



A Reach for Harmonization

US Access Board Allows Peek at New Guidelines

by Lawrence G. Perry, AIA

On April 2, 2002, the US Architectural & Transportation Compliance Board (Access Board) published a draft of the final guidelines revising the Architectural Barriers Act (ABA) and the Americans with Disabilities Act Accessibility Guidelines (ADAAG). The Board took this somewhat unusual step to provide an opportunity for both the International Building Code Council's (ICC) International Building Code (IBC) and ICC/ANSI A117.1 Accessibility Standard to be "harmonized" with the likely new federal accessibility requirements.

Both the IBC and the A117.1 Standard are at a point in their revision cycles where it was possible to introduce proposals to make them consistent with the new ADAAG. If the Board had waited until publication of the Final Rule, the opportunity to harmonize the IBC and A117.1 would have been lost for several years.

This article highlights some of the major provisions in the document, particularly changes from current ADAAG and the 1999 Notice of Proposed Rulemaking (NPRM) and addresses the responses by the model codes and standards bodies to the Draft Final Rule.

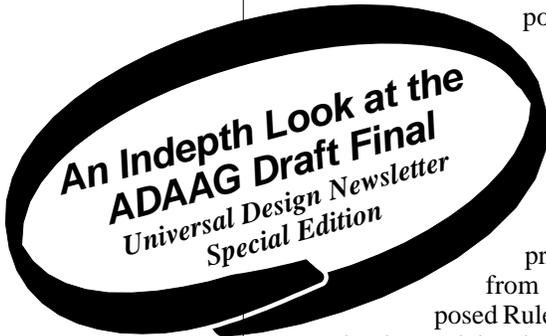
Highlights of the Draft Final Rule

Format and Editorial Style. The Draft Final Rule retains the new format and editorial style recommended in 1996 by the ADAAG Review Advisory Committee. This substantial change in the appearance of the guidelines was well received during the public comment period to the NPRM. The new format simplifies the organization of the document into logical "chapters," and makes it easier to find relevant technical provisions without having to memorize the numbering sequence of the entire document. The new editorial style is modeled after typical codes and standards language, and attempts to state requirements once, in clear, concise, mandatory language. Any "advisory" language, recommendations, or commentary has been eliminated from the body of the document. The Board has decided that it will be including some "advisory" language, but it will be inserted in a manner that will clearly indicate it is not a mandatory part of the guidelines.

The new guidelines are divided into three parts, as follows: ADA Administrative and Scoping Provisions (Part 1); ABA Administrative and Scoping Provisions (Part 2); and Technical Requirements (Part 3).

Parts 1 and 2 each contain a Chapter 1, titled "Application and Administration," which also includes definitions, and a Chapter 2 titled "Scoping Requirements." The two scoping documents are similar; except for differences related to the underlying federal laws [e.g., an elevator exception under Title III of the Americans with Disabilities Act (ADA) that is not in the Architectural Barriers Act (ABA)] and facilities which typically fall only under government control (such as military installations). Part 3, contains the technical provisions applicable to both the ADA and the ABA.

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Editorial

Visitability: Another View

by Larry Lattomus

In the April 2002 issue of *Universal Design Newsletter* there was an article on the "Visitability" issue written by visitability proponents. I would like to use this opportunity to comment as a proponent of the homebuying public, one who has a severe disability and as a citizen of the USA. I also have been intimately involved in the disability community for some 26 years having served as chairman of Tucson's Commission on Disability Issues (CODI). At the outset and for a period exceeding two years, I have participated in the visitability issue.

The issue appears to be rather simple and easy to advocate. In reality, it becomes more complex than meets the eye and very emotional. The building community, with a mission of providing affordable housing, constantly seeks to balance desires with cost. Proponents are sometimes uninformed with the intricacies of design and construction, leading to hasty and simple conclusions. Visitability proponents in Tucson could have achieved success with an ordinance limited to subsidized housing, but they unwisely held out for mandatory legislation, ending with no action. And this is where the issue usually meets resistance.

Advocates cite the demand for more accessible friendly housing from the disability community and

the elderly population arguing "aging in place," while statistics show people move every five to seven years. Tucson's local builders indicate they have never had a request for a visitable home. At my urging they were willing to cooperate with CODI in a survey of potential homebuyers to get a sense of the underlying demand for such housing and what buyers would be willing to pay. Unfortunately, the commission refused to participate. At my urging, local builders agreed to offer a standard visitability option to all new homebuyers, but CODI refused to compromise on any issue.

As a result of lengthy discussions, Tucson's City Council dropped the issue. But the proponents proceeded to the county (Pima) where they

Editor's Note

This month we are devoting an unprecedented amount of space to a single article we commissioned from Larry Perry, AIA on the newly released ADAAG Draft Final Rule. We think UDN readers will appreciate a head start in their efforts to understand some of the more controversial issues in the proposed update to the Americans with Disabilities Act Accessibility Guidelines.

had a favorable political lineup to push the issue unbeknown to me, the builders or other interested parties. By a 3-2 vote, the Board of Supervisors passed a mandatory ordinance on the day before the third voter's resignation. There is now a real battle around the table prior to the ordinance's taking effect. Enforcement may be delayed six months or modifications made. I believe a court test will eventually throw out all mandated ordinances.

In Tucson and Arizona, the disabled community is divided on this issue. So are disability service organizations. Advocates use service agencies as their supporters. But they express much displeasure with the service organizations that remain neutral or allow their clients the right to make their own decisions. The missing element in support of the issue is the potential homebuyer who in the end pays the cost. There is a cost and it can vary greatly. Builders have a mandate to build affordable homes and adding any cost can push some people out of the market. And the disabled community may suffer the most.

An important issue has yet to be mentioned. Here in America we value certain rights and among those are personal property rights...the right of a person to build his home as he sees fit. The advocates speak of "civil rights" to enter my home. That may be so in England or Holland or Sweden, but not here. This issue is a veiled attempt to bestow ADA status to private residential homes. The last time I looked, a home is not a public accommodation.

Finally, I have yet to talk with a builder who refuses to build me or anyone an accessible or visitable home. Here in Tucson, local builders regularly offer many accessible floor plans, especially for retirees. And they tell me everyone has their own definition of accessible. Surprised? Of course not! 

Larry Lattomus is a 35-year member of the Paralyzed Veterans of America.

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Universal Design Newsletter is published by Universal Designers & Consultants, Inc., which is frequently engaged by plaintiffs and defendants for consulting and expert witness services in ADA litigation, design review and facility evaluations.

Mail subscription rates: One year \$35 (U.S.). Second-class postage paid at Takoma Park, Md. Postmaster send address changes to *Universal Design Newsletter*, 6 Grant Ave., Takoma Park, MD 20912-4324, publisher@universaldesign.com. For information on advertising rates or obtaining alternative accessible formats, please call or write the *Universal Design Newsletter* Publisher.

