



Building a Ramp

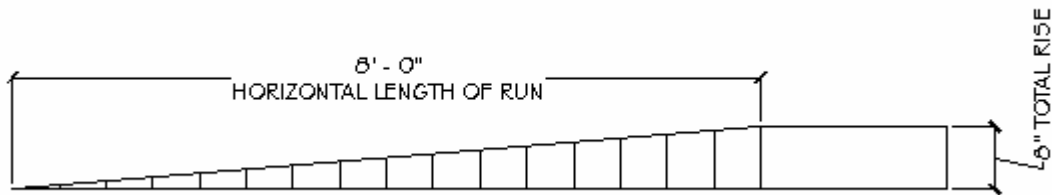
Powering Independent Living

This insert is intended as a "pocket guide" to building a ramp for residential use. We have condensed information contained in An Accessible Entrance: Ramps, an excellent publication written by Design Coalition. We thank them for their consultation in putting this abbreviated guide together, and for their willingness to share this information.

WHERE DO I PUT A RAMP?

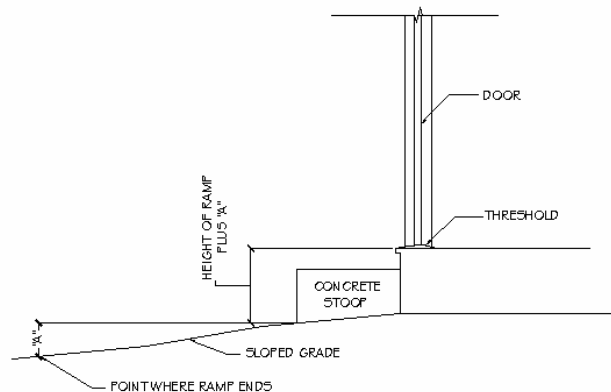
Take some time to decide the best location for your accessible entrance. It is true that the shorter the ramp, the less expensive it will be to build. However, also look at the other factors such as how close (and convenient) the ramp's location will be to your driveway, whether one of your entrances has an easier door to use, and how much of your home is made accessible according to the entrance you select.

Once you have done some "eyeballing", it is essential to measure precisely three basic things: amount of rise, clear opening at doors, and approaches and door swings.



AMOUNT OF RISE: What is the distance from the ground to the threshold of the entrance? Is the entrance located off a sloped surface? (If so, you need to calculate that into the length of ramp you will need). For every inch in height, your ramp needs to have a foot in length (ratio of 1:12). For example, if you are ramping an entrance that is eight inches high, you will need a ramp eight feet long.

It may be tempting to build a shorter ramp, but by doing that, you are also sacrificing important safety features. A steeper incline than 1:12 makes it more difficult for someone to push a wheelchair up the ramp; it can also be harrowing at best when the person is going down the ramp.



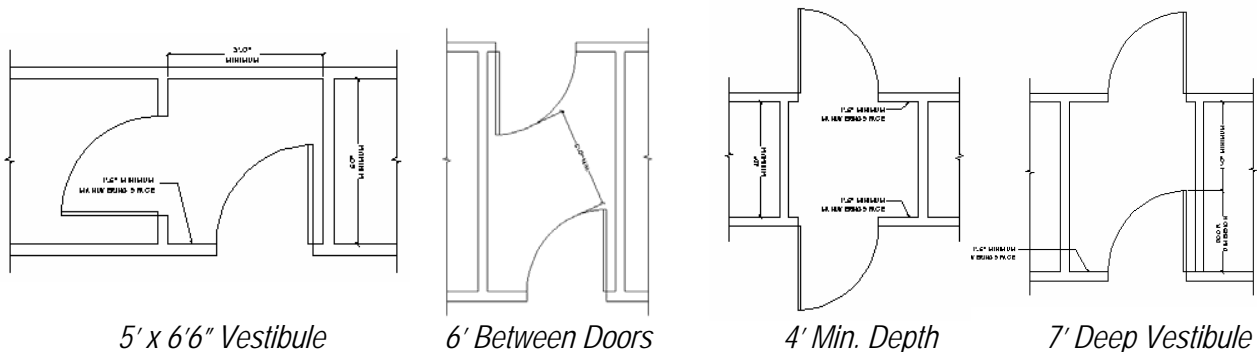
Powering Independent Living



DOORS: There are three factors to determine when measuring entrances: the amount of clearance, the kinds of approaches and door swings, and the ease with which the door may be opened.

