrams

Figure 1-2 Bubble diagram

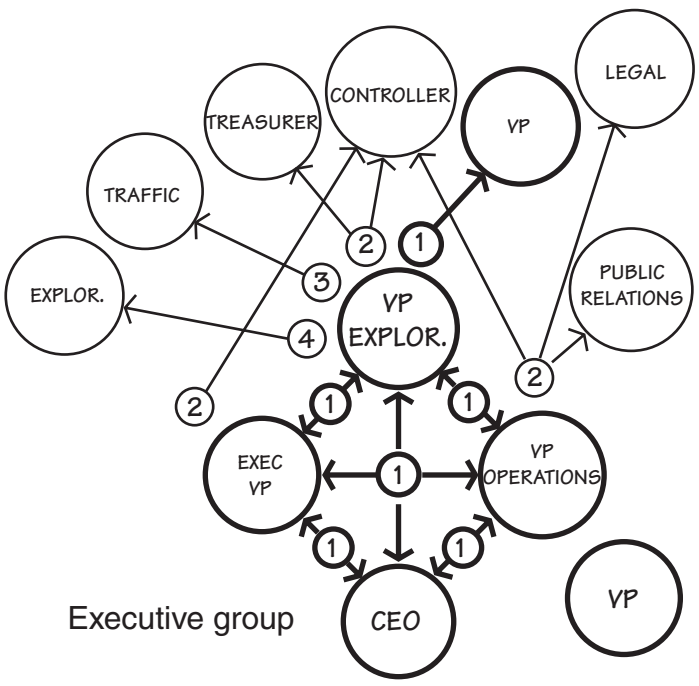

Figure 1-3 Area diagram

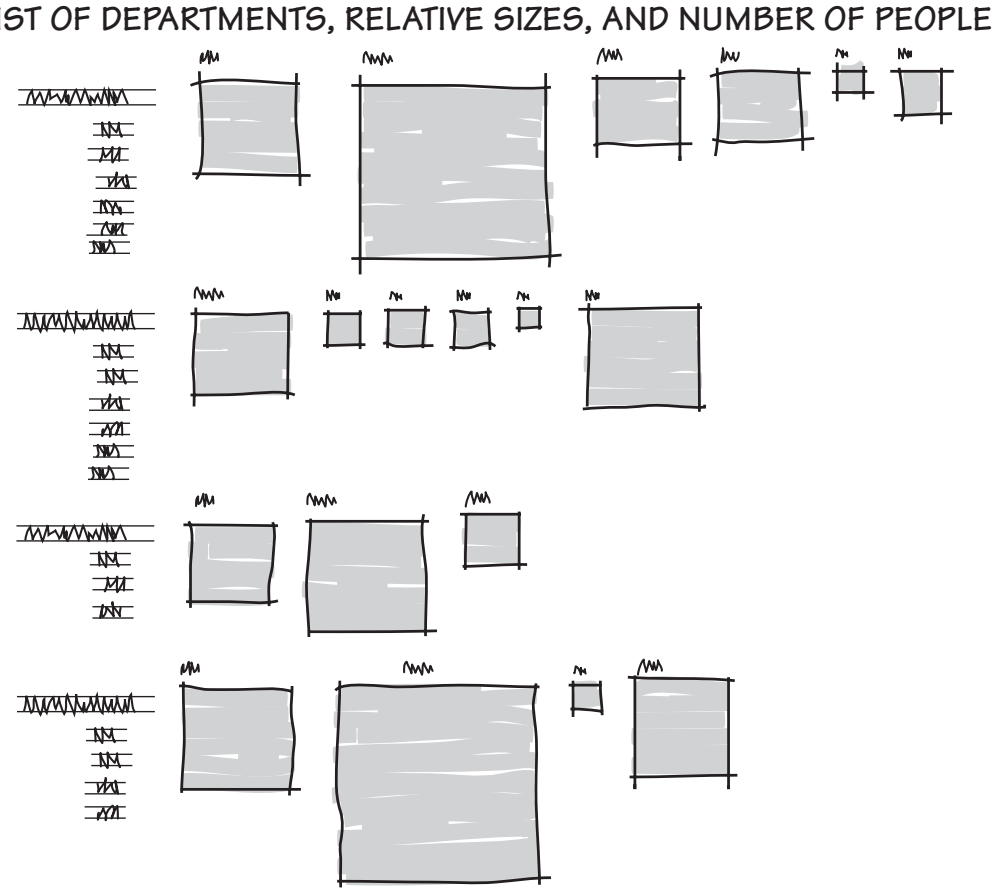

Figure 1-4 Evaluation matrix

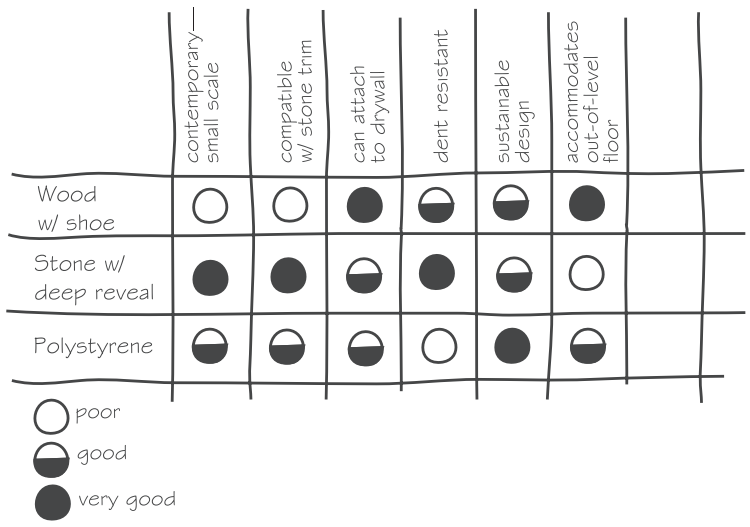

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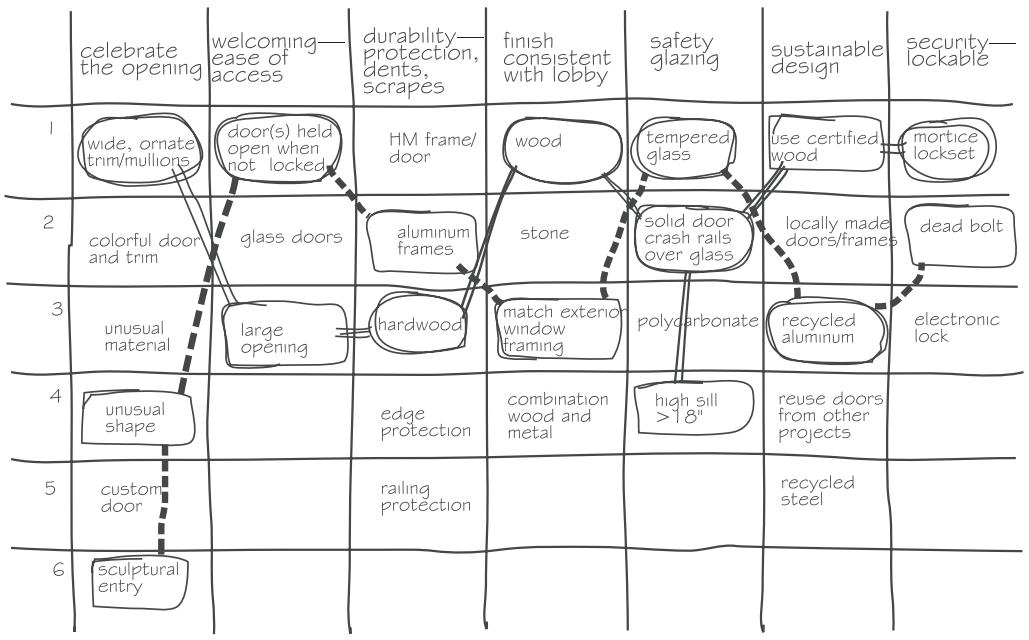
Figure 1-5 Morphological chart



- flow charts and other network diagrams
- matrices
- morphological charts
- comparison charts
- two-dimensional drawings such as plans, elevations, and sections
- three-dimensional sketches including isometrics, perspectives, and others
- bar charts and other intensity diagrams
- graphs

Practical Tips

Although every designer has a unique way of working, and every detailing problem is a little different, here are some practical techniques that can focus efforts and speed the process. Some of the following suggestions assume that the designer's preliminary work is done with marker on paper as described above.

- Use the right marker. The type of marker used affects thinking. A hard, thin pencil will generally lead to precise, detailed thinking too early in the process. A soft, thick marker, on the other hand, will make it impossible to explore smaller scale ideas or details.
- Use markers that are permanent, not a pencil. This makes it impossible to erase. Because every line on paper represents a valuable thought (although not necessarily a correct one), nothing should be lost. If a line needs to be eliminated or modified, use tracing paper to work on a new drawing. Dark, permanent marks also have a practical advantage because they reproduce well on copying machines and scanners and are easy to see.
- Draw a line only once; do not scribble. Scribbling suggests uncertainty and although working through uncertainty is part of the process, it can be done by trying one line in one position and reviewing it. If it is not correct, use another layer of tracing paper to modify the line. Every line is important and records a thought.