New Final Draft ADAAG, *from page 1*

Not surprisingly, most of the significant changes contained in the draft Final Rule are the result of large amounts of comment during the public comment period. The majority of these were provisions that are substantially different than current ADAAG. In some cases, the Board has added new material that was not included in either current ADAAG or in the NPRM.

Reach Range Limits. In the new format, Chapter 3 contains the "Building Blocks," which most other chapters refer to for applying heights, sizes and clearances at accessible elements. The reach range provisions were the most controversial "building block" issue in the ADAAG Review Process.

In the NPRM, the Board maintained the current ADAAG high side reach limit of 54" maximum. However, the Board included several questions in the Preamble to the NPRM, seeking comment on the ramifications of a maximum 48" limit, which was recommended by the ADAAG Review Advisory Committee and, is contained in the 1998 A117.1 Standard.

In the Draft Final Rule, the Board has adopted 48" as the maximum allowable height for both forward reach and side reach. Exceptions have been provided for elevators serving more than 16 openings (regulated by "opening" rather than "floor" to accommodate cars with front and rear doors), and for gas pumps installed on existing raised curbs. The Board received little or no other opposition to this change from other industries that make products that would possibly be covered. The vast majority of controls (such as light switches and thermostats) are small enough that simply adjusting the height at which the control is originally installed will provide compliance. Certain types of equipment may require additional modification to meet the new lower standard.

Construction Tolerances. The Draft Final Rule includes new text addressing construction tolerances. Current ADAAG states "All dimensions are subject to conventional industry tolerances for field conditions." The new Draft Final Rules states "All dimensions are subject to conventional industry tolerances except where the requirement is stated as a range with specific minimum and maximum end points."

Lawrence G. Perry, AIA is an architect and codes consultant in Silver Spring, Md. In addition to representing the Building Owners and Managers Association in the model codes and standards arena, he also provides a variety of consulting services related to both ADA and Fair Housing compliance.

This new text removes tolerances wherever a stated range is provided. For example, current ADAAG required water closets to be centered 18" off a side wall, but "conventional industry tolerances" could be applied in either direction off the centerline. The text of the Draft Final Rule provides a "stated range" of 16" minimum to 18" maximum, but prohibits any additional tolerance. A water closet centered 18-1/16" off the side wall is a violation with the new construction tolerance text.

The new text also creates a "double standard" for construction tolerances. In many cases, the technical requirements do not state specific minimum and maximum end points, but provide only an "implied" range, with only the minimum or maximum end point stated. For example, knee clearance is required to be 30" minimum in width. Because no "maximum" is stated, it appears that knee clearance slightly less than 30" due to construction tolerance is acceptable.

Referenced Standards. In two locations, the Board has deleted detailed provisions from the ADAAG, and replaced them with a reference to an existing, widely-used model code or standard. Provisions addressing accessible means of egress and areas of refuge have been deleted, and the IBC provisions (2000 edition, with revisions through the 2002 Supplement) on accessible means of egress have been referenced. This creates no technical change from the NPRM.

Similarly, extensive text and multiple tables applying to the technical characteristics of visual alarm appliances have been replaced with a reference to NFPA 72-1999, National Fire Alarm Code. The technical requirements remain unchanged.

See New Final Draft ADAAG, **page 4**

The reach range provisions were the most controversial "building block" issue in the ADAAG Review Process.

A Perspective on Reach Range

by **Tricia Mason**

Little People of America is thrilled to see the obstructed and unobstructed, forward and side reach ranges lowered to 48" in the new draft ADAAG. Previously being 54" for a side reach, and 48" for a forward reach, this continuity will certainly make things more accessible for people of short stature. This change in the ADAAG will coordinate with the efforts made by our organization to get reach ranges lowered from 54" to 48" in ANSI A117.1 for both side and forward reaches.

Not only will this change benefit people of short stature, it will also improve access for people who have limited arm strength and other types of disabilities. While there are exceptions for laundry facilities and fuel dispensers in the side reach range, the changes will make for an overall improvement in access for all people. 

Tricia Mason, Delegate, ICC/ANSI A117.1 Committee, Little People of America

New Final Draft ADAAG, from page 3

In each of these two cases, the Board did modify the newly referenced documents. In the case of accessible means of egress, the Draft Final Rule includes a provision, not found in the IBC, that requires accessible means of egress to be provided on the level of exit discharge when the difference in level between the floor and the street is 30" or less. The Board feels that if the difference in elevation is 30" or less, it is feasible to accommodate the change in level, possibly with interior or exterior ramping, to reach the level of exit discharge.

In the case of fire alarm systems, the Board included a limit that audible alarms can be 110 dB maximum. The current standard allows 120 dB maximum. According to industry sources, the use of appliances exceeding the 110 dB level is extremely rare. It is likely that proposals to "harmonize" the Fire Alarm Code by inserting the lower limit will be considered in the next revision cycle.

Employee Work Areas. In the NPRM, the Access Board retained the current ADAAG "approach, enter and exit" concept for employee work areas. However, a new additional requirement was proposed: that all employee work areas be provided with visual alarm coverage where audible alarm coverage was provided. As the Board noted in the NPRM Preamble, this would have required visual alarms in every room with a door within work areas. In the Draft Final Rule, this provision has been removed, and replaced with a requirement that the "capability" to install visual alarms within any work area be provided. The Board intends this to allow the typical "additional" capacity built into most new installations to satisfy this requirement. This change was the result of opposition raised by owners and managers of office buildings, where this requirement would have had the broadest impact. In addition, people

See New Final Draft ADAAG, page 6

"All dimensions are subject to conventional industry tolerances except where the requirement is stated as a range with specific minimum and maximum end points."

Final Draft, ADAAG

Codes and Standards Bodies Response

The model codes and standards bodies carve up accessibility issues in a slightly different manner than does the Access Board in its Draft Final Rule. The new federal guidelines divide scoping provisions (those that state where a requirement applies and the number or percentages of covered elements) from technical provisions (which specify height, size, and other specific criteria of accessible elements) into separate portions of the Rule. In the model code arena, the building code generally contains the scoping provisions, while the technical criteria are contained in the separate A117.1 Standard.

International Code Council's International Building Code

The final code change cycle is in progress before the publication of the 2003 edition of the ICC International Building Code. Proposals were submitted in November 2001, and were the subject of public hearings in mid-April in Pittsburgh, PA. The Means of Egress Committee has responsibility for most accessibility issues in the I-codes.

A number of accessibility related proposals were submitted by the original November deadline, most seeking to make changes based on provisions from the Access Board's NPRM. These proposals, and several others, served as the "foot-in-the-door" for a series of substantive amendments intended to revise the IBC to align with the Draft Final Rule. Most of the proposals, with the necessary amendments, received favorable recommendation by the Code Development Committee. The ICC process this year will allow additional amendments to be presented in the form of public comments, which will be de-

bated at the Final Code Hearings, scheduled for Sept. 29 – Oct. 4, 2002, in Fort Worth, TX. Some of the changes intended to align with the Draft Final Rule may be "challenged" at this meeting, and some of the harmonization issues that were not initially accepted may be re-introduced. The results of the hearings held in Fort Worth will determine the final content of the 2003 edition of the IBC, scheduled to be published by January 2003.

