

The key is to think about the building from the client's perspective

BARRIER-FREE BUILDING BASICS

by Paul Hanke

Let's have a show of hands. How many of you know a handicapped person, or are handicapped yourself in some way? One in ten Americans are handicapped to some degree. I suffer from a chronic inner ear problem which causes dizziness (and makes me leery of working on roofs) when it flares up. I can simply avoid the roof when that happens, but most people with disabilities are more restricted than I am, and require housing that suits their needs. This special housing market will grow as the average age of the population rises. Right now, there are more than 20 million citizens over age 65.

How are you supposed to know what to do for these people? To quote from the excellent reference book *How to Create Interiors for the Disabled*, by Jane Randolph Cary (Pantheon Books, New

York, 1978): "There's no way you could know... even medical and building experts will tell you there's no universal blueprint to follow, that each disabled person's needs have to be met individually."

An entire book couldn't cover every possible problem disabled people cope with every day. This article simply provides methods and guidelines you can use to avoid building barriers into your projects.

Getting To Know You...

As Ray Lyle and Al Wasco point out in "Barrier-Free Design" (*NEB* 11/87), getting to know your client is essential to good handicapped home design. Betty G., a handicapped homeowner from California (quoted by Jane Cary)

says of her building experience: "The first thing to do was to get the builder interested in my individual needs. Our close association during the planning phase paid off and I had no problem getting a well-designed, functional house with all the details I wanted."

Her builder spotted that central vacuum outlets had not been placed where she could reach them, and it was corrected. Betty concludes: "This illustrates how really dependent the disabled person is upon the builder. I would not have been able to check out the project as it progressed, but he could and did." Satisfied referrals undoubtedly followed.

Ms. Cary also mentions a client who left a wheelchair at the site so the crew could use it when making design decisions. Consider renting a wheelchair or

blindfolding yourself to put yourself in your client's shoes.

Impairment type and degree varies dramatically. According to architect Alexander Kira in his book *The Bathroom* handicapped clientele consist of "all persons suffering from significant, chronic activity limitation," which includes everyone from arthritis sufferers to quadraplegics, from those with progressive disease to permanently blind or deaf people. Some can walk with assistance, while others are confined to wheelchairs. Some can't feel pain (such as burns) or easily turn door knobs. Your job is to find out their individual needs, and build to make their lives as safe, normal, and convenient as possible.

The Approach

Handicapped design begins before

What's An Adaptable House?

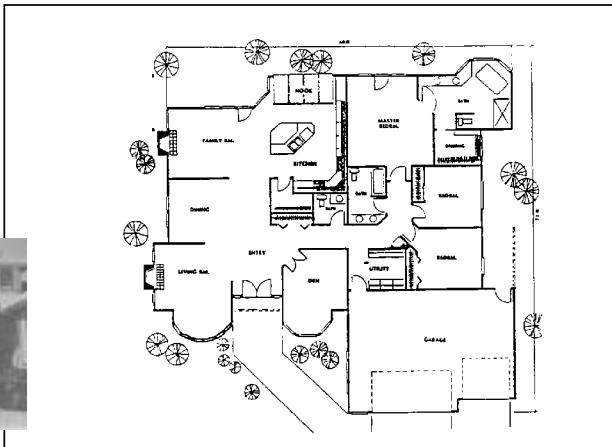
While most builders involved in barrier-free projects are doing so at the request of a disabled client, some are experimenting with the idea of building homes that are "adaptable." That is, they can be used by any type of household, and with very little work can be modified for use by someone with a serious disability. This concept becomes more meaningful as you consider the aging population. It will mean that a house needn't require massive (and expensive) renovations if someone in the household should become disabled.

A special demonstration house in Portland, Maine was built with this concept in mind. "The Adaptable House" was built as part of the annual local home builders association's "Street of Dreams." The master bathroom has a roll-in shower, the whirlpool bath has been raised above floor level, the kitchen and master bath have removable base cabinets—all features that can accommodate a wheelchair but do not create any inconvenience for others. The house's entrance does not look "odd" but is entirely accessible. The bathroom walls are reinforced to permit installation of grab bars at a later date if needed. In addition, all doorways permit wheelchair access, light switches and outlets are at recommended levels for the disabled, closet rods are adjustable, windows are easy to operate, and each room includes a minimum turning area. Low pile carpets have been installed for easy wheelchair movement, and lever doorhandles have been used. To fully convert the home for a disabled person would only cost an additional \$2,000.