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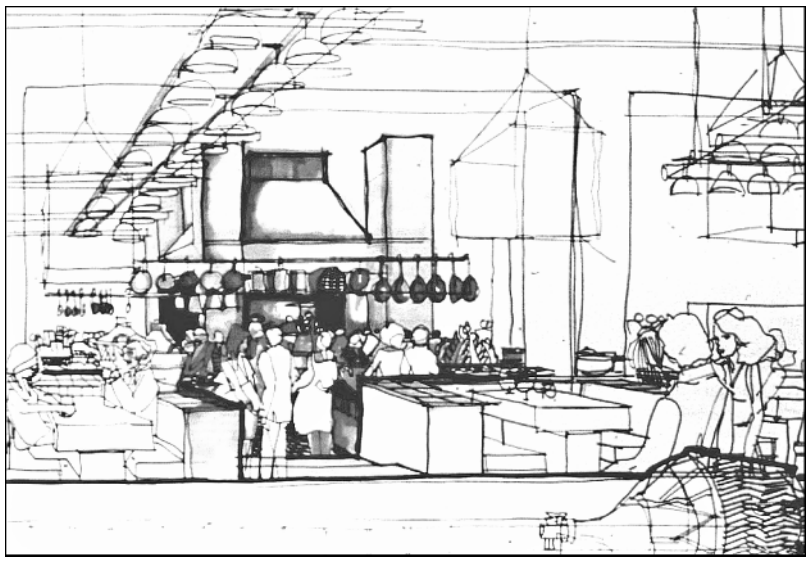
- Use color sparingly, if at all. This, of course, depends on the type of problem and the type of drawing. The practical reason for limiting color is to reduce the number of markers on the table and the time it takes to move from one to another. However, in some cases color is useful to differentiate different parts of a very complex detail or to represent grouped parts of sketches such as bubble or flow diagrams. Used sparingly, it is also a useful way to use hierarchy in context as described below. Shading or hatching is another way to differentiate parts of the drawing without having to change markers.

Generally, a medium to thin, black felt-tip marker works well. If a combination of rough sketches and more detailed drawings is being completed, the designer may want to use two or three different marker thicknesses at most.

- Use a small paper size. Large sizes of paper encourage the designer to fill them up with images. Although there is nothing inherently wrong with this, the drawing-thinking-drawing cycle is more useful when the *number* of explorations is more important than their size. Of course, large floor plans may need a large paper size, but most early sketching and problem solving can be accomplished on small paper. A 14-inch (356-mm) roll of inexpensive tracing paper is ideal (12-inch [305-mm] rolls are often a little too small). Fourteen inches is large enough for most sketches, details, and floor plan studies but small enough to easily fit on any desk or drafting table. Smaller pieces of paper have the added advantage of being easier to file, organize, and reproduce on copy machines and scanners.
- Draw images relatively small. Drawings should, for the most part, be small enough to be totally visible without too much shifting of the eyes. Early graphic problem solving and detailing relies on exploring many ideas and variations. Using a small paper size helps encourage this practice. Small images are also faster to complete.
- Use scale early on. Of course, diagrams like bubble diagrams and flow charts are without scale, but when a section or elevation is being sketched, using scale can help keep the various parts in realistic relationship to each other. The drawing does not have to be hardlined or perfect just because scale is being used, but if one part is three times the length of another part, it should look that way on the drawing. For smaller drawings, keeping a 6-in. architect's scale in one hand while drawing with the other hand is a convenient way to accomplish this.
- Limit time spent with each drawing. In general, it is better to produce more drawings than highly complex ones, if not necessary. It is also important not to overwork one drawing that is not advancing the process. Of course, the type of drawing will suggest the amount of time spent; bubble diagrams take less time than a complex section detail. Even isometric or perspective drawings should be completed with a quick sketch technique.
- When possible, keep diagrams simple. One of the most valuable uses of diagrams is to reduce complex problems or issues to their essence so that they can be analyzed. For example, in a bubble diagram, rather than trying to show every room, use one bubble to represent an entire department or group of spaces. If further complexity is required, use another drawing.
- Use hierarchy in context. Hierarchy in context means that within one drawing certain areas may be more important than others and should be highlighted to focus attention on them, while still giving overall context to the detail. Some of the ways to do this include using line weight, shading, color, composition, or a greater number of lines in one area. See Fig. 1-6.

