August 29, 2005

Re: Metropolitan Government Pavement Engineers Council (MGPEC)

For over 10 years, the Metropolitan Government Pavement Engineers Council (MGPEC) has studied a wide variety of issues concerning pavement and roadway design. In an effort to share the knowledge obtained through such studies, training sessions covering basic and specialized topics in pavement design and construction are offered on a yearly basis. MGPEC promotes the standardization of specifications among local jurisdictions which increases efficiencies and improves the bidding process.

MGPEC has also researched issues which do not directly affect pavement and roadway design. For example, included with this letter, is the position paper prepared by the MGPEC ADA Task Force. The Americans with Disabilities Act and associated ADA Access Guidelines are the basis for many of the regulations that affect the design of roadways and intersections. In the last few years revisions to these documents have led to some confusion on the application of the requirements. The MGPEC ADA Task Force investigation of some of these issues culminated in the preparation of the position paper.

Additional recent MGPEC research has resulted in the creation of asphalt design guidelines and software, as well as construction specifications tailored for urban settings in both asphalt and concrete pavements. In the coming year, we will be studying concrete specifications for minor roadway elements (curbs, sidewalks, pedestrian ramps, etc.), smoothness specifications for urban environments, and subgrade stabilization and trench restoration.

For those of you who are already members of MGPEC, you are probably aware of our many endeavors, and we thank you for your continued support. If you are not a member, we would encourage you to consider becoming involved and help MGPEC in the mission to provide quality engineering support to the Front Range metropolitan area and beyond.

Sincerely;

Pat Kennedy, PE
MGPEC Steering Committee Chair
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MGPEC ADA Task Force
Position Paper
April 4, 2005

I. MGPEC ADA Task Force

The Metropolitan Government Pavement Engineers Council (MGPEC) was formed in 1993 to improve the quality of pavements throughout the Denver-Metro region through the development of regional pavement design and construction standards for use by local governments. MGPEC started with 11 members from local governments and in 2004 had grown to 58 government and industry members.

At the annual meeting in March, 2004, a survey was distributed to members, part of which dealt with what topics the membership would like to see MGPEC investigate. One of those topics was for MGPEC to study the effects of the Americans with Disabilities Act (ADA) on local government infrastructure policy. The MGPEC ADA Task Force was formed to bring together engineers and policy makers from around the metropolitan area to share their views and policies with a goal of developing a unified standard for the construction of pedestrian curb ramps throughout the area. This Position Paper is the result of the hard work by all of the members of this Task Force.

II. Americans with Disabilities Act

The Americans With Disabilities Act was passed by Congress in 1990 and covers virtually all aspects of civil rights for the disabled community. Enforcement of the Act is the responsibility of the Department of Justice. The Access Board is an independent Federal agency that oversees the development of accessibility guidelines and the enforcement of accessibility standards for federally funded projects. Title II of the Act covers State and Local Governments and includes accessibility requirements for public facilities including streets and sidewalks.

Title II was published in the Federal Register in July 1991. All public facilities newly constructed or altered after January 26, 1992 were required to be accessible. The specific regulation, 28 CFR §35.151 (e) Curb Ramps, states anytime a street is newly constructed or altered, ramps must be built at crossings, and whenever a sidewalk is newly constructed or altered, ramps must be built at crossings. One of the biggest areas of confusion has been the definition of 'alteration'. The regulations define an alteration as a change that "…affects or could affect the usability of a facility or part of a facility." The Department of Justice and the courts have taken a broad view of this regulation to the extent that if work performed makes a facility more usable to the general public than it must also be made accessible to the disabled community. Because of this, surface overlay projects are considered alterations requiring the construction of curb ramps.

Minor maintenance, i.e. pothole repair, striping, thin seal coats, curb repairs, do not fall into the category of alterations.

Ramps are not required in all cases. If it is not technologically feasible to install a ramp at a particular location, it is permissible to have the accessible path deviate from the primary pedestrian path if the alternate route is not significantly longer. This relaxation of the requirement does not extend to new construction of streets and sidewalks. In those cases, curb ramps are required at all sites where sidewalks intersect streets and pedestrian crossings are located.

One other provision of Title II is the requirement to provide tactile warning at hazardous locations or street crossings. This requirement was suspended by the Department of Justice and the Access Board for a period of 10 years to allow for study of the best way to meet this need. The suspension expired in July 2001, at which time truncated domes became a required component of pedestrian curb ramps.