ICC/ANSI A117.1

The A117.1 Committee began the revision cycle for the next edition of the A117.1 Standard late in 2001. Public proposals were requested, and the committee held week-long meetings in December 2001 and February 2002 to act on them and on recommendations from several committee task groups. With the release of the Draft Final Rule for review, the committee chair appointed a "Harmonization Task Group," which was charged with identifying technical and editorial differences between the Draft Final Rule and the 1998 edition of A117.1. This task group met for two days at the end of April and developed recommendations to either revise A117.1 to match the Draft Final Rule, or allow differences to remain.

These proposals were addressed by the A117.1 Committee during meetings held May 29-31, in Washington, D.C. The majority of changes needed for harmonization were approved by the committee. Similar to the IBC process, there is another round of public comment, in which some of these decisions may be challenged. Additionally, in the A117.1 ANSI process, the committee needs to sustain its actions from the meetings through written ballots. 

BELGIUM: New Program in Schools of Architecture

Three Belgian Schools of Architecture, located in Antwerp, Ghent/Brussels and Hasselt/Diepenbeek, responded to the Council of Europe Feb. 15, 2001, resolution "on the introduction of the principles of universal design into the curricula of all occupations working on the built environment" by developing a proposal to integrate universal design into their curriculum.

The project began in November 2001 with a focus on developing the framework and some pilot curricula. A Scientific Contact Forum held in May 2002 brought together faculty throughout Europe to discuss universal design education. The faculty is also planning a European design competition in 2003 on the Universal Hotel in collaboration with the European Institute on Design and Disability. Its vision statement notes, "A hotel is a public building and hence should be accessible for all, but also a hotel accommodates people in an atmosphere similar to housing. Unlike any other building, which is either public or private, it should combine the qualities of a public place and the touch of a private home. This is a perfect topic for students to explore universal design."

For more information on the project, contact Hubert Froyen at HFroyen@mail.phlimburg.be. Details on the 2003 competition will be announced on the Universal Design Education Online website at www.udeducation.org. For details on the Council of Ministers resolution (introduced in the April 2001 *Universal Design Newsletter*) see <http://cm.coe.int/ta/res/resAP/2001/2001xp1.htm>

UNITED KINGDOM: Arts Council Funding Assured Inclusive Design

The lottery funded Arts Capital Programme of the Arts Council of England has awarded more than 1 billion pounds to over 2,000 arts projects since it was launched in 1995. With the premise that the lottery money comes from all the citizens, the lottery funding had to be spent on projects that assured the participation of all citizens. This philosophy was

"World Update" is written by Elaine Ostroff, founding director of Adaptive Environments Center. If you have information about international universal design efforts that you would like to see published in Universal Design Newsletter, write to: 6 Grant Ave., Takoma Park, MD 20912; or publisher@universaldesign.com

translated into effective accessible design guidelines long before the Disability Discrimination Act (DDA) guidelines were a requirement. The guidelines assure that people with disabilities can work in arts settings as well as be part of the audience. They address individual workstations, such as lighting booths, back stage areas, management information and communication design. The capital funding awards are timed to match the Royal Institute of British Architects (RIBA) design and construction phases. They also include the costs of the required consultation by people with disabilities.

The Arts Council funding was a factor in the recent Civic Trust 2002 Awards. These annual awards honor the very best urban and environmental design all over the UK. The Royal Court Theatre had received significant Arts Council funding and won one of the three top awards for "the project that best reconciles the access needs of people with disabilities with the conservation requirements of a historic site." Haworth Tompkins Architects of London were the architect/designers. Excerpts from the awards booklet explain, "...The building was structurally unsound and the front and back of the house had become too cramped and inaccessible for production use...Re-raked tiers and new seats have improved sightlines and comfort...The judges also were impressed with the swift and easy to use elevators with friendly actors voices giving announcements."

For more information on the Arts Council visit www.artscouncil.org.uk/funding/fcapital.html. For the Civic Trust, see www.civictrust.org.uk/awards/awards.shtml.

NORTHERN EUROPE: Policy-Oriented Design Competitions Address Universal Design

Universal design is a hot topic in Northern Europe. The Nordic Council on Disability Policy, a component of the intergovernmental Nordic Council of Ministers, is sponsoring design competitions that address major problems in community living, through a universal design approach. Two recent competitions exemplify its intent. The Modern Journey, supported by government agencies and transport-related companies looked for solutions to



The reception desk at the Royal Court Theatre could be used by everyone.

New Final Draft ADAAG, from page 4

who experience seizures due to photosensitivity commented that the proliferation of visual alarm appliances throughout the workplace would create a hazard for them.

The Board has departed from the “approach, enter, and exit” requirement. In addition to visual alarm capability, the Draft Final Rule regulates circulation paths and accessible means of egress within employee work areas. Common use circulation paths within employee work areas are required to be accessible routes; exceptions are provided for work areas less than 300 square feet in size, and defined by permanent partitions, counters, casework or furnishings, for work areas that are an integral part of equipment, and for circulation paths that are part of work areas fully exposed to the weather.

Employee work areas that are less than 150 square feet in size and must be elevated 7” or more above the adjacent floor area are exempt from all requirements.

The Board has departed from the “approach, enter, and exit” requirement.

Signage Highlights by Ken Ethridge, AIA

The biggest new item added is that there are now two ways of providing identification signage for permanent rooms and spaces. There’s even a reasonable definition for “permanent”: something that exists for more than seven days. Thanks to Roger Whitehouse, RIBA, FSEGD, the two ways of meeting the regulation are:

- Pretty much as things are now. Raised lettering should contrast with its background because, after all, it will be read visually as well as by touch.
- An Alternative: Raised lettering does not contrast with its background (and the lettering can be a little smaller) because the message is repeated clearly by conventional, non-tactile lettering.

Included in both alternatives are some good practice requirements for clearance between raised lettering and Braille, and between raised lettering and other raised elements like rule lines and borders. Requirements for raised lettering will also call for a little thinner stroke width than generally used now. This is because it’s easier to follow a narrower ridge by touch than a fatter, flat area.

There is also an easy to accomplish requirement for wide spacing of text: one stroke width of space minimum, four stroke widths maximum.

There is a reasonable chart of required text heights based on approach distance to the sign and distance of the text or Braille baseline to the finished floor. Also a provision that signs can be mounted on doors that swing into spaces, do not have hold open devices and have power closers (e.g., hotel rooms and restrooms!).

In addition, proposed is an acceptable range of heights from finished floor to baseline of text or Braille. This is much more flexible than the present requirement of 60” from floor to center of sign. It allows proper placement for children’s facilities and for facilities with a large population of wheelchair users. I view these proposed changes to the ADAAG as very positive and effective. I sincerely hope they will survive the rest of the adoption process. I further hope they will be adopted into the upcoming revision of the ANSI model accessibility code, thereby clearing up conflicts between federal and state level regulation. 