Figure 1-6 Hierarchy in context

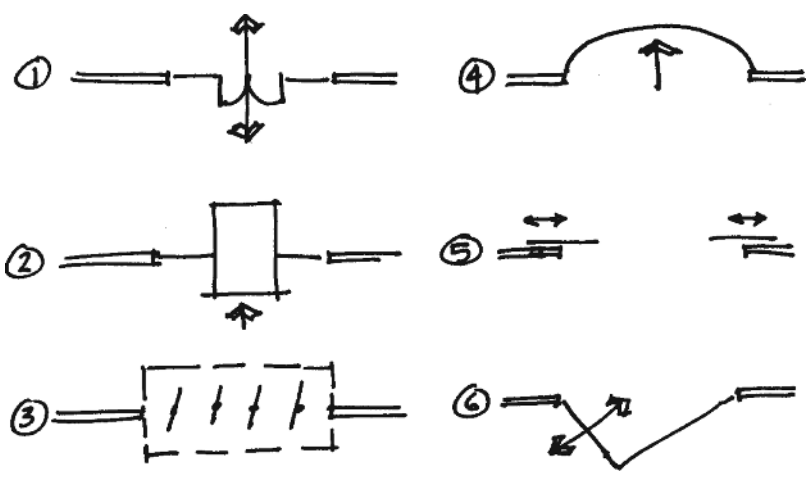


- Explore alternatives. Solving design and detailing problems is largely a matter of exploring alternatives. During the early stages of detailing, various broad approaches to the problem should be investigated quickly. It generally becomes apparent that some of the alternatives will not work and that others are worth developing in more detail. For example, Fig. 1-7 shows six alternative concepts for creating an entry into a bar from a hotel lobby. These were quick to develop but expanded the designer's thinking in exploring ways to detail this design element.
- Know when to stop. This is often the most difficult part of the process because there is usually more that the designer feels can be done. However, if a deadline does not stop the process in itself, the designer must keep time spent within the budget.

If a problem is especially difficult and it is unclear where to start, the following additional suggestions may help. All of these are related to each other in the process.

- Go with what you know. Very little creative thinking happens without the designer seeing something on paper. In nearly all detailing situations, there are some givens or

Figure 1-7 Concept alternatives



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constraints that can be represented on paper. For example, even something as simple as using a horizontal line to represent the floor is a starting point. A vertical line representing a wall immediately suggests the possibility of a sloped orientation instead, a material thickness required, and the connection necessary between horizontal and vertical.

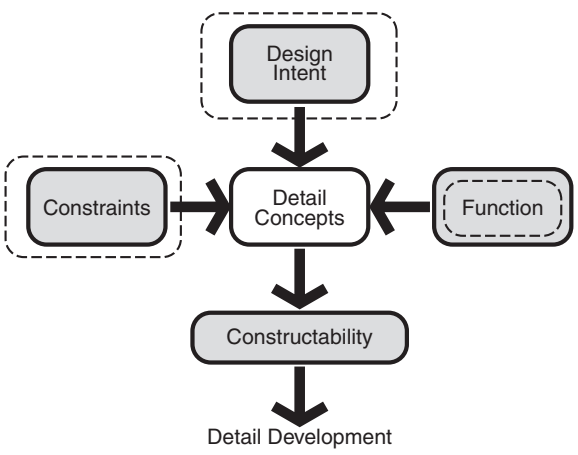
- Draw first, think later. The drawing-thinking-drawing cycle does not work unless there is something on paper to view and respond to. Drawing something that may not be right is better than drawing nothing at all.
- Trace, don't erase. As previously discussed, every line is important, even if it is incorrect because it represents a thought and something learned about the problem. Lines that do not work can be traced over and refined.
- Succeed by failing. A wrong turn may lead to the right path. Part of the drawing-thinking-drawing cycle is learning something with each cycle. Making mistakes is part of this process.

1-5 DETAILING COMPONENTS AND PROCESS

The Four Aspects of Detailing

All detailing is a way to satisfy requirements in four areas: design intent, constraints, function, and constructability. *Design intent* is the requirement produced by the aesthetic needs of the project, including the basic design elements and principles the designer is using. For example, horizontal line may be an important part of the designer's approach to the problem. *Constraints* are the given conditions within which the detail must perform and over which the designer has little or no control. For example, building code requirements and material availability are constraints. *Function* is the requirement the detail must meet based on its basic purpose. For example, a stairway must provide safety, durability, and a good anthropometric fit to the human body. *Constructability* is the set of requirements produced by the detail itself regardless of design intent or functional needs. Once a detail is developed, it must be buildable, structurally sound, durable, and have all the other qualities of good construction. The relationships among these four aspects of a detail are shown in Fig. 1-8.

Figure 1-8 Four aspects of detailing



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Every detail may have a different emphasis on each of these elements, but they all are always present. For example, some details may be developed primarily to enhance the design intent, while others may be primarily functional requirements to meet given constraints. Constraints, function, and constructability are discussed in more detail in the following chapters.

The Detailing Process

Theoretically the detailing process follows the procedure shown in Fig. 1-9. In most cases, the designer is guided by the design intent and determines the constraints and functional needs of the problem given the particular context of the project. Constraints and functional needs are generally known, but if not, the designer can do any research to resolve the unknowns. The research may be as simple as a quick phone call to the client or as complex as a multiweek investigation of regulatory requirements. From these three aspects of detailing, the designer can develop concept alternatives and, with the help of the client and other stakeholders, select one for final development.

In reality, the process proceeds more like that shown in Fig. 1-10. This is how a designer solves a wicked problem, rarely in a neat, linear process. The starting point may be any of the three aspects of defining the detailing problem, and work may jump into the area of the problem solution to test ideas and then back to problem definition areas again. Figure 1-10 also shows an additional component: social input, including the stakeholders, which may include the client, contractor, subcontractors, suppliers, and regulatory agencies.

During the process, the designer may review previously used details and lessons learned and apply those to either the problem definition or possible solutions to the current problem. Then, at some point, the resources of either time or money, or both, are exhausted and the designer must stop the process and use the best solution developed to date.