III. ADAAG

The original ADA Accessibility Guidelines of 1991 were developed as the basis for standards used to enforce the Americans with Disabilities Act of 1990. The Purpose Statement of the ADAAG states that this document sets guidelines for accessibility to buildings and facilities. It defines a facility to include any improvement on a site. A site is defined to include " …a designated portion of a public right of way." The provisions of section 4.7, Curb Ramps, are therefore intended to include the construction of ramps in the public right of way. These ramps must meet minimum criteria for running slope, cross slope, width, landings, edge protection and detectable warnings.

The new ADA Accessibility Guidelines, issued July 23, 2004, are the result of 13 years of work by the ADAAG Review Advisory Committee. The Advisory Committee published a report in 1999 which recommended changes to the original ADAAG. Input was then received from the public through a series of hearings and from over 2,500 written comments. This input was considered in the finalization of the new guidelines.

Access ramps have been included in Chapter 4 of the new guidelines, Accessible Routes. No changes in minimum design criteria from the original ADAAG are evident except in the area of detectable warnings. The Summary section of the " Guide to the New ADAAG" states that "The new guidelines do not include a requirement for detectable warnings at curb ramps…" It goes on to state that "…the (Access) Board is revisiting this issue in a separate rule making on accessible public right of way." The new ADAAG includes a section, 705, detailing the specifications for truncated domes used in detectable warnings. Again, these specifications remain unchanged from the original ADAAG. It is unknown at this time if the Board will refer to section 705 in its detectable warning rulemaking on accessible public right of way.

The new ADAAG has yet to be adopted by the Department of Justice, the enforcing agency, and is therefore not mandatory on the public. The original ADAAG of 1991 remains the standard used to enforce the law.

IV. Ramp Standards

Standards for the construction of pedestrian curb ramps was collected from a number of the member agencies for the purpose of comparing the criteria used in the area. This data is shown in the table below. There are many small differences between agencies but there are also many similarities and it is apparent that ramps constructed throughout the metropolitan area do not have significant differences across jurisdictional lines. Studies by the Access Board concluded that uniformity in design and construction practices is an important element in providing a safe environment for the disabled community.

Standard Comparison

Agency	Type			Slope			Length	Width	Thick	Landing
	Flared	Trough	Corner	Throat	Flares	Approach				
Denver Old	Yes	Yes	Yes	1:12	1:12	No	Varies	5'	6"	No
Denver New	Yes	Yes	Yes	1:12	1:12	Yes	Varies	5'	6"	No
Longmont	Yes	Yes	No	1:12	1:12	No	6' min	5'	6"	No
Adams	Yes	No	No	1:16	1:12	No	8'	Varies	8"	No
Arapahoe	Yes	Yes	No	1:12	1:12	No	8'	4' - 5'	6"	No
Greeley	Yes	Yes	No	1:12/1:20		No	Varies	5'	6"	Yes (3')
CDOT	Yes	Yes	No	1:12/1:20	1:12	No	7 1/2'	4' - 6'	4" - 6"	Yes (3')
ADAAG				1:12	1:10	1:20		3'		

Agency	T Domes	Type	Color	Direction Cue	Tactile	
					Joints	Other
Denver Old	No	--	Yes	Yes	Trans. & Long. 12" o/c	No
Denver New	Yes	No Pavers	No	Yes	Trans. & Long. 12" o/c	No
Longmont	No	--	No	No	Trans. 8" o/c	Broom
Adams	Yes	Pavers	No	No	No	No
Arapahoe	Yes	Open	No	No	Trans. 12" o/c	No
Greeley	Yes	Pavers/Stamped	No	No	No	No
CDOT	Yes	Pavers	No	No	No	No
ADAAG	Yes		No	No	No	No

V. Truncated Domes (Detectable Warnings)

Truncated domes are a detectable warning system consisting of a specific raised pattern of dots on the surface of a traveled way that can be detected through the use of a cane or under foot by those that are visually impaired. The color of the surface to which the truncated domes are applied is required to contrast with the rest of the walking surface in order to provide a visual warning for those that are visually impaired, but still have limited vision. The truncated dome pattern is required along the bottom edges of pedestrian ramps, and along the edges of bus-boarding or other transit boarding platforms.

The purpose of truncated domes is to provide a warning to the visually impaired that they are about to enter traffic or walk off an edge. Anywhere there is potential for a visually impaired person to unknowingly enter into a hazardous location, a detectable warning system should be applied.