Ken Ethridge, AIA, RIBA is vice president of Marketing and Corporate Communications for ASI Sign Systems in Dallas.

Press Boxes. Two new exceptions for press boxes have been added to the Draft Final Rule. The new exceptions exempt the accessible route to press boxes located in bleachers that have entry points on only one level, and free-standing press boxes elevated 12 feet or more above grade. Both exceptions apply only where the aggregate area of all press boxes in the “facility” (which could include multiple fields) does not exceed 500 square feet.

Accessible Entrances. The Draft Final Rule increases to 60%, from 50%, the minimum number of building entrances required to be accessible.

Parking. The Board has modified the scoping provisions for van-accessible parking spaces, requiring that one of every six accessible parking spaces be a van-accessible space. Current ADAAG requires only one of eight accessible spaces to be van-accessible.

The Board has reduced an exception for small parking lots. Where a total of four or less parking spaces are provided on a site, the accessible space is not required to be reserved by signage. In the NPRM, this exception applied where five or fewer spaces were provided, which is currently the IBC provision.

Water Closet Clearances. The Board has maintained a proposal from the NRPM that will require a 56” by 60” minimum clearance at water closets, and will not permit a lavatory with knee/toe clearance in the area.

Transient Lodging: Accessible Communication Features

One of the more significant changes proposed in the NPRM was a requirement that 50% of hotel guest rooms be provided with visual alarms and other features for communication access. Current ADAAG requires a range between 16% and 4%, depending on the size of the facility. The Draft Final Rule removes the 50% requirement of the NPRM, but will still, for most facilities, require far more rooms with accessible communication features than current ADAAG. The Draft Final Rule proposes the following:

- 1-200 guest rooms, 10% require accessible communication features;
- 201-500 guest rooms, 15% require accessible communication features;
- 501 and more guest rooms, 20% require accessible communication features.

For a 200 room facility, this results in an increase from 14 rooms to 20 rooms. For a 1,000 room facility, the increase is from 40 to 200 rooms.

Because current ADAAG used tables, and the Draft Final Rule uses a straight percentage, some small facilities will have a reduced requirement; however most will see a significant increase. This is

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Developing a Prototype Anthropometric Database

by David J. Feathers & Victor Paquet, Industrial Engineering, University at Buffalo

The physical dimensions of the built environment should allow people to live, work and play in the way they prefer. This requires an understanding of the structural characteristics of human body sizes, as well as functional abilities, including reach. Capturing both structural and functional aspects of the human form is necessary for proper understanding of the relationship between the body and the built environment.

Now in it's third year, the Prototype Anthropometric Database project of the Rehabilitation Engineering Research Center on Universal Design at Buffalo (RERC UD at Buffalo) is creating a database that contains the structural and functional attributes of 500 adults who use wheelchairs to perform activities of daily living on a regular basis. Paralleling this effort, the project will also seek to develop and test new measurement methods that provide designers with new and useful information intended to facilitate the improved design of built environments. This article describes one of the challenges involved in the process of methods development and the research strategy that is currently being employed to deal with the challenge.

Challenge: Body Measurement and Context

Traditional measurement tools (see Figure 1) seek to use traditional methods to capture linear dimensions of the human body or function, and are bound by their context. This is to say that when measuring subjects with disabilities, data collected with traditional tools are often flawed because their validity often relies on standardization of body positioning during measurement — both on a single subject, as well as during comparison of measurements between subjects.

By measuring the true distance between two stipulated points in three-dimensional space, electromechanical measurement tools (see Figure 1)

capture dimensions and context that offer more realistic representation of the body within the built environment. The three-dimensional electromechanical measurement techniques allow both measurements to be considered simultaneously with other environmental features and body landmarks.

Since the three-dimensional electromechanical approach captures context and may have other advantages such as rapid measurement rendering and emersion into computer-aided design (CAD) programs, it would seem as though this approach would be advantageous. However, great care must be taken during the application of this approach to the anthropometric research, for two important reasons:

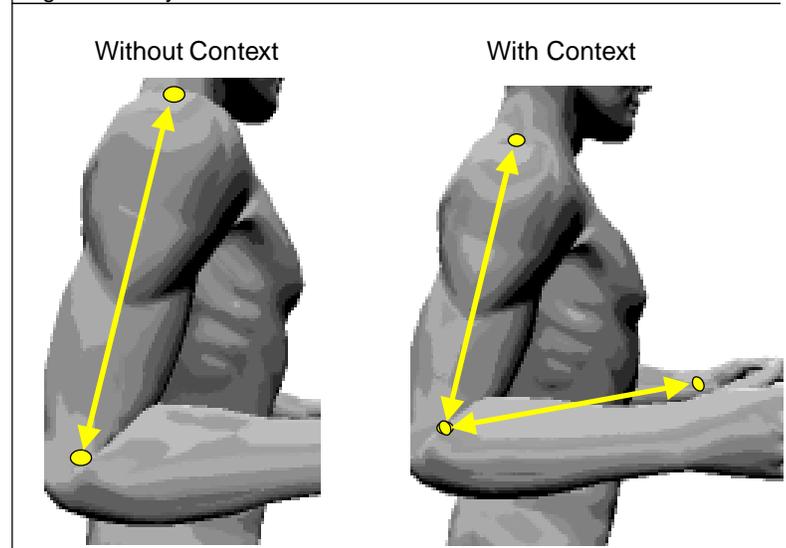
1. There are no standards of comparison between traditional two-dimensional measurements and three-dimensional measurements.
2. If a standard were developed, the application of the three-dimensional approach would need to be congruent with the manner by which the two-dimensional method is applied.

Taking these two factors into account, RERC UD at Buffalo researchers have tested the reliability of measurements for both traditional and three-dimensional approaches. The reliability study measured 58 people, and recorded 218 body measurements per participant. Each participant was measured twice by each measurer and twice by

See Anthropometric, page 10

...data collected with traditional tools are often flawed because their validity often relies on standardization of body positioning during measurement....

Figure 1: Body Measurement and Context



The RERC's primary research project will take and computerize the exact body measurements and reach ranges of 500 wheelchair users.

The contents of this insert are provided by the Rehabilitation Engineering Research Center (RERC) on Universal Design at Buffalo, which is sponsored by a grant from the National Institute of Disability and Rehabilitation Research (NIDRR) U.S. Department of Education (DOE). These contents, however, do not necessarily represent the policy of DOE. Readers should not assume an endorsement by the federal government.

Graduate Thesis Seeks to Provide New Tool for Designers

By Victor Paquet, M.S., ScD

Anyone familiar with universal design can tell you that those who are seeking to produce a universally designed product should start, from the product's earliest phases of development, by including features which adhere to the seven principles of universal design. But what about those who do not specifically seek to design universally? Can the design process itself be improved so that the end product that results is more likely than not to be universally designed, regardless of whether the designer specifically intended it as a goal?