Example

The following example illustrates the process of developing a simple detail in which the four aspects of detailing are used in a nonlinear fashion. The detailing problem is to develop a

Figure 1-9 The detailing process

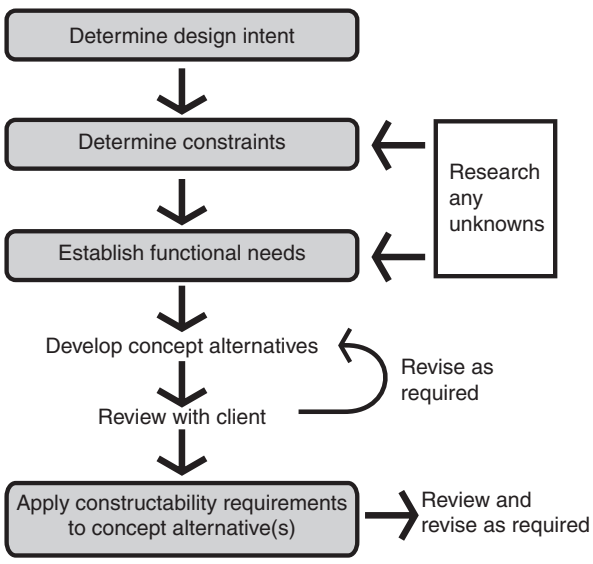

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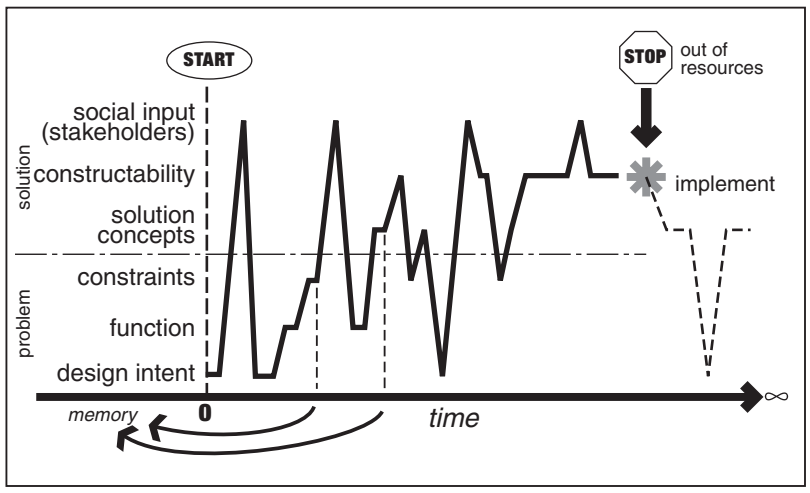
Figure 1-10 Actual detailing process



borrowed light in an office partition separating a small conference room from a corridor. The purpose is to bring natural light into the corridor from the exterior windows in the conference room. At the same time, the client wants visual privacy between the corridor and conference room, and the designer wants to use a detail that is sympathetic to the existing window wall and door framing that is being developed for an adjacent wall of the conference room.

To begin, the existing constraints and conditions are sketched as shown in Fig. 1-11(a). This includes the ceiling height and type and the partition construction, which is 5/8-in. (16-mm) gypsum wallboard on 3 5/8-in. (143-mm) metal studs. The ceiling height is noted. In this case, the detail is being sketched at its final scale, and a dashed line is drawn to indicate the drawing module being used for detail placement within the larger-sized sheet.

Next, instead of sketching alternative solutions, the detailer decided to start drawing a standard wood-framed glazed opening to explore the implications of this approach. See Fig. 1-11(b). This was traced over the first sketch, although they are printed separately in the illustration. Assuming that the glass would be clear, an "eye" notation is made to remind the detailer of the constraint of privacy; that is, the sill of the glass should be above eye level. This early sketch also produced some immediate questions to the detailer concerning the size of the casing trim, what kind of glazing rabbet should be used, how the frame should be braced above the ceiling, and what the overall height of the opening should be.

In the third sketch, shown in Fig. 1-11(c), the detailer decided to use the same 3-in. (76-mm) trim used in the other framing in the room and remembered that the change in ceiling height would also have to be considered and coordinated with the wood trim above the adjacent door and full-height glass opening. The detailer also began to question whether the casing trim on the corridor side needed to be the same as the 3-in. trim on the conference room side. In this iteration of the drawing-thinking-drawing cycle, the detailer learned something about the problem and made a decision.

In the fourth sketch, shown in Fig. 1-11(d), the detailer studied the implications of matching the top of the sill trim to the top of the adjacent door trim. If this happened and if the change in ceiling height was taken into consideration, then the overall size of the glass would be too small to make much difference in admitting natural light to the corridor, which was the original purpose of the detail.

