



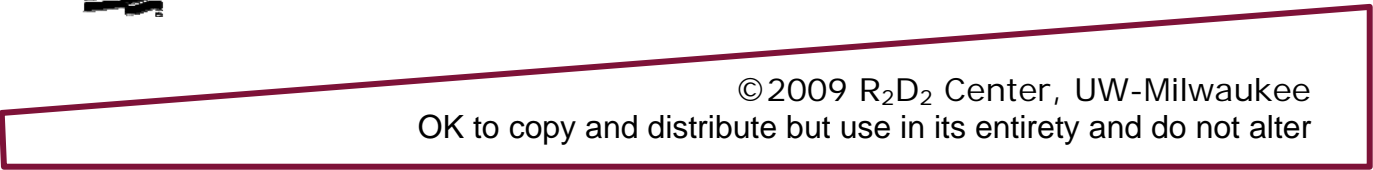
ACCESSed

P R O J E C T

Doorway AUDIT Manual (Version 1.1) (Accessibility and Universal Design Information Tool)

Denis Anson, MS, OTR & Roger Smith, PhD

Manual last updated February 13, 2009



©2009 R₂D₂ Center, UW-Milwaukee
OK to copy and distribute but use in its entirety and do not alter

COMPATIBILITY

All AUDITs have been tested for compatibility with Excel 2004 in Mac OS X and Excel 2003 in Windows XP and Windows Vista.

Note: If you are a PC user in order to use the AUDITs, Macro Security must be set to Medium (recommended) or Low (not recommended). The AUDITs will run on a Mac system without needing this adjustment.

BACKGROUND

Universal design (UD) is a process that ensures that a newly created product is useful to the broadest possible array of people, particularly those with disabilities. UD of testing allows all students to have a better opportunity to express what they know through a system that allows for a variety of learning styles and abilities.

DIRECTIONS

This AUDIT has been tested for compatibility with Excel 2004 in Mac OS X and Excel 2003 in Windows XP and Windows Vista.

Note: If you are a PC user turn the "Macro security" down in Excel to "Warn", or the spreadsheets won't work. The AUDITs will run on a Mac system without needing this adjustment.

To perform an AUDIT:

- Open the Excel file: click on "enable macros".
- The AUDIT will open in "Page Break Preview" view. You may change to another view mode if you wish.
- Save your file with a new name.
- Identify the doorway for audit and clearly label it (along with your name and date) at the top of the worksheet by double clicking on "AUDIT Target", "AUDIT Date", and "Auditor" to enter data in these cells.

- (The AUDIT Target, in this case, could be “Main door to room 201”.)
- Print a copy of both the Accessibility and Usability worksheets,
(or, you may enter scores into the AUDIT directly on your computer).
- You may use the print features of Excel, or you may click on the buttons at the bottom of the page to print individual sheets or the entire workbook.
- Carefully observe each relevant feature of the doorway.
- Score the AUDIT/enter data.
- You can move from sheet-to-sheet by using the buttons across the top or by clicking on the Excel worksheet tabs at the bottom.
- Examine and interpret the graphical data.
- Write comments about the route, or specific issues related to the Doorway AUDIT, in the comments section.

For most AUDITs (e.g. doing an AUDIT of an architectural feature) it is easiest to print a paper copy of both the accessibility and usability worksheets. Take the paper copy to the location, score the items, and then transfer your scores to the computerized spreadsheet. Some AUDITs may be scored directly on the spreadsheet. The method you use depends on the item you are auditing and the computer you use.

The AUDITs are formatted in an Excel workbook with 3 spreadsheets. You may use arrow keys to facilitate the entering of data. Double click on the boxes where you will enter text (e.g. “Comments”, “Auditor”). The spreadsheets for both the accessibility and usability sections will tally the scores and provide a numerical score based on the degree of demonstrated accessibility or usability. Graphical data are presented on the 3rd sheet.

Trichotomous scoring (e.g. “Yes”, “Partial”, “No”) is used to rate each item in the AUDIT. The spreadsheet converts these to numerical scores.

A “**Yes**” score indicates the item is present and effective

. This should not be selected if there is any doubt if the item is present.

A “**Partial**” score indicates that the item is present to some extent. If the item is only present in some cases, or is present but not in an effective way, you mark “Partial”.

A “**No**” score indicates that the specified item is not present. If a feature is present, but not readily “discoverable,” the typical user will not benefit from it. If you are not sure that an item is present, it should be marked “No.”

“**NA**” will remove the item from scoring.

The Accessibility and Usability scores compute the “demonstrated” levels of accessibility and usability. Thus, items that are not scored are considered not to have been demonstrated. If you do not score all items the final score will be lower because the spreadsheet will interpret any unscored items as zero.