The minimum clearance you want to have is 32". Anything less may just not be adequate. Clearance is not the same as door size. To measure for clearance, measure the amount of space that exists between the door stop and the door when it is open 90 degrees.

APPROACHES AND DOOR SWINGS: It is critical to have adequate room at both the inside and outside of the entrance in order to negotiate turns and operate the door. If the entrance you are planning to ramp has a vestibule or foyer, the minimum space you will need is a width of 5' by a length of 6'6". If the entrance or foyer has two doors, make sure the doors open in the same direction or open out. If both doors open into the room there must be 6' or more between their arcs of swing.



SLOPES: (one foot in length to every inch in rise, or a ratio of 1:12) apply to the ramp portion only. Add the platform dimension to the length or ramp you will need. (Otherwise, what you have done is made the ramp portion steeper and less safe).

HANDRAILS AND MIDRAILS are both safety and assistive features. The Standard Minimum height for adults is 2'-8" above the surface of the ramp and 1'-4" to 1'-6" for children. For residential ramps these dimensions can be adjusted for the particular user. If the handrail is installed on a wall, allow a 1/2" knuckle space between the rail and the wall. *Note: Local building codes may require vertical balusters as a guardrail; check with your local building inspector.*

CURBS help prevent wheels from going over the edge of the ramp surface, and as such, as an essential safety feature. These are continuous strips of wood, laid along both ramp edges (2" min. height).

RAMP WIDTH can vary, particularly for residential use since the ramp is being designed to specifically accommodate a consumer. The recommended [and minimum] width for residential ramps is 3'6" [or 3' between handrails] to facilitate comfortable reach to both handrails at the same time.



Building a Ramp

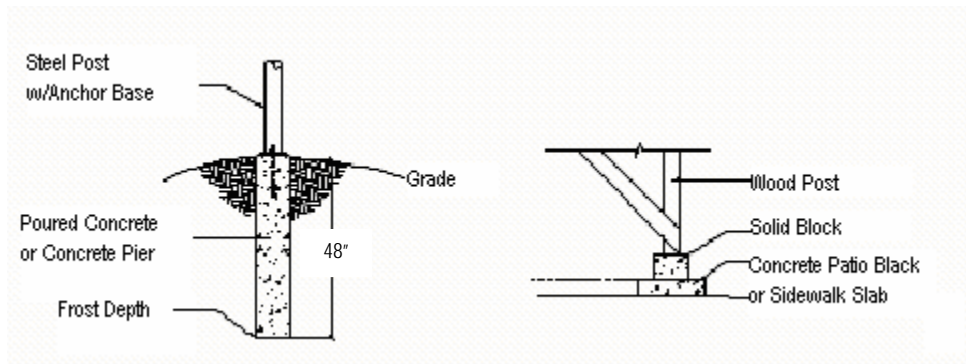
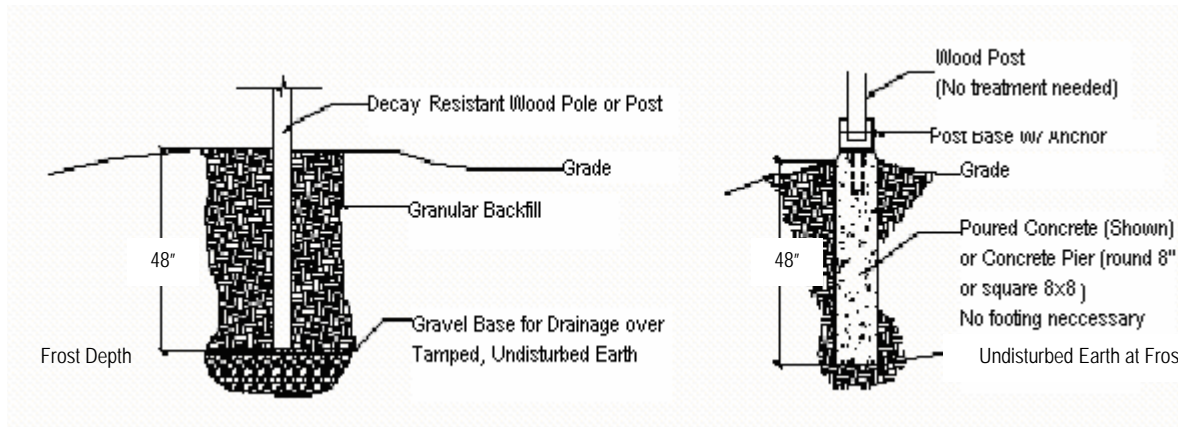
Powering Independent Living