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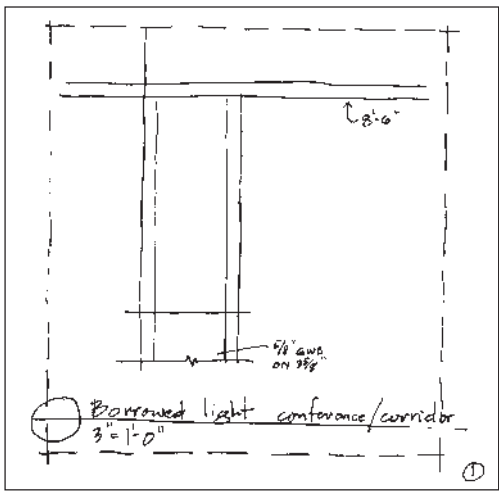
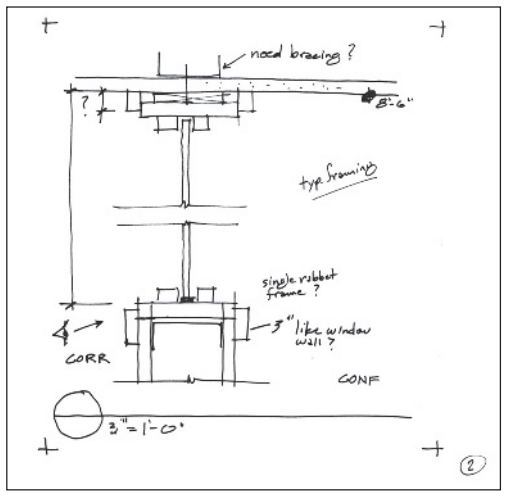
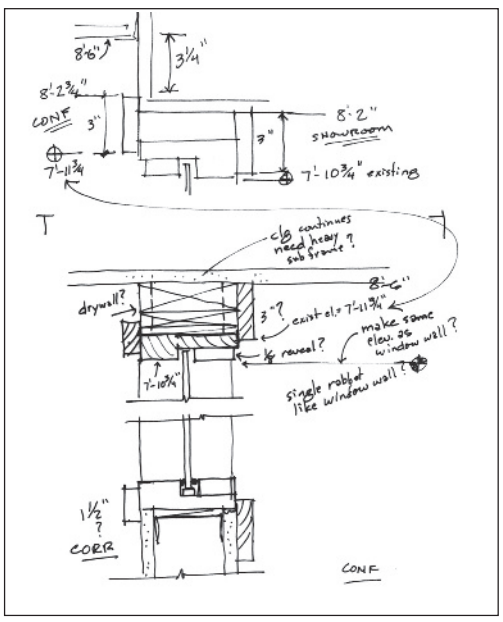
Figure 1-11 Development sketches



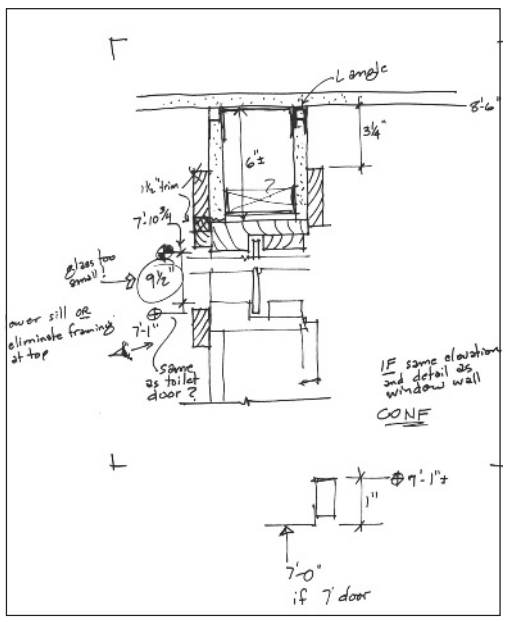
(a) sketch 1



(b) sketch 2



(c) sketch 3



(d) sketch 4

In order to maximize the actual glazed area for the most light, the detailer thought of using a partial or totally frameless glazed system, as shown in Fig. 1-12(a). To study the design implications of these two approaches, the detailer quickly sketched two perspectives, as shown in Figs. 1-12(b) and (c). These raised some additional questions and concerns. The detailer decided the wood frame approach would be more in keeping with the overall design intent of the space and the adjacent construction and decided to try drawing an arbitrary 2′-0″ (610-mm) high glass opening with the head trim positioned to match the adjacent window wall trim.

These assumptions are shown in the final glazing detail illustrated in Fig. 1-13, along with other detailing considerations that are typical for a standard wood-framed, glazed opening. Some quick arithmetic showed that doing this would put the windowsill at an elevation of about 5′-11″ (1803 mm), sufficient to provide the visual privacy the client wanted. In