These are the questions which were the starting point for a thesis project proposed and defended by Valerie Ferguson, an industrial engineering graduate student at the University at Buffalo State University of New York, who worked as a researcher at the RERC on UD at Buffalo. Ferguson started with the goal of providing designers with a questionnaire that could be used as part of the standard design process when testing product prototypes or ideas. To do so, she decided to

begin by investigating whether or not the currently existing questionnaire adequately reflected actual inclusion of universal design principles.

Ferguson used as the basis for her tool, a performance evaluation originally developed by Molly Follette-Story and Jim Mueller for North Carolina State University's Center for Universal Design. Story/Mueller had previously tested the questionnaire to rate the universal design of products used in the homes of consumers — so that consumers could rate products in a comfortable environment, while using the product in their own preferred fashion.

Ferguson's study posited that the tool (or a modified form of the tool) would provide designers valuable information if it was used during a set of standardized tasks during the "usability testing" stage in the design process. She conducted a research study, which required adult and elderly subjects with and without physical disabilities, who performed standardized tasks with consumer products to simulate "usability tests" that might be used in the design process. A diverse set of good and bad products were tested that included different calculators, food containers, pens, and pliers.

Ferguson was able to document that certain products and or features displayed universal design characteristics, and defend the principles of universal design as being accurate indicators of enhanced usability. In addition, because of the standardization, variables affecting/indicating how a product should be designed could be tracked in relation to its use as it was designed. Finally, Ferguson's study was also able to validate that the "expert" guidelines developed for each principal actually related to each principle.

Ferguson's collected data also showed, in part:

- Items on the questionnaire were predictive of principles of universal design.
- Which items on the measurement tool corresponded to which principles of universal design.
- Completing the questionnaire as a part of the design process provided information relevant to the universal design of consumer products.

As the protocols developed by Ferguson and Story/Mueller become integrated into the product design process, the development of universally designed products should become second nature to production designers and manufacturers. 

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Stakeholder Survey Available Online

The RERC on Universal Design at Buffalo is seeking feedback on the services and information it provides to the community. To participate in the online survey, visit www.ap.buffalo.edu/lercud or www.ap.buffalo.edu/idea.

The survey takes less than 10 minutes to complete. Survey participants can receive a CD filled with RERC on Universal Design at Buffalo program information, resources we use in the community, as well as Center publications and press coverage of its activities.

To find the survey, go to RERC on Universal Design at Buffalo or the IDEA Center website and click on the 'FREE CD' hypertext at the bottom of the opening page.

For more information, contact RERC at the websites listed above. 



Traveling Exhibit Lands in Milwaukee

Milwaukee Institute of Art and Design (MIAD) will be the first venue to host the RERC's traveling version of the Unlimited by Design Exhibit (UBD). Currently scheduled to begin its run at the institute on its annual Gallery Night – July 26, the traveling Unlimited by Design will – like the original exhibit – center on products which define universal design in terms of the acronym D-E-S-I-G-N (Demographics Economics Senses Intuitive Generations Navigation) and illustrate universal design principles by incorporating features which provide advantages in use to everyone in a community. The exhibit will continue at the MIAD until March 15, 2003.

The fact that the opening at the MIAD falls precisely on 12th anniversary of the signing of the Americans with Disabilities Act is a fitting coincidence. Where the law was passed to end discrimination legally, and has met with mixed results, universal design is a logical attempt to design beyond features which may tend to dis-

criminate, not doing so because it is “right” or legal, but rather because such products better serve a larger/more inclusive community by providing enhanced usability for all. When the larger community finds that it is better served by universally designed products, the realization will underscore the advantage of such design creating demand and marketability, which will lead to more use, more awareness and more demand. In this way, adherence to the principles of universal design can lead and contribute to the creation of a more universally usable community for all.

The RERC's UBD traveling exhibit is customizable to the exhibit space of any venue, and the RERC on Universal Design at Buffalo is currently evaluating proposals from several additional venues to host it. Should you be interested in becoming one of these, please send an e-mail entitled “UBD exhibit request” to Steven Truesdale, coordinator, outreach and media, at stt2@ap.buffalo.edu. 

The fact that the opening at the MIAD falls precisely on 12th anniversary of the signing of the Americans with Disabilities Act is a fitting coincidence.

Easy Living Homes Coalition Debuts Certification Process in Georgia

Citing the need for “safe, accessible, adaptable, and affordable housing,” Ken Mitchell, State Director of Georgia's American Association of Retired Persons commended the creation of Georgia's first Easy Living Homes certification process in Snellville, GA, a northeast suburb of Atlanta. The program was the project of a coalition of housing professionals and housing advocates statewide, and certifies that homes marketed as “Easy Living”^(CM) Homes provide the following adaptability and features:

- **Easy Entrance** - a zero step outside entrance for safe and easy access;
- **Easy Passage** - ample width (minimum 32") doorways throughout the main floor, including the entrance;
- **Easy Use** - at least one bedroom and a full bathroom on the main floor.

Based on the concept of Visit-ability, the Easy Living^(CM) homes program represents an attempt to invest professional participants in the housing market in the process of incorporating a new level of basic access at the neighborhood level. At the same time, the experience with these homes is expected to build within this group the knowledge that such homes are desirable to the mainstream homebuyer, and therefore marketable to growing segments of the general public.

While the requirements for certification as Easy Living^(CM) homes add the inclusion of a ground floor bedroom and a full bath to the requirements for basic Visit-ability, Eleanor Smith, founder of the Visit-ability advocacy group Concrete Change, was pleased with the establishment of the certification program.

“Finally, people are realizing that it made no sense to build a house with major barriers in it,” she said. “An Easy Living^(CM) Home works for young mothers with strollers as well as someone with mobility problems due to age or for other reasons.”

The program in Snellville is the first such certificate program nationwide. 

Want to join a listserv?

The RERC on Universal Design at Buffalo administers both home-modifications and Visit-ability Listservs. For detailed instructions on how to join either Listserv, please visit the RERC on UD at Buffalo web site or the website operated by the IDEA Center, and go to the Frequently Asked Questions (FAQ) page.

For more information on stories contained in the RERC on Universal Design at Buffalo, contact Steven Truesdale, coordinator of outreach and media for the RERC on Universal Design at Buffalo at 716.829.3485 ext. 335 or stt2@ap.buffalo.edu.

Anthropometric, *from page 7*

each measurement method. The resulting 10,000 anthropometric measurements showed that although differences existed between researchers and methods, these differences rarely, on average, surpassed one centimeter. Because the differences demonstrated by the reliability study were so small, the study was considered to have proven reliability

measuring the dimensions and tolerances of those with disabilities within the built environment.