CONSTRUCTION WITH LUMBER

FOUNDATION – A foundation anchors your ramp and distributes the weight and load of your ramp. Wood used for posts, or wood 8" or closer to the ground, must be decay-resistant.

OTHER FACTORS – Evaluate the type of door handle you have in terms of how easy it is to use (i.e., a lever type is easier than a knob). Also look at how quickly and how easily a door opens and closes, as well as how heavy the door is. Most of these considerations can be easily modified to provide maximum access.

Thresholds higher than ½" can be hazardous and/or impossible for wheelchair users to use. If the additional height is due to weather stripping remove it from the threshold and apply it to the bottom of the door. Another alternative is to add a mini-ramp or transition using wood or metal.



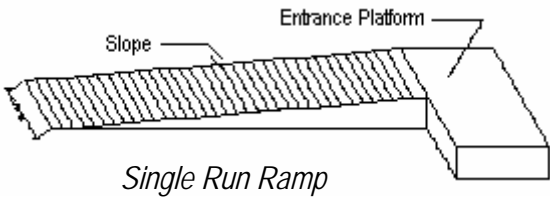


Powering Independent Living

Building a Ramp

DESIGN

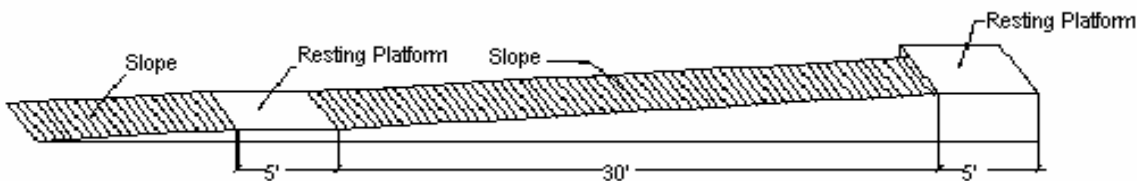
PLATFORMS are level areas which are located to allow for maneuvering, turning, and resting.



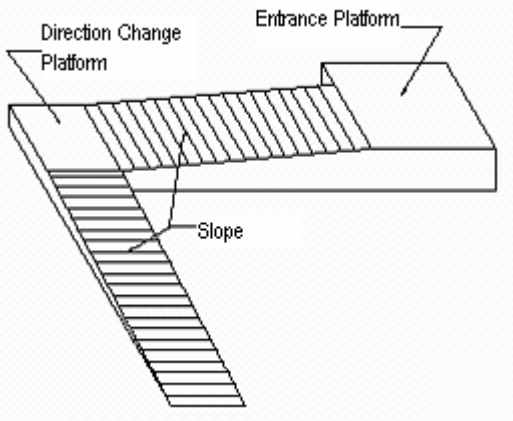
Single Run Ramp

A platform at the entrance is essential. The platform should be 5' deep and extend a minimum of 18" on the latch side of the door. If your ramp will be constructed to that it has a right angle turn or doubles back, it will need a direction change platform. Again, it should be 5' deep so that

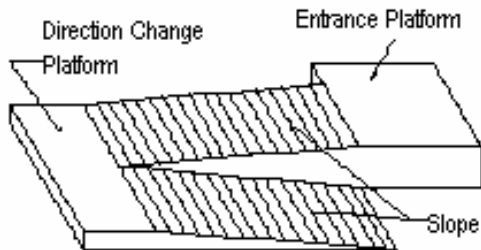
wheelchair users can make a turn safely and with ease.