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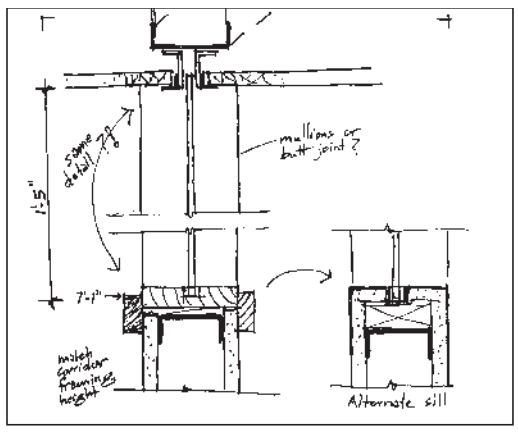
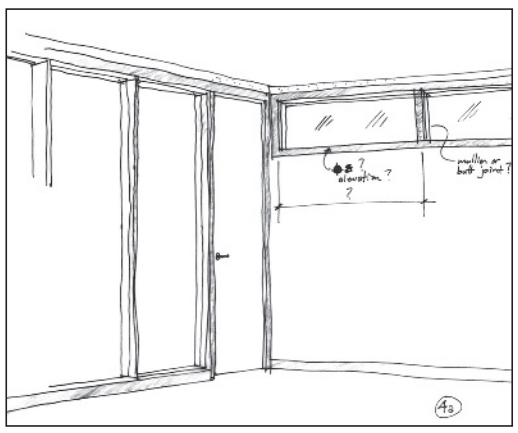
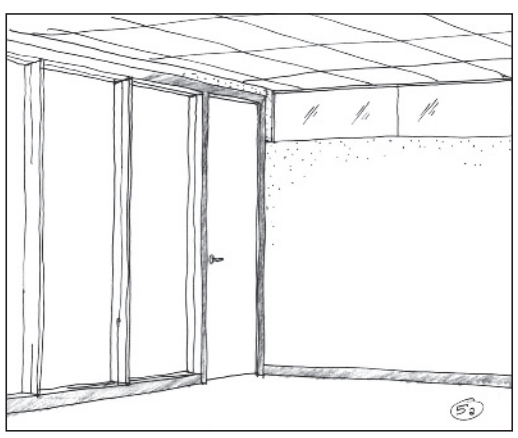
Figure 1-12 Study sketches



(a) framing options



(b) study with framing



(c) study with no frame

addition, the glass would not have to be safety glazing because the sill is more than 60 in. (1525 mm) above the floor. This would minimize the cost of the detail.

Although the final detail would work, additional questions that might be raised include whether to use laminated glass or thicker glass for increased acoustical privacy and whether to use larger areas of obscure glass to increase the light transmission, while still providing privacy. These questions would require more time for study, a cost review, and possibly a longer time

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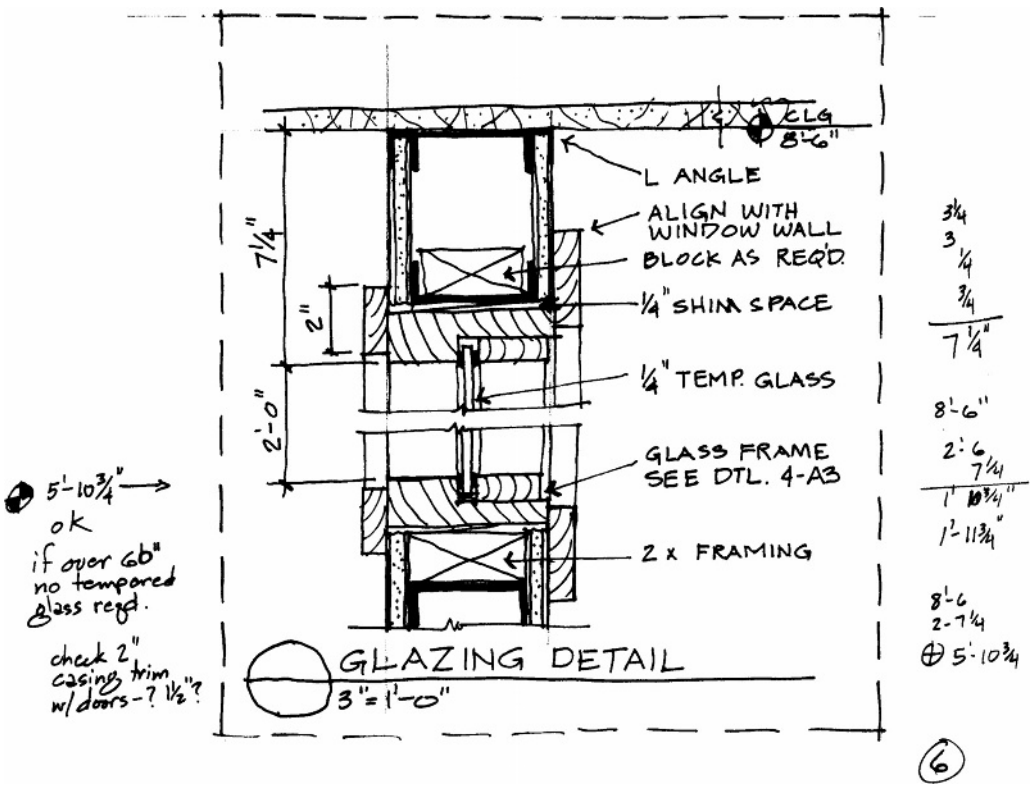
Figure 1-13 Borrowed light final sketch



to get glass samples and obtain the client's approval. The designer may decide that in this particular circumstance, the additional time and design costs are not worth the effort for this particular detail.