As a result of this work, a new standard of

measurement error tolerance is being formulated at the RERC UD at Buffalo for a three-dimensional electromechanical approach. As a departure from the traditional-to-electromechanical comparison, three-dimensional measurements should be subject to the same scrutiny as traditional measurements.

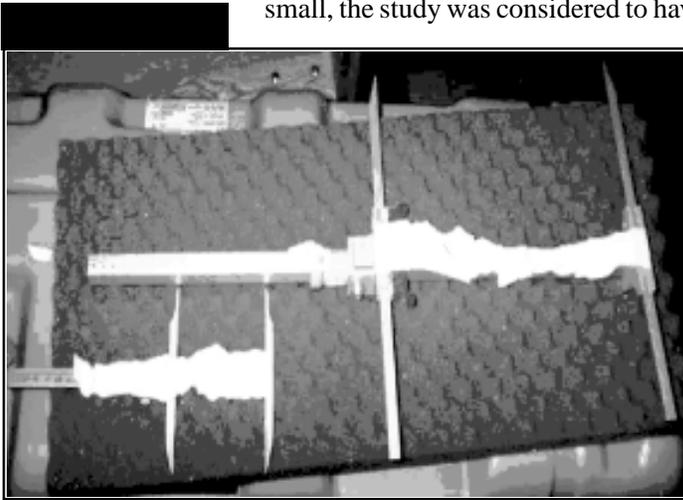
Standardizing error tolerances for three-dimensional data will guide potential research expectations for the difficulty and financial costs

associated with the accuracy of measurement repeatability.

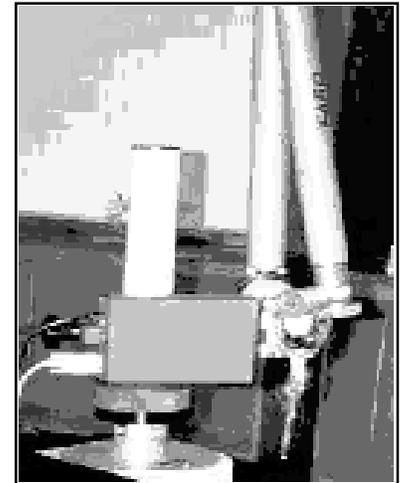
Other Progress-to-Date

A full static anthropometric protocol, including 200+ body measurements, has been developed and performed on an additional 60 participants recruited with cooperation from the the Western New York Independent Living Project Inc., United Cerebral Palsy Association in Cheektowaga, and the Veterans Administration Medical Center of Buffalo. A full functional protocol has also been developed and performed on the same participants. This functional protocol assesses participant reach at a variety of heights and angles from the mid-digital, grip strength, two types of pinch strength and grip span for all digits.

A maneuverability protocol will soon be integrated with the other two protocols for a comprehensive anthropometric assessment for persons who use wheelchairs. □



Traditional anthropometric measurement tool.



Three-dimensional anthropometric measurement tool.

RERC Resources Available on Visitability and New York

A booklet entitled **Visit-ability: An Approach to Universal Design in Housing** is now available for download from the Rehabilitation Engineering Research Center (RERC) on Universal Design at Buffalo. This booklet describes the concept and the philosophy of Visit-ability, has an extensive section on the associated costs and contains case studies, examples, and nationwide resources.

Universal Design New York is now available for distribution. The publication is a project of the IDEA Center which houses the RERC on Universal Design at Buffalo, State University of New York. The book includes a conceptual rationale for universal design and demographic data for the U.S.

For more information, contact RERC at www.ap.buffalo.edu/ercud. □

Removing Barriers to Health Clubs and Fitness Facilities

The North Carolina Office on Disability and Health, in collaboration with the Center for Universal Design, has published a new accessibility guide, *Removing Barriers to Health Clubs and Fitness Facilities: A Guide for Accommodating All Members, Including People with Disabilities and Older Adults*.

The 50-page guidebook was created to help facilities determine their overall accessibility as well as expand their membership and ensure equal access to all users by incorporating universal design features.

To download a free copy in PDF format, visit the North Carolina Office on Disability and Health website at www.fpg.unc.edu/~ncodh/FitnessGuide.pdf.

The ADA Guidebook for Small Towns

The National Center for Small Communities (NCSC) has published *The ADA Guidebook: A Practical Guide to the Americans with Disabilities Act for Small Towns and Rural Counties*. The 53-page guidebook outlines the basic application of the Americans with Disabilities Act within the context of small community government structures and features chapters on compliance, general re-

quirements, program accessibility and effective communication.

To request a free copy, call the ADA Information Center at 800.949.4232 (v/tty) or e-mail adainfo@transcen.org.

New Technical Assistance Materials from the U.S. Access Board

The U.S. Access Board's website now features new technical assistance documents and resources, including a comprehensive collection of documents and links designed to ensure successful implementation of Section 508 of the Rehabilitation Act of 1973. The "Guide to the Standards" is a resource for anyone interested in accessibility issues related to multimedia, telecommunications, and computer and web-based technologies. In addition, the site features three new technical bulletins on assistive listening systems and information on the Board's proposal to the International Code Council for the incorporation of classroom acoustical standards into the next edition of the International Building Code. For more information, contact the Access Board at 800.872.2253 (v), 800.993.2822 (tty) or visit www.access-board.gov. 

New Products

Kohler
(Falling Water Wall-Mount Lavatory Faucet)
Phone: 800.4.KOHLER
www.catalog.kohler.com

AD-AS
(Approach^a for the Kitchen)
2728 South Cole Rd.
Boise, ID 83709
Phone: 800.208.2020
Fax: 208.362.8009
www.ad-as.com

Falling Water™ Wall-Mount Lavatory Faucet

Kohler's Falling Water^a wall-mount lavatory faucet features an ergonomic single lever handle for ease of operation. Constructed of solid brass with a one-piece ceramic valve to resist debris and hard water build-up, the faucet is available in a variety of finishes. The faucet releases 2.2 gallons of water per minute and comes with a limited lifetime warranty.



Approach™ Height-Adjustable Kitchen Line

AD-AS has created a family of universal design products that merge accessibility with smart-look-

ing design. Approach^a for the Kitchen offers height adjustment for sinks, cooktops and cabinets with the push of a button. The system raises and lowers easily and quietly to accommodate each user's height requirement. The sink and cooktop units are designed with ample knee space and clearance for working while in a wheelchair. Ap-



proach^a works with standard cabinetry and counters ranging from 36 to 48 inches wide and comes with a two-year warranty. While some of the products can be integrated into

the bathroom, AD-AS is planning to introduce Approach^a for the Bath this year, with universally accessible sink and vanity storage systems. 

Ten Years of Universal Design

**Universal
Design
Newsletter**

1992
to
2002

10th Anniversary

This year Universal Design Newsletter is celebrating its 10th Anniversary. As part of our celebration, we are featuring articles from various “movers and shakers” – designers, advocates, attorneys and officials – to reflect on what has happened in the field of universal design over the past decade. Our thanks to Jim Sandhu and Elaine Ostroff for their contributions to this issue.

subsidiarity, which give considerable latitude to each member state, still apply), etc. This recent focus on standardization will ensure that the concept of de jure compliance will be built into all aspects of provision and service delivery – including that of the design professions. It could become the most effective way to implement UD to bring about change to benefit the maximum number of European citizens.