CLARIFICATION ON INDIVIDUAL ITEM SCORING

Accessibility Items

Usability Section 1, item 3: If there are two doors in series, there is sufficient space for a wheelchair as the door swings. (The ADA-ABA guidelines specify 48 inches plus the width of the door, if the door swings into the space.)

- ✓ When passing through a set of doors in series, a person in a wheelchair should be able to move between the doors without being struck by a swinging door. When the doors swing the same way, the space between the doors should be measured from the door which swings into the space between the doors, while held open, to the face of the closed door which swings out of the space. There should be at least 48 inches of space clear of the door swings to accommodate the range of wheelchairs that might use the doorway.

Usability Section 2, item 1: The lever handle is horizontal in the resting position.

- ✓ A person passing through a doorway with arms encumbered (or with limited arm function) may prefer to open the door with an elbow or forearm. A service animal may need to unlatch the door with a paw. It is much easier to operate latches with body parts other than hands if the level is horizontal when it is not in operation.

Accessibility Section 2, item 2: The door latch can be released by purely downward force. (e.g. does not require rotation beyond 60 degrees)

- ✓ Door mechanisms are operated, by the able-bodied users, with forearm rotation. This action is not always available to the person with limited hand function or to the service animal. If the door can be unlatched by pressing downward on the lever (and rotation beyond 60 degrees is not required), operating the mechanism is possible for a wider range of potential users.

Accessibility Section 3, item 1: The door can be unlatched and moved without tight grip or pinch or with a body part other than the hand. (e.g. use lever, push-bar, push-button/linear pull handle, etc. Door knobs and finger holes can present significant problems.)

- ✓ There are a wide range of mechanisms to unlatch and move a door. Some require gripping and twisting, while some pocket and sliding doors require inserting a digit into a small hole and either pulling or dragging sideways. These types of mechanisms are very difficult or impossible for those without full hand function, or who rely on service animals for mobility. Mechanisms that combine the unlatching movement with the door-moving action (for example pushing on a release bar, and continuing to push to open the door) provide much greater accessibility.

Accessibility Section 3, item 2: The door release handle is at a height that is reachable by seated or standing users. (The ADA-ABA guidelines specify between 34 and 48 inches from the floor.)

- ✓ Under the ADA-ABA guidelines, any height between 34 and 44 inches is allowable. However, a height of 42 inches from the floor is “standard” and an optimal compromise.

Accessibility Section 3, item 3: Door handle provides visible and tactile cues to distinguish it from the background.

- ✓ In pursuit of style, some architects will use door latches that blend into or that echo the surrounding wall features. This makes the door very difficult to use for a person with low vision or no vision. Unless there is a strong functional reason for disguising a doorway, it should be easily discriminated from the surroundings.

Accessibility Section 3, item 4: The door mechanism provides at least 1 1/4 inch of clearance between the gripping surface and the door.

- ✓ When a door mechanism depends on the operators grip to operate or pull the door, there must be space between the grip and the door. Some people with limited hand function use their entire palm or the back of their hand to pull. For these people, there must be adequate space between the door and the handle.

Accessibility Section 3, item 6: The door release can be activated without excessive force. (e.g. for rotating mechanisms, no more than 5 ft-lbs of torque, for linear mechanisms, not more than five pounds of force)

- ✓ Many types of disability limit the amount of force that a person can apply. Muscle weakness, joint instability, and chronic pain, among others, can make applying high force levels difficult or impossible. Service animals may need to use a paw to release the latch, and may not be able to exert high forces due to limited body weight. On a typical lever style door handle, a downward force of 10 lbs at the end of the lever will produce a torque of approximately 5 foot lbs.

Accessibility Section 4, item 1: The key can be turned in the lock without excessive force. (e.g. the force required to turn the key is not greater than .5 foot ounces.)

- ✓ Holding and turning a key requires pressing the key against the first finger with the thumb, then turning the wrist. The forces that can be generated in pinch are much lower than those a full grip, and this must be reflected in lock design. Many people will have difficulty turning a key that requires high force.

Accessibility Section 4, item 2: The latch can be unlocked without excessive twisting of the wrist. (e.g. the lock mechanism does not require more than 90 degrees of rotation to operate.)

- ✓ Many kinds of arm limitation restrict the ability to rotate the hand (pronate and supinate). If the lock mechanism requires more than 90 degrees of rotation, many people will not be able turn it successfully.

Accessibility Section 4, item 3: For doors where a key is always required for passage, the mechanism allows the key to be turned independently of the lock mechanism. (i.e. the key is not used to pull the latch bolt.)

- ✓ For security reasons, some doorways are fitted with latches that always require the key to be inserted for the door to be opened. If the key turning also pulls the bolt, without requiring turning of the lever, the pinch forces on the key will exceed the level that many people can produce.