1-6 THREE PURPOSES OF A DETAIL

As mentioned previously, *design intent* is one of the four aspects of detailing and one of three that defines a detailing problem (as well as any design problem). In many cases, function takes the lead in defining a detailing problem, but when all other factors are equal, design intent is the driving force in determining the final configuration of a detail. Design intent may incorporate many things, but there are basically three design purposes of a detail: to contribute to the overall design concept, to resolve problems of connection or transition, and to coordinate with adjacent construction. These will be discussed here; the aspects of constraints, function, and constructability are reviewed in the next three chapters.

Contributes to Design Concept

Every good design project works as a whole, with every part contributing to the overall concept and look of the space. Details should support the designer's vision, as well as the basic elements and principles of design. A small-scale space, for example, may require small-scale details. In some cases, the designer may choose to design a detail differently to create an eclectic contrast with the rest of the space.

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Resolves Problems of Connection or Transition

Details must always resolve the problems of connection or transition of one component to another. This may be done for practical reasons or for purely aesthetic reasons, or for both. For example, a baseboard makes the transition between the floor and the wall and conceals the rough construction joint below the wall finish. It also serves a functional requirement to protect the wall from cleaning equipment and foot scraping. From a strictly design perspective, a baseboard can also modify the scale of the wall or the entire room, create a strong horizontal line, or emphasize the demarcation between architectural planes, depending on how it is detailed.

A connection or transition can be made between different elements, such as between the wall and ceiling plane, or between construction elements that are on or part of other elements, such as door openings as part of a partition. Some of the ways this can be done are discussed in Chapters 10, 11, and 12.

Coordinates with Adjacent Construction

Details also coordinate one construction element with another in terms of connection, structure, and continuity of materials. In some cases, the coordination is strictly functional, as with structural connections. In other cases, the coordination between elements is visual, creating a smooth, coherent transition from one part to another, consistent with the designer's concept.

1-7 PROGRAMMATIC CONCEPTS VERSUS DESIGN CONCEPTS

During the detailing process, the designer must clearly understand the difference between programmatic and design concepts. It is impossible to adequately detail something based only on a programmatic concept. The detailer should have several design concept sketches for each programmatic concept.

A *programmatic concept* is a performance requirement related to methods of solving a problem or satisfying a need without stating a way to achieve it. For example, maintainability is a programmatic concept. Programmatic concepts identify a particular problem or goal in general terms and narrow the focus. They also provide a way to evaluate how well the goal is reached.

A *design concept* is a way to satisfy a programmatic concept that actually has implications for design. Generally, several design concepts are generated as possible ways to satisfy one programmatic concept. These provide guidance for the detailing process.

For example, in the design of a retail store, the owner and designer may agree that one of the programmatic concepts should be the following: *Provide a medium level of security to protect against theft of merchandise without making the security methods obvious*. This statement identifies and responds to a particular problem (security), narrows the problem focus (security of property from theft, as opposed to security of people or from fire), and establishes a way of evaluating how well the goal is reached (Are the security methods obvious or not?). Although a reasonable goal, there is no way a designer can respond directly to this concept. One possible design concept suitable for this programmatic concept might be to provide a central cash/wrap station at the entry and exit point to the store. This way, the clerks could sell merchandise

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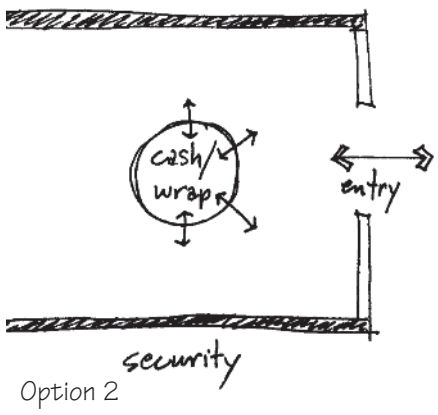
Figure 1-14 Design concept



and also observe people coming and going. This design concept could be sketched as shown in Fig. 1-14.

This type of sketch is a shorthand way to record a design concept without directly stating how it can be achieved. The designer could use this design concept to design a cash/wrap station that is straight, round, square, or U-shaped and that is placed in the middle of the opening or off to one side. The station could also be located directly at the front of the store so no one could exit without passing through the checkout area, although this response might be considered obvious. It also does not restrict decisions on materials, form, size, or other aspects of the final design.

Additional design concepts could also be generated to satisfy the programmatic concept. For instance, only samples of the merchandise could be displayed, and when the customers wanted to make a purchase they would go to a central point where clerks would retrieve what they wanted. Another way to satisfy the programmatic concept could be to tag all merchandise with electronic identifiers and discreetly incorporate detection devices into the design of the entry.