If your ramp is straight and is longer than 30', include a resting platform every 30'
Single Run Ramp Exceeding 30'



Right Angle Ramp



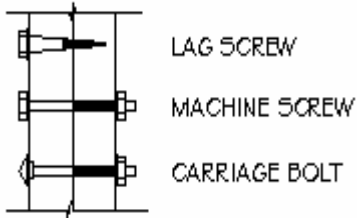
Double Back Ramp



Building a Ramp

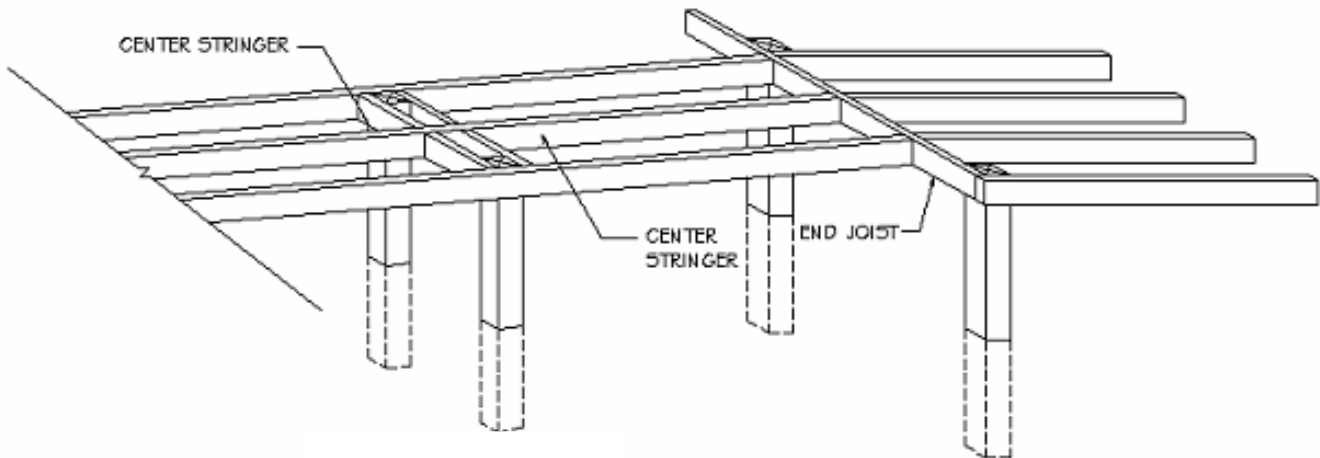
Powering Independent Living

SUPPORTING FRAMEWORK – This includes side beams (stringers), joists, and cross bracing. These support the ramp surface, distribute the load, and add strength to the structure.



Attach side beams to the posts with carriage bolts, machine bolts, or lag screws. When using bolts, drill a hole the size of the bolt (1/2" hole for 1/2" diameter bolt) and pound the bolt through the wood. While you can also fasten by using galvanized nails, this does not create as strong a joint. For support to the decking surface, add a center beam. Face nail this beam with galvanized nails to the end joist and reinforce mid-way with bridging or a center joist.