The requirement to use truncated domes is addressed by the Americans with Disabilities Act (ADA) 1990, as amended in 1994. This requirement was suspended until 2001, to allow for a period of study of their application. The suspension was lifted in July 2001, at which time the requirement to install truncated domes at all ramps became enforceable. The latest recommended amendment to the regulations omits the need for truncated domes on ramps, but this is only a recommendation and has not yet been adopted. As of now, truncated domes are required on all ramps. The need to apply a truncated dome surface is triggered by any alteration on a street, including overlays, although there is still a debate on whether surface treatments also would trigger the requirement. The prevailing thought is that any surface treatment a minimum of 1½" thick triggers the need to install ramps.

The specifications for the truncated dome pattern come out of the ADA Guidelines, Technical Chapter 7. They are as follows:

705 Detectable Warnings

705.1 General. Detectable warnings shall consist of a surface of truncated domes and shall comply with 705.

705.1.1 Dome Size. Truncated domes in a detectable warning surface shall have a base diameter of 0.9 inch (23 mm) minimum and 1.4 inches (36 mm) maximum, a top diameter of 50 percent of the base diameter minimum to 65 percent of the base diameter maximum, and a height of 0.2 inch (5.1 mm).

705.1.2 Dome Spacing. Truncated domes in a detectable warning surface shall have a center-to-center spacing of 1.6 inches (41 mm) minimum and 2.4 inches (61 mm) maximum, and a base-to-base spacing of 0.65 inch (17 mm) minimum, measured between the most adjacent domes on a square grid.

705.1.3 Contrast. Detectable warning surfaces shall contrast visually with adjacent walking surfaces either light-on-dark, or dark-on-light.

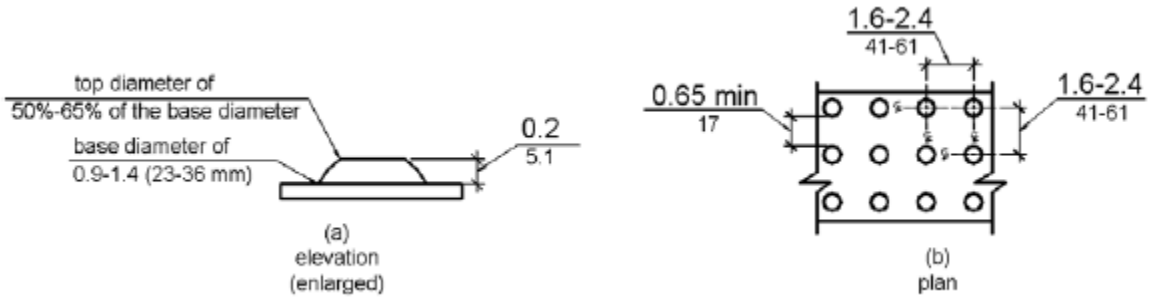

Figure 705.1
Size and Spacing of Truncated Domes

705.2 Platform Edges. Detectable warning surfaces at platform boarding edges shall be 24 inches (610 mm) wide and shall extend the full length of the public use areas of the platform. [1]

[1] Chapter 7: Communication Elements and Features, ADA and ABA Accessibility Guidelines for Buildings and Features, Access Board, Published in the Federal Register, July 23rd, 2004; www.access-board.gov/ada-aba/Blue%20HTML/ADA-ABA%20Guidelines%20Blue.htm

The types of processes and products are varied. They include:

- Surface Application; The surface of an existing ramp has an application added to it so that the truncated dome pattern is created.

- Surface Treatment; This is a stamping process that is applied to the wet concrete of the ramp. The stamp is placed on the surface, aligned and pressure is applied to the stamp to form the dome patterns on the surface of the ramp.

- Pavers; Truncated domes are constructed on one surface of precast bricks or concrete blocks. They are placed into a pre-formed 'well' in the ramp. They are installed after the ramp concrete has set up and are typically placed over a layer of sand in order to maintain a level and uniform surface of the pavers.

- Wet Set; A pre-manufactured product with the truncated dome pattern is set and anchored into the wet concrete of the ramp. These can be made of many different materials.

The products available for applying truncated domes to a surface are numerous and the list is growing. Many suppliers can be found on the Internet by simply typing in 'truncated domes' for your search. The Colorado Department of Transportation (CDOT) has put together a list of manufacturers of a variety of processes for applying truncated domes. The Access Board has also complied a list of manufacturers that can be accessed by going to www.access-board.gov/adaag/dws/manufacturers.htm. Finally, talk to your peers and share information of what each is using.

VI. Audible Warnings

Whether or not to utilize audible warnings at signalized intersections is a long and complicated problem which has no easy solution. The purpose of audible warnings is to provide a cue for the visually impaired pedestrians to aid them in crossing high traffic areas. Under the ADA, it is *recommended*, not required, that audible signals be installed.