Accessibility Section 5, item 3: The design of the door push/pull accurately indicates door movement. (e.g. handles suggest pulling, plates suggest pushing)

- ✓ As a person approaches the door, the design of the door hardware should provide a clear indication of the door movement to allow the user to prepare for the required action. This includes whether the door swings toward or away from the user, as well as the side of the door that swings. Some doors provide a single bar across the entire door, indicating that the door should be pushed, but do not provide a cue as to which side of the door should be pushed on.

Accessibility Section 6, item 1: The automatic door opener allows sufficient time to move through the door before closing, e.g. The ADA-ABA standards specifies that from a fully open position, the door takes 5 seconds to reach a position 3 inches from the latch.

- ✓ If an automatic door closer operates too quickly, it may strike the person passing through the door, or trap their clothing in the closing door. The ADA-ABA standard of five seconds from fully open to three inches from closed will allow most people to clear the doorway before the door comes closed. The final three inches of closure should be at approximately the same rate, so as not to trap an individuals fingers with a sudden slamming of the door.

Accessibility Section 7, item 1: Automatic opener sensors respond to individuals who are at least 36 inches high (optical or ultrasonic sensors) or who weight at least 50 lbs (mat sensors).

- ✓ Automatic doors typically sense approaching uses with ultrasound or infrared sensors, or with pressure mats. These often have threshold settings so passing pets, birds, or rodents do not operate the doors. If the sensing threshold is set too high, it may also ignore individuals of short stature.

Accessibility Section 7, item 2: The manual actuator is placed at a height that can be reached by both seated or standing users. (e.g. No lower than 34 inches, and no higher than 48 inches from the finished floor surface.)

- ✓ When a power door opener requires the user to press a button to open the door, the button must be placed where it can be easily reached by the user. If lower than 34 inches, it will be difficult to reach for standing users. If higher than 48 inches, it will be out of reach for a seated user. A height of 44 inches appears to be optimum for most users.

Accessibility Section 7, item 3: The actuator for a manually activated power door does not require a reach of more than 15 inches from the accessible path.

- ✓ In addition to height restrictions, many users are limited in their ability to reach forward or to the side. This is especially true when the accessible path leading to a door is bordered by planted or other soft surfaces. The actuator button must be reachable by a person who is on the path.

Accessibility Section 7, item 4: A door being opened by a powered opener can be stopped without excessive force, e.g. no greater than 15 ft-lbs for rotating doors or 5 lbs for sliding doors.

- ✓ If a person or service animal is still in the doorway when the door begins closing, they must be able to override the door without excessive force. The maximum recommended forces will not cause injury for most users.

Accessibility Section 7, item 7: The actuator for a manually activated powered door is large enough to be operated by body parts other than fingers. (e.g. elbow, service animal's paw or nose)

- ✓ A person using a door opener may have hands that are either limited in function or encumbered by objects being carried. To accommodate these conditions, and the need for service animals to “nose” the door open, the button must be large enough to accommodate operating by an elbow or other body part.

Accessibility Section 7, item 8: Manually operated door openers hold the door open for the greater of 5 seconds, or the number of feet from the actuator location to the hinge side of the door multiplied by 2/3 seconds.

- ✓ If the door is not open long enough after the button is pressed, it will not allow an individual to pass. If the button is within 8 feet of the door hinge, it should remain open for at least five seconds before beginning to close. If the distance to the button is greater, the door should stay open at least two seconds for each three feet from the button to the hinge.

Accessibility Section 8, item 2: If the doorway has two leaves (doors) that operate independently, at least one meets all of the requirements for accessible doorways, including width.

- ✓ In a doorway with two doors that operate independently, it should not be required for a person to operate both doors to have an accessible path. In many such cases, the doorway will be fitted with one door which is wider than the other. In such cases, the wider doors should provide accessible passage without operation of the narrower half.

Accessibility Section 9, item 1: Where a doorway has a raised threshold, the threshold does not present a barrier to wheeled mobility. (The ADA-ABA guidelines specify that the change in height is no greater than 1/2 inch for interior doors, and no greater than 3/4 inch for exterior doors. In both cases, the edges of the threshold are beveled with a slope of no less than 1:2 at least 1 inch extension for a 1/2 inch threshold.)

- ✓ For a wheeled device, a barrier that is as high as the axel is effectively a wall. Because many ultra-light manual wheelchairs have front casters that are two inches in diameter, a 1-inch ledge represents a severe barrier, and a ¾ inch threshold a major bump. To allow passage of wheeled devices, the threshold must be beveled.

Accessibility Section 10, item 1: Mechanisms used to hold doors open may be activated without requiring reach below 15 inches above the floor.