Professor Jim S Sandhu is the director of Inclusive Design Research Associates Limited, a past president of the European Institute for Design and Disability and a team leader with Design-for-All/Information and Communications Technologies of the European Committee for Standardisation (CEN).

Progress of Universal Design Over the Last 10 years

by Elaine Ostroff

There have been thrilling breakthroughs and some unexpected developments in the practice of and the education for universal design – and there are some persistent barriers.

Within the last four years there has been an explosion of shared knowledge about worldwide developments in universal design. Through the Internet and several international conferences and publications we have seen some brilliant and unique efforts. We learned that the Norwegian government has elevated planning for universal design to a high policy issue so that it is not relegated to a low level, fragmented, merely technical approach. We have witnessed design solutions throughout Europe that illustrate design-for-all in the planning of the Copenhagen Metro system; in the Millennium Wheel, a giant ferris wheel 435 feet above the Thames River; and in the redesign of some of Rome’s urban neighborhoods. The world’s most accessible taxicab, the redesigned London Black Cab, is available to all tourists, shoppers, and families throughout the busy city of London. In Columbia, the Nacional Museum has wayfinding, exhibit design, and communication devices that enhance the museum experience for every user. In Curitiba, Brazil a fully accessible and truly universally designed bus system solves massive transportation needs for workers in,

See Ten Years, page 14

The broad consensus confirmed that UD was an over-arching philosophy, whilst design-for-all referred to its down-to-earth practice.

10 Years of UD in Europe

by Jim S. Sandhu

Parallel with developments in the US, the past decade has seen the evolution of UD from a topic of marginal interest to nearer to the hub of European policy.

The evolution falls into two distinct, but overlapping, phases. The first phase, largely orchestrated by the European Institute for Design and Disability (EIDD) focused on generating awareness. Integral to the initial part of the first phase was asking difficult questions and establishing definitions. One such question centered on the difference between UD and design-for-all, a term which most Europeans prefer. The discussions and arguments were intricate and arcane. The broad consensus confirmed that UD was an over-arching philosophy, whilst design-for-all referred to its down-to-earth practice. Few of the real movers were seriously convinced that there was a difference to quibble about. In a sense, this debate about terms and definitions continues to date as new professions, sectors and policy makers encounter them for the first time.

The overlap between the two phases represents the move away from disability related to largely mainstream issues in design. This is best exemplified by two major policy initiatives by the European Commission – e-Europe and e-Accessibility which impact across the board to all the citizens of Europe. Both focus on maximizing citizenship and choice through extant and new electronic networks covering all aspects of daily living. Slightly behind such developments is the implementation of the UN Standard Rules on the Equalisation of Opportunities and the Amsterdam Treaty which cover non-discrimination and physical accessibility.

The second and more significant recent phase is the use of standards and standardization organizations to effectuate UD in targeted areas such as health and safety, transport, telecommunications, services, housing (uncertain and new area as rules of

New Final Draft ADAAG, from page 6

currently the only provision within the guidelines that will require higher percentages of accessible elements when more standard elements are provided.

The Board has also modified the dispersion requirements for guest rooms with accessible communication features. In current ADAAG, all accessible guestrooms are required to have accessible communication features; an additional number of rooms are required to provide only accessible communication features. In the NPRM, the Board proposed requiring only half of the wheelchair accessible guestrooms to have accessible communication features, which was consistent with the proposed scoping of 50% of all guest rooms with accessible communication features. In the Draft Final Rule, the Board prohibits any of the required rooms with accessible communication features from being accessible rooms, but offers no explanation for this revision.

Assembly

The entire package of assembly provisions has been substantially revised from the NPRM. Assembly provisions, which have been the source of the most contentious debate and litigation in the current guidelines, continue to be studied in the A117.1 arena. The A117.1 Committee has developed measurable provisions which do not "harmonize" with the Draft Final Rule.

Assembly: Number of Wheelchair Spaces.

The number of wheelchair spaces required in larger assembly facilities has been reduced from both current ADAAG and the NPRM. Due to comments submitted by arena owners indicating far less demand for wheelchair accessible seats. In the current ADAAG, facilities with more than 500 seats require 1% of seats above 500 to be accessible. The Draft Final Rule lowers this to .67% for

facilities with 501 to 5000 seats, and further reduces it to .5% for seating exceeding 5,000. For large facilities, this will cut by almost one-half the required number of wheelchair spaces.

Assembly: Companion Seating. The NPRM included a new provision that would have required that each companion seat be removable, and serve as an additional wheelchair space with the seat removed. This requirement has been removed from the Draft Final Rule. The Draft Final Rule maintains the proposed requirement that companion seats and wheelchair spaces be aligned shoulder-to-shoulder.

Assembly: Public Address Systems. The Draft Final Rule includes new provisions that will require text display of public announcements in some stadiums, arenas, and grandstands.

Summary

The Board will likely receive some unsolicited public comments as the contents of the Draft Final

See New Final Draft ADAAG, page 15

The entire package of assembly provisions has been substantially revised from the NPRM.

Assembly Seating in Performing Arts

by William Conner

The American Society of Theatre Consultants strongly supports the goal of full and equal participation of people with disabilities in all aspects of the performing arts, as audience, performer, and staff. My comments herein address the need for developing clear performance standards so they encourage good design solutions and expressing these concepts so they have a reasonable probability of consistent interpretation.

Addressing primarily those regulations specific to assembly seating in performing arts theatres, the draft of the final revisions to ADAAG is more logically organized than the current regulation and begins to address distinct issues separately and thus seems to be an improvement. Unfortunately, substantial issues such as requirements for comparable sightlines are addressed at greater length but with no more meaning. Objective characteristics such as "integral" and "dispersed" are without a means to measure or test acceptability and the word "better" is used without any guidance as to which side of the median is more desirable. All these variables are valued and judged differently by different folk and depending upon the use of the space: music, drama, lyric theatre, speech, projected light images, etc. Thus, it may not be possible to set a single standard but I believe it is still feasible to develop, as has been done by ANSI A117.1 Committee, measurable acceptable criteria for these features.

Horizontal dispersion of wheelchair spaces is required but not defined. While it is probable that this refers to distance or angular displacement from a plan axis or centerline, ADAAG could have used the work of the Federal Review Advisory Committee or could have used a simpler criterion such as "Wheelchair spaces shall be separated a distance equal to one third of the row or section in which they are located." Confusingly, vertical dispersion, a term normally associated with elevation, appears to refer to horizontal distance from the stage or screen. While in many theatres wheelchair spaces at different elevations will result in spaces at various distances from the stage, it would be clearer and more consistently interpreted if it said: "Wheelchair spaces shall be dispersed at varying distances from the stage."