In the United States, there are two main organizations representing the visually impaired citizens, the National Federation of the Blind, and the American Council of the Blind. There is disagreement between these two groups on the necessity to install audible warnings. The NFB prefers no aid at crossings, they advocate the use of other environmental cues (traffic noises, people moving) to provide the necessary information on when to cross. The ACB would prefer that audible signals be installed (beeps, chirps, voice indication) to aid in crossing.

VII. Conclusions

Our society has developed into one that values the ability to live in a widely dispersed environment. It is important that the mobility necessary for this life style extend to all corners of this society. The Americans With Disabilities Act was established to ensure that all members of the disabled community have the opportunity to interact and contribute to society in the greatest possible way. Guidelines and standards were developed by the Federal Access Board (ADAAG) that help in the establishment of policies and procedures in all aspects of private and public endeavors. These guidelines have been adopted by the United States Department of Justice which renders these guidelines enforceable by the Federal Government.

Most communities have been committed to the installation of facilities that aid in the expansion of mobility of the disabled community. One of the main goals of the MGPEC ADA Task Force was to analyze the standards and procedures used in the metropolitan area, compare these, learn from each other and improve the delivery of services in support of the ADA. From this research we learned that there were more similarities than there were differences in the various standards and policies. This is an important point, studies by the Access Board indicate that consistency in application of standards is vital.

The expiration of the suspension to the requirement to utilize truncated domes for detectable warnings on pedestrian curb ramps resulted in a burst of activity by local agencies to update pedestrian ramp standards. Many questions were raised by the requirement to use truncated domes and this became a point of discussion between many of the local agencies before the ADA Task Force was formed. The Access Board has stated that there are no alternatives other than truncated domes for the purpose of providing detectable warnings at pedestrian curb ramps. This requirement has been propagated even though there is disagreement within the disabled community as to the need for detectable warnings at pedestrian ramps. There is agreement within the Task Force that domes must be part of the installation of ramps but that the use of domes creates other problems, wheel chair navigation and ice removal being two of the most notable.

In July, 2004 the Access Board published a new version of the Access Guidelines (ADAAG) to address some of the concerns and make modifications to the original ADAAG that arose out of the ADA in 1991. The new ADAAG will become enforceable after adoption by the Department of Justice, a process that could take until 2006. The new ADAAG is silent on the use of truncated domes in pedestrian ramps, but the Access Board has stated that a Notice of Proposed Rule Making will bring clarification to this issue.

Since the adoption of ADA, a number of government entities have been found in violation of some of the provisions of the Act that have resulted in settlements with the Department of Justice designed to bring these agencies back in compliance with the requirements of ADA. Recent notable settlements include the City of Sacramento, Ca., which is required to expend 20% of their transportation budget on accessibility issues for the next 30 years, and the Town of Pueblo, Co., which is in negotiations with the DOJ on the final configuration of their settlement. From the investigation of these settlements, and others, the MGPEC ADA Task Force makes the following recommendations:

- Government agencies should have a specific and defensible policy on the installation of pedestrian curb ramps. The policy should include (but certainly not be limited to);
  - requirements for new developments
  - alterations to streets as defined in ADA Title II, 28 CFR §35.151(e)
  - individual requests by members of the disabled community
  - repairs to existing infrastructure
  - upgrade of existing facilities to current standards
- Placement of ramps is a critical issue. Ramps at the mid-point of the radius (apex ramps) designed to work for pedestrian traffic crossing either street in a intersection can lead to pedestrians entering travel lanes and/or cause difficulties with visually impaired citizens finding the proper path. Directional ramps that are in line with crosswalks and adjacent sidewalks remove this problem and are more effective in keeping citizens in proper alignment.
- ADAAG provides maximum allowable slopes for ramps but designers should also remember that ramps that have too shallow of a slope can also lead to difficulties. Visually impaired pedestrians can use the grade change where the ramp intersects with the sidewalk as a cue that they are entering the ramp. Truncated does are located at the lower end of the ramp at the entrance to the street so are not capable of conveying to the pedestrian that they are entering a ramp.
- Designers should look at the geometry and configuration of the entire infrastructure surrounding a ramp;
  - slopes of adjacent sidewalks
  - wheel chair turning capabilities at the top, and in the case of apex ramps at the bottom of ramps
  - cross slope of pavements that must be navigated by pedestrians

- drainage across the bottom of a ramp where puddling can become a nuisance or a hazard if freezing conditions are present.

- The use of audible warnings at signalized intersections