According to promoters for the

project, the home has already been sold (asking price \$250,000)—to a family with no disabilities—evidence that the home's "adaptable" design did not detract from its sales appeal. For more information about the project, contact NAHB National Housing Center, 15th & M Streets, N.W. Washington, D.C. 20005; 202/822-0254.

—NEB



The 2,800-square-foot "Adaptable House" has a two-car garage, living room, family room, den, kitchen and breakfast nook, three bedrooms, and two-and-a-half bathrooms. Its one-story layout and easy entry (see inset photo) make it accessible.



The universally accessible shower stall can be used by anyone, with or without disabilities.



Pull-out work spaces in the kitchen will enable someone at the wheel chair level to prepare their own food.

you even enter the building. Local and federal regulations need to be checked out during preliminary design and permitting stages. An automatic garage door opener may be a luxury for some, but it is often a necessity for hand-capped drivers. To make the vehicle accessible, parking spaces need 3 or 4 extra feet on the driver's side. Curbs need to be designed for wheelchair users.

Outdoors there should be good lighting of paths and ramps, especially for those with impaired vision or mobility. And in cold climates, pay attention to where the roof dumps snow, ice, and rain.

Getting to the front door may require a ramp. As Jane Cary says, "These gentle slopes are to the disabled as wings to a bird." The ramp's pitch should be 1:12 maximum (see Figure 1). A level area of 5x5 feet is needed at top and bottom. Curbs, 2 inches high, act as wheel guides on the sides of a 2'10"-wide non-slip pathway. The ramp should be placed on the latch side of out-swinging doors and on the hinge side for in-swinging doors. There should be at least 1-foot clearance on each side of the door. For people in wheelchairs, a fraction of an inch can literally make the difference between easy access and being "locked out".

Railings should be 32 inches high and well supported. Ramp construction may be of pressure-treated wood (most economical) or concrete. Consider the ramp's visual impact as part of the house's front entry. There are far too many ugly ramps around. It's much better to design a ramp to fit the house—just as you would a porch—rather than treat it as some sort of appendage.

Access doors should have minimum clear openings of 32 inches, measured with the door in the 90-degree position (see Figure 2). A 2'-8" door will not suffice (without special hardware). Allow for lead time because 2'-10" doors may not be a stock item.

If an entry is present, there should be at least 6 feet of clearance between doors, but check local regulations (see Figure 3).

Moving Inside

Jane Cary admonishes her readers that they should "in general, regard every door as an expendable barrier." If doors can't be eliminated, a pocket door may be a better solution than a hinged one, and solve clearance problems at the same time.

Interior doors should also have a minimum clear opening of 34 inches although 36 inches is better. Interior thresholds should be eliminated. Lever handles are much easier to maneuver than conventional doorknobs, and a closed-end-type (see Figure 4) will keep people from catching their clothing.

Clearances

Hallways should have a clear width of at least 36 inches—preferably 42 or 48 inches. There should be 24 inches minimum wall space on the latch side of a door swinging toward the user (see Figure 5). Where the door exits to a hallway, there should be 12 inches minimum clearance on the latch side (2 inches on the hinge side) before an obstructing partition (see Figure 6).

Light, View, and Ventilation

Handicapped people, like everyone else, enjoy daylight, views, and fresh air. Eye level when seated is around 42 to 48 inches, so window sills should be at the 30- to 36-inch level to permit views, simplify window operation, and put cooling breezes at this lower level.

In general, sliding, awning or casement windows are recommended. A 4-foot-high slider can be too heavy to

operate for people lacking good upper body strength. Tiny roto-crank handles typical of awning or casement windows (can be very difficult to grip. Avoid double-hung windows.

Remember building codes require a means of egress from all sleeping rooms. Though a certain size window usually suffices (and meets the letter of the code), for a disabled person a door with amp may be necessary.

The Bathroom

Using the bathroom can be the most physically taxing and dangerous activity for even moderately handicapped people. Feeling helpless and unable to cope with life's most basic necessities can bring on a profound sense of depression and loss of dignity. Alexander Kin points out. Good bathroom design can help with both hygiene and grooming necessities.

Tubs are poorly designed for human beings—handicapped or not! Setting the rim 26 to 30 inches from the floor can facilitate a seated entry maneuver by the semi-ambulatory. Non-skid bottom surface and grab bars secured at the entry point are essential for lowering into the water or rising.