Thus, distances from the stage and from the centerline are measurable criteria and could then be applied to each level, such as a balcony or mezzanine or gallery. Then, true vertical dispersion by any name: main level, mezzanines, balconies, upper decks, galleries; could be addressed separately.

One specific hardship I foresee is requiring vertical (front to back) dispersion in single story facilities. Generally, areas with up to 500 seats are served by two entrances - left and right at the same elevation - with seats on tiers above and below the entrance elevation. Previously, dispersion in these mid-sized facilities was achieved by horizontal dispersion and the previous exception for seating slopes greater than 5 percent could be applied. Now, with no exception for vertical dispersion in these spaces, unless they are "bleachers," these otherwise simple facilities will be required to have accessible routes to levels other than the on main floor, which will have a major economic impact on the facility.

William Conner, ASTC, Schuler & Shook, Inc., ICC ANSI A117 Committee Member Representing the American Society of Theatre Consultants

Ten Years, *from page 12*

out, and around the city. Developing economies in Africa, Asia, India, South and Central America are finding ways to meet basic human needs with a more universal approach. The archives of the *Universal Design Newsletter* provide some snapshots on accomplishments all over the globe. However, there is a gap in communications that limits our knowledge of significant universally designed features in award-winning buildings and environments. Architects and the architectural press do not talk about usability features and the ways in which the designs accommodate diverse user needs. Green design advocates have figured out how to bring their issues forward as an integral aspect of building design. When will universal design advocates develop strategies to reach the mainstream architectural press?

In the educational arena 10 years ago, the Adaptive Environments Center, with support from the National Endowment for the Arts, was preparing the first Requests For Proposals (RFPs) from faculty for the Universal Design Education Project (UDEP). We believed and hoped that there were experienced educators out there who wanted to teach with a more universal design approach – we just needed to find, support, and connect them. Then, the proposals arrived – it was very exciting to open and read what people had been doing and how they wanted to build on their experience so that future design professionals would have a different attitude about designing for a diverse population. Twenty-one programs across the US were selected to participate in the first UDEP and their experience was documented in *Strategies for Teaching Universal Design*.

From that time to now there has been a great increase in numbers and the formation of a worldwide network with over 300 participants who at least profess an interest in universal design education. In 2001, the Council of Europe proposed that universal design be included in the curricula of all programs on the built environment. Now there are a number of well-documented examples of teaching strategies in Australia, Canada, Japan, Ireland, Norway, United Kingdom, and in the United States. Notices of universal design education online are increasing. Assuredly there is more good work that has not yet been documented. The best examples reflect universal design as a human-centered value within a program and/or required courses. Unfortunately, these are still unique examples within the overall array of educational experiences around the world. You can read about these educational efforts in *Strategies for Universal Design* (Welch, 1995), in the

Universal Design Handbook (Preiser and Ostroff, 2001), the new Norwegian book, *Teaching Universal Design* (Christophersen, 2002), and on the websites www.udeducation.org and www.adaptenv.org/21century/proceedings.

The North American interior design educators have taken the lead in incorporating universal design in their accreditation programs. The Foundation for Interior Design Education and Research (FIDER) states in its 2000 Professional Standards, “Student work must demonstrate understanding of universal design concepts and principles as the basis for their design work...” In overall promotion for the practice of universal design, the Industrial Design Society of America (IDSA) has built these concepts into the criteria for many of its competitions and awards programs. Its professional interest group in universal design has grown from nine members in 1993 to more than 600 members in 2002. Unfortunately, there is little evidence of impact on faculty in schools of architecture. There are 112 accredited architecture programs in the USA, with long-standing and disparate educational traditions. There is still limited attention to user needs. There are continuing debates with little consensus on the degree of “practical” experience that one should have in school and what should be reserved for the internship period. There is still confusion about universal design and its relationship to the Americans with Disabilities Act (ADA) Standards for Accessible Design. For many architectural educators, universal design is a code word for designing for older and disabled people. Since much of what is designed by architects is subject to the ADA, many architects feel that they know all about that. However, there are still too many examples where accessibility has been considered as an afterthought to the overall design, and not as a creative opportunity at the outset of the design process. These barriers are not unique to the US - architectural education in Asia, Australia, Canada, Europe, South and Central America seems to share variations of indifference and resistance toward universal design.

We are at the beginning of human-centered design in our educational traditions; there is increasing momentum, strong experience to build on and all over the world, there are daunting demographic and environmental changes yet to be addressed. 

Elaine Ostroff is the founding director of the Adaptive Environments Center and is a consulting editor for *Universal Design Newsletter*.

When will universal design advocates develop strategies to reach the mainstream architectural press?

Elaine Ostroff



Printed on recycled paper with vegetable inks.

Events to be placed in the UDN Calendar must be submitted to the editor two months before the publication date.

July 8-10, 2002: *The US Architectural & Transportation Compliance Board* will hold its bi-monthly meeting in Washington, DC. Contact the Board at 202.272.5434(v), 800.872.2253(v), 202.272.5449 (tty) or www.access-board.gov.

July 22-26, 2002: *Union of International Architects Convention 2002*, Berlin, Germany. Contact: www.uia-berlin2002.com.

Aug. 8-11, 2002: *ADA/504 Coordinators and Accessibility Managers in the Cultural Arts Conference, Kennedy Center, Washington, D.C.* Sponsored by the John F. Kennedy Center for the Performing Arts, the conference will feature presentations and speakers who are experts on issues related to making cultural arts organizations accessible to individuals with disabilities. Contact: Betty Siegel at 202.416.8727(v), 202.416.8728(tty), or access@kennedy-center.org.

Sept. 12-14, 2002: *The Universal Design Summit*, Maryville University, St. Louis. Sponsored in part by the Center for Universal Design, this summit will familiarize participants with existing laws and code requirements relating to the built environment. Contact: www.moaccesshouse.org/center_for_universal_design.htm.

Oct. 7-10, 2002: *Retrofitting for Accessibility, Yellowstone, Montana.* Sponsored by the National Center on Accessibility, this training course is for maintenance professionals, facility managers, access coordinators and planners. For more information, contact www.ncaonline.org

Oct. 18-19, 2002: *Design+Technology+Users: Design that Works for Everyone*, Rhode Island School of Design (RISD), Providence, RI. Co-sponsored by Adaptive Environments and RISD. See: www.AdaptiveEnvironments.org/webconference.

Oct. 27-30, 2002: *6th Global Conference Maturity Matters*, Burswood International Conference Centre, Perth, Western Australia, sponsored by the International Federation on Ageing. Contact: IFA@congresswest.com.au.

Nov. 30-Dec. 4, 2002: *International Conference for Universal Design in Japan 2002, Yokohama, Kanagawa, Japan.* The conference will feature examples of universal design in Japan and the Far East, in the areas of products, housing, buildings, transportation and information technology. Contact: www.ud2002.org/index-e.html.

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