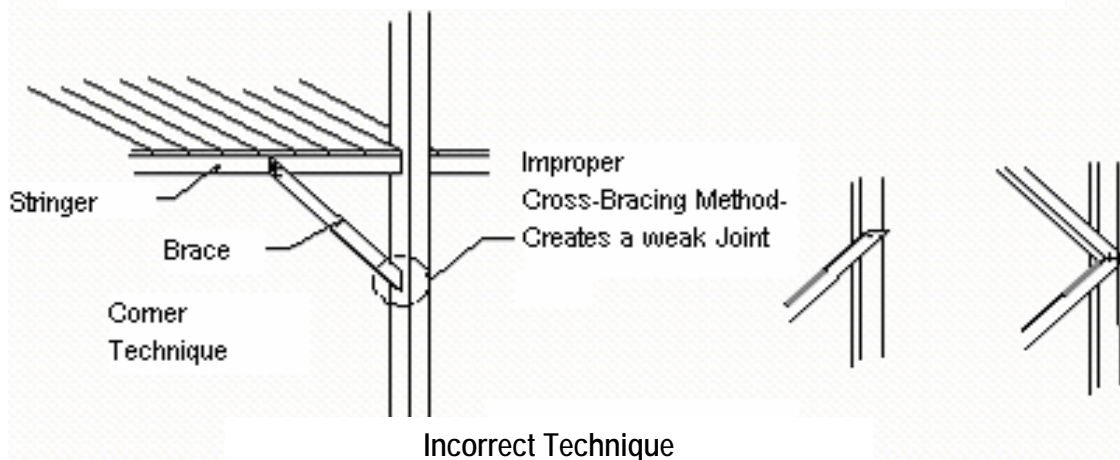
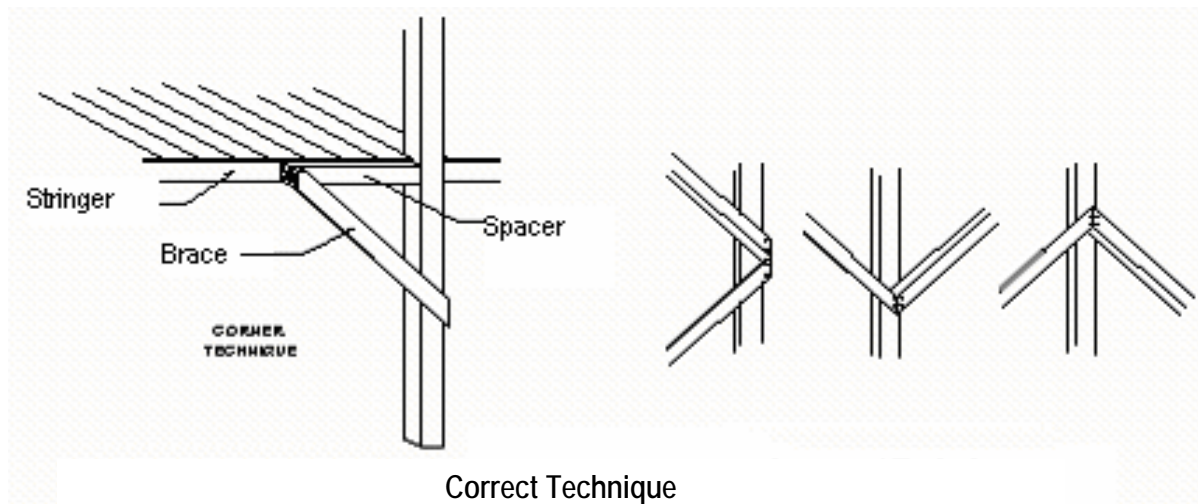
Joists run perpendicular to the side beams, and are used with a 5/8" OR 3/4" plywood surface. Minimum size lumber for joists is 2x6 with spacing 16" on center. Attach them to the side beams with 16d galvanized nails. (You can also use joist hangers but they are expensive).



Powering Independent Living

When posts are not secured in the ground, or to a foundation, it is a good idea to apply cross bracing at the ramp posts.

Cross Bracing Methods



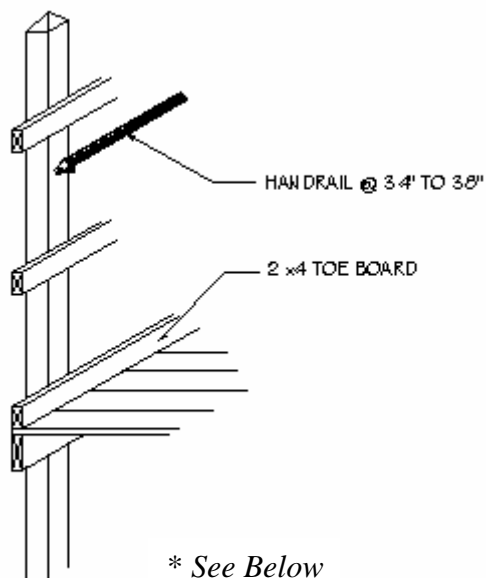
SURFACE – Two common ramping surfaces are plywood sheets or decking. If you decided to use plywood, use a 5/8" or 3/4" exterior type, AC grade. This has a waterproof bond and a paintable veneer grade panel face. Secure the plywood at each joint with 8d galvanized nails spaced 10" apart and along each edge spaced 6" apart.