Large shower stalls (36 inches by 48 to 60 inches) with a built-in seat are desirable for anyone, and are a great improvement over the classic 30-inch-square "modified coffin." Include a roll-in rim and hand-held shower, and place the controls (with temperature mixing valve) on the sidewall for easy access. Conventional shower doors restrict access and can trap a fallen person inside.

Bathroom doors should swing outward, to allow opening by rescuers should someone collapse against the door.

Drying off can be time-consuming for handicapped person. An infrared heat lamp increases comfort while a person is disrobed and wet.

For wheelchair clearance, lavatories should be set with the rim at 34 to 36 inches above the finished floor. This is better for able-bodied adults too (as opposed to the conventional 30-inch height). Wedge-shaped lavatories with smooth undersides are preferable.

A 36x72-inch counter space puts everything within easy reach. Drains and traps should be located as far back as possible beneath the counter. Insulating hot water pipes under the sink protects legs from burns.

For people who can't grip conventional handles, lever handles, especially the "surgical" type, are beautiful and functional.

Mirrors should extend low enough for seated viewing, and the medicine cabinet should be placed to the side of the lavatory to prevent a long reach.

Specialty toilets such as Kohler's Highcliff Water-Guard (K-4268-ET) have the seat 18 inches off the floor for ease of transfer from a wheelchair. Include support arm accessories when you order. A wall-hung toilet can be mounted at higher than the normal 15 to 16-inch height (be sure to advise the carpenter before roughing in). They so increase wheelchair maneuverability in a tight space.

Bathrooms (and kitchens) need a 5x5-foot clear floor space for turning a wheelchair. The illustration shows a nicely laid out bathroom adapted from Jane Cary's book (see Figure 7).

Kitchens

Kitchen design involves important differences. Sinks, cooktops and work surfaces must allow room beneath for leg room. One shallow sink beside a deeper one will allow room for legs beneath. Wheelchair users need 32-inch high countertops and an enlarged toe space (9 inches high x 6 inches

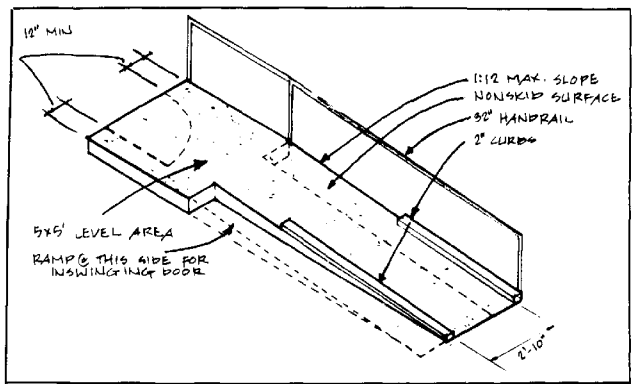


Figure 1. Ramps need to comply with design guidelines to be useful: a 1:12 maximum slope, a level area of 5x5 feet at top and bottom, 2-inch-curbs along the sides of a 2'10" pathway, and a non-skid surface. In cold climate areas, pay attention to where the roof dumps snow, ice, and rain.

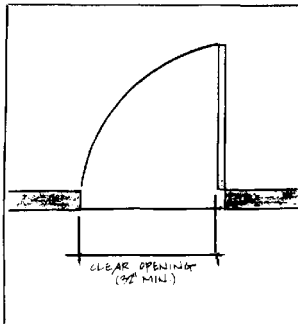


Figure 2. Access doors should have a minimum clear opening of 32 inches. You'll need 2'10" doors, an item not often in stock, so allow for lead time.

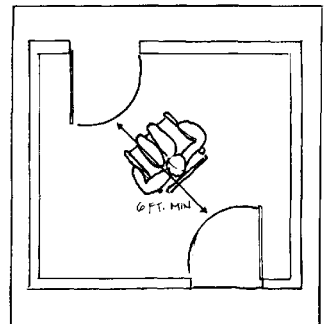


Figure 3. When faced with two door swings, as in this entry vestibule, the wheelchair user needs at least 6 feet maneuvering space.

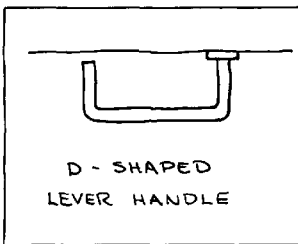


Figure 4. Lever handles are the easiest to use, but use the D-shaped type to avoid everyone's catching their clothing on them.