- ✓ Devices that hold doors open should be as accessible as those that hold them closed. If a door stop requires reaching below 15 inches from the floor, it cannot be used by a person in a wheelchair, and will be difficult to use for many people with limited balance or poor joint mobility.

Accessibility Section 10, item 2: Doors held in position with magnetic or mechanical latches may be released without requiring forces greater of greater than 5 lbs at the latch side of the door, and without requiring reach below 15 inches above the floor.

- ✓ Magnetic latches can generally be released by applying enough force to overcome the magnetic bond, anywhere on the door. If the forces required to release a magnetic or mechanical latch are greater than can be produced by the individual, the ability to reach to the latch is of no benefit.

Usability Items

Usability Section 1, item 1: When a doorway connects two spaces with similar lighting, the doorway is lit to an equivalent level.

- ✓ For certain types of disability, abrupt lighting changes are difficult to accommodate, and are significant barriers. If the area around a doorway is either brighter or dimmer than the surrounding area, the risk of falling while passing through the door is increased. If lighting level changes are less than 10% of the overall lighting level (5 foot candles for an area lit to 50 foot candles) the risk will be minimized.

Usability Section 1, item 2: When a doorway connects two spaces with different lighting levels (dark to light or light to dark), the doorway is lit to an intermediate level.

- ✓ Some doorways connect areas with deliberately different light levels. Moving into a movie theater from a well-lit lobby, for instance, often requires significant changes in lighting level. In such cases, providing intermediate lighting in the area immediately adjacent to the doorway gives the individual a greater time to accommodate to the change in lighting level, and minimizes risks.

Usability Section 2, item 1: The lock provides visual and tactile cues for the location and orientation of the key slot.

- ✓ When lock mechanisms are exposed to harsh environments, or when designers fail to consider the consequence of their actions, they may have coverings that obscure their location or doors that block the key slot. For a person with low vision, such

efforts can make the location of the lock impossible to determine. If such a covering is used for environmental reasons, it should provide visual and tactile contrast with its surroundings to identify the lock location.

Usability Section 3, item 1: Doors may be "parked" in open position without use of a door blocking object (e.g. trash can or wedge).

- ✓ Some door automatic door closers include a feature that allows the door to be "parked" by carefully positioning the door in an open position. Such closers are preferred because they do not require the removal of a physical obstacle to close the door.

Usability Section 4, item 1: The doorway includes an ADA compliant gripping surface (handrail) on the latch side of both sides of the door, mounted between 34 and 38 inches above the floor.

- ✓ For people with limited balance, the greatest risk of falls is at movement transitions. Providing a stable support at doorways can reduce the risks to users with limited balance.

Usability Section 5, item 1: Where the door is provided with a vision light (window), the lower edge of the light is no more than 42 inches above the floor.

- ✓ Windows in doors allow someone approaching the door to detect a person approaching on the other side, minimizing the risk of collisions. Placing the lower edge no more than 42 inches above the floor provides this benefit to a person using a wheelchair as well as those who are standing.

AUDIT SCORE SHEET

The AUDIT summary graphs display the accessibility and usability scores for both parts of the AUDIT. The graphs help determine the perceived levels of accessibility and usability for the item under review based on the percentage of possible points. Behind the scenes a score of “Y” = 2 points, a score of “P” = 1 point and a score of “N” = 0 points. A score of “NA” removes the item from consideration, reducing the total number of possible points for the section of the AUDIT.

Accessibility interpretation: A one hundred percent score suggests full, basic access to people with disabilities. Any "no" or "partial" scores indicate that some people with disabilities will not be able to use the AUDIT target. They flag major problems.

Usability interpretation: The usability scores illustrate the "friendliness" of the AUDIT target. This usability affects all users, including people without disabilities, but difficulties are often amplified for people with disabilities. The higher the "yes" and "somewhat" scores, the more usable the AUDIT target is for everyone. "No" responses signify less access for everybody.

The score sheet “**comments**” section is provided for your notes and/or recommendations.



The ACCESS-ed Project considers all AUDITs to be live/working documents. Please share any comments, feedback or suggestions that you may have through the “Contact Us” feature of our website.

R₂D₂ Center, Enderis 135
University of Wisconsin-Milwaukee
PO Box 413
Milwaukee, WI 53201-0413
voice (414) 229-6803
fax (414) 229-6843
TTY (414) 229-5628

Email: access-ed@uwm.edu
access-ed.r2d2.uwm.edu

The ACCESS-ed project is supported in part by the U.S. Department of Education’s Office of Post-secondary Education, PR/Award #P333A050090. The opinions contained in this publication are those of the grantee and do not necessarily reflect those of the U.S. Department of Education