If you decide to use decking, use 1x4 or 1x6 nominal dimension lumber. (Larger decking sizes are stronger, but have a tendency to warp). Apply it perpendicular to the direction of travel; secure it at the side and center beams with galvanized nails or screws. Try to use edge-grained wood since it weathers better than flat-grained lumber. If you use flat-grained lumber, fasten it in place with the arc of the grain facing up. Leave a 1/8"-1/4" space between boards for water to drain off the surface. Screws are stronger and result in a more finished appearance. If a lip exists at the bottom of the ramp

Powering Independent Living

after the decking or plywood has been applied, you can attach a ¼" thick metal plate to span the lip and help ease of access to the ramp.

CURBS – A continuous 2"x2" strip of wood nailed to the surface of the ramp along both edges can help prevent chair wheels from rolling off the ramp surface. A bottom rail or tow board (fig. 17a) can serve the same purpose.



HANDRAILS and MIDRAILS – This is the final construction step. Railings must be smooth, continuous, and anchored securely on both sides of the ramp. Accessibility codes require a maximum diameter of 1 ½" for gripping ease. A 2x4 can be modified to meet this requirement.

FINISHES – Ramps need some type of protection from the wear of weather, decay and regular use. Different options are noted below:

- redwood, cedar, or cypress can all weather naturally. These, however, are all expensive lumber
- if you decide to use a stain, select a type that does not rub off on clothing or track underfoot.
- Paint requires more maintenance than natural finishes, but it is best for lower grade lumber.

If you use plywood decking, seal the edges well so they don't de-laminate. Be sure to prime the wood first and use high quality paint specifically for heavy wear areas.

SLIP-RESISTANT SURFACES – These are applied after the finish except for porch or deck paint used with silica sand. When applying paint with sand, paint about 9 sq. feet of surface and sprinkle with silica, then immediately apply a second coat of paint. This surface is inexpensive, easy to apply, and relatively durable.

A non-skid material similar to coarse sandpaper with an adhesive backing is easy to apply and is made more durable by rounding the ends and adding waterproof adhesive to the edge. This is available in different widths and colors.

Cross-rib rubber runners, another option, are sold in 3' wide rolls and available by the square foot. Use a waterproof adhesive to secure to the ramp surface. It weathers relatively well.