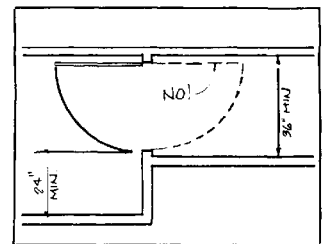


Figure 5. Hallways should be at least 36 inches wide and provide 24 inches minimum wall space on the latch side of a door swinging toward the user.

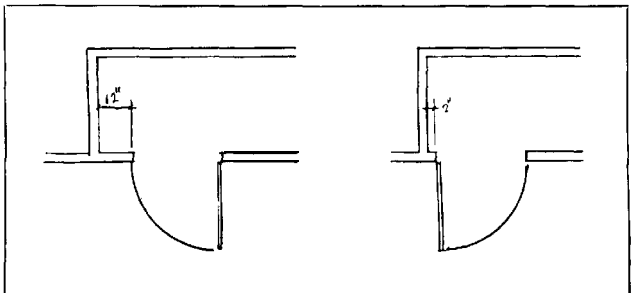


Figure 6. Where the door exits to a hallway, leave at least 12 inches clearance on the latch side-and 2 inches on the hinge side—before an obstruction, such as a partition.

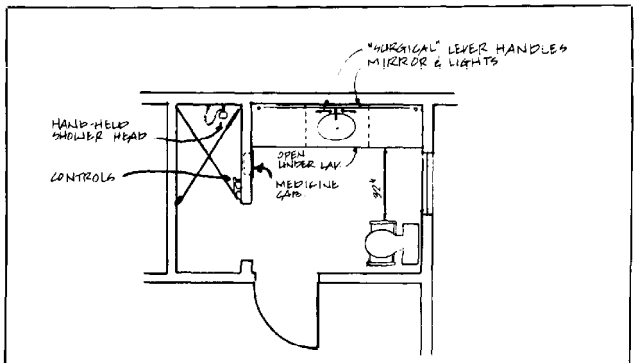


Figure 7. An accessible bathroom plan includes controls and handles that are easy to operate. Other important features: a medicine chest on the side of the lav rather than above it, knee space under the lav, mirrors low enough for seated viewing, and good lighting. Special toilets are available that put the seat at 18 inches off the floor for ease of transfer from a wheelchair.

deep). Kitchens also used by unhandicapped cooks will need a variety of counter heights or perhaps an "alternative" kitchen for the wheelchair user.

For easy reaching, countertops should be reduced to 18 inches wide, and shelves to 8 to 10 inches deep. Wall cabinets (with custom countertops) can be adapted for use as base cabinets, or specialty cabinetry can be ordered (such as the Life-Spec units mentioned in "One Size Fits All" (NEB 11/87 p. 35).

Select ranges with front controls to prevent reaching over hot burners. Use single lever mixing faucets. Lower wall cabinets to 12 to 14 inches above the 32-inch countertop. Pull-out cutting boards and roll-out shelves and storage racks are also excellent choices.

Easy access to a fire extinguisher must also be considered in the layout.

Storage

Open storage is the most convenient, but visually messy. If closet doors are used, install bifolds or hollow-core sliders with the best track hardware available. Rather than shallow finger grips, "D" handles should be used on bifold doors, while through hand holes or cloth straps will be best on sliders.

Clothes rods should be 48 inches from the floor (verify with your customer), with a shelf 3 inches above. Closet-Maid or other adjustable shelves combine flexibility and compactness with accessibility.

Light and Power

Little details of handicapped design make a big difference. Mounting switch plates at 36 inches (to the center) from the finished floor, instead of the conventional 48 inches, makes them convenient for both standing and seated users. For people with poor strength or motor control, rocker switches or specialty pull extenders make life easier. Outlets should be located 24 inches above the floor. Appliances and accessories that signal by sound aid the sightless, and new specialty phone equipment comes on the market daily.

The Human Factor

Put yourself in your client's position, empathize, and design solutions for the problems you identify jointly. Sell yourself as a concerned and knowledgeable professional and as a problem-solver. Then follow through. To paraphrase Alexander Kira, we've come a long way from the time when "cripples" were laughed at and infirmities seen as punishments from God. It is the human factor that can make the difference between building a frustrating obstacle course or a home that is a joy to live in. ■

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