** Local building codes may require vertical balusters as a guardrail; check with your local building inspector.*

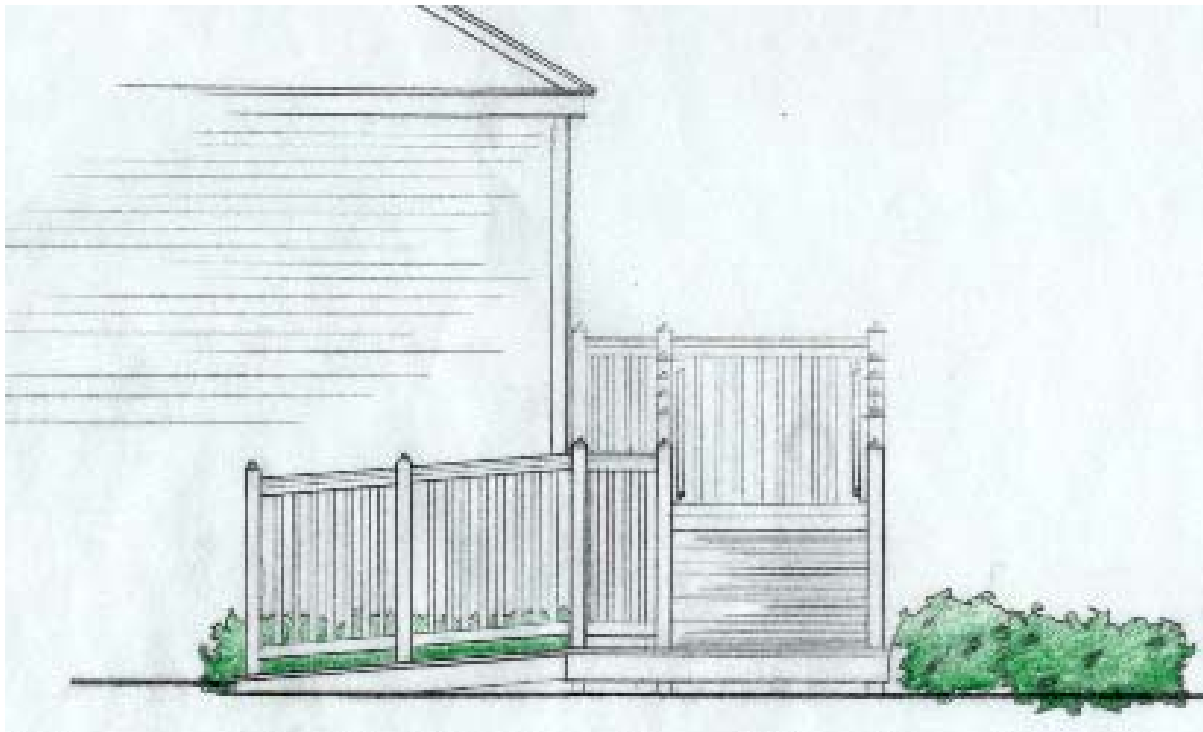


Powering Independent Living

Building a Ramp

AESTHETICS

Ramps can be designed and built to integrate well with the existing architecture. Landscaping or other applications, such as decorative fencing or screen panels, can be incorporated into your ramp planning to suit your personal tastes. Factors to consider include cost, amount of maintenance required, and amount of space you have available. There are many free sources to use to get ideas – seed catalogs, library books on landscaping, nursery personnel, etc. etc. Adding your personal touch can make your ramp not only functional, but an attractive addition to your home and yard.



Prepared cooperatively by Access to Independence and Design Coalition.



Powering Independent Living

Building a Ramp

DESIGNING CURVED RAMPS FACT SHEET AND RECOMMENDATIONS

Current access design standards, including the ADA Accessibility Guidelines (ADAAG), the Uniform Federal Accessibility Standards (UFAS), and the American National Standards (ANSI) avoid addressing alternative ramp configurations and imply that the only acceptable design is a "straight run" ramp, as outlined in Sections 4.8 of all three standards. The only implied allowable deviations from the standards exist in the ADA regulations, although not specific to ramps. Section 2.2 of the ADA Guidelines allows "equivalent facilitation," or the use of alternative designs and technologies as long as "substantially equivalent or greater access is achieved." ADAAG Section 4.1.6 Accessible Buildings: Alterations also allows for deviation from the standards in cases where it is technically infeasible to fully comply with the Standards; in those cases, meeting the Standards to "the maximum extent feasible" is allowed within the scope of the alteration undertaken.

According to reliable sources from both the Access Board and the Department of Justice, the following clarifications regarding alternative ramp designs are appropriate:

- 1) Because alternative or curved ramp designs are not addressed nor specifically prohibited in the standards, they are not considered a violation of the standards if used as long as the designs meet the slope, rise, cross slope, and all other technical ramp requirements for as clear width, landings, handrails, and edge protection.
- 2) Care should be taken, however, in designing ramps with curved surfaces because:
 - a. Inside curve slopes are steeper than outside curve slopes since slopes are a function of rise over run; the shorter distance creating a steeper slope
 - b. Curved ramps, when in full compliance with slope and cross slope requirements, are in fact a warped plane (surface) and compromise the four contact points and stability of a wheelchair; the tighter the radius of a curved ramp, the more warped the surface of the ramp will be
 - c. Currently, there are no technical recommendations available on minimum curve radii to maintain a reasonably level ramp surface; research may be initiated by the DOJ, however.
 - d. Level landings are still required at each ramp rise of 30" or change of ramp direction.

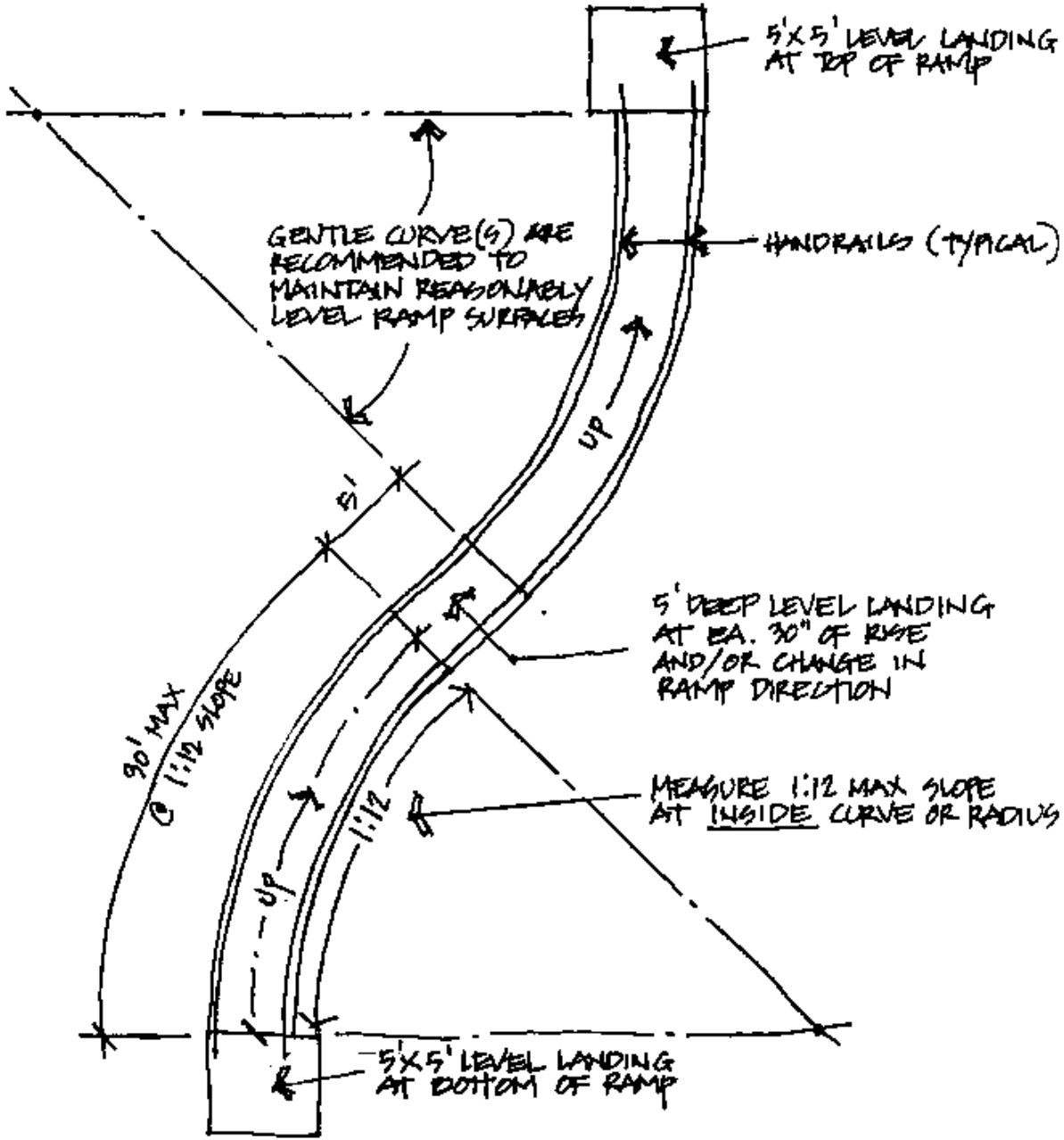
SUMMARY AND RECOMMENDATIONS (See attached sketch)

Alternative ramp designs are not prohibited by the regulations. When designing curved ramps, however, calculate the 1:12 maximum ramp slope on the inside curve; the outside curve will always be at a less steep slope and a reasonably level ramp surface maintained. Gentle curves are recommended to minimize warping and providing the most level ramp surfaces possible. Follow required ADAAG ramp guidelines outlined in section *4.8 Ramps*.



Powering Independent Living

Building a Ramp



CURVED RAMP RECOMMENDATIONS
 1/8" = 1'-0" 10/18/95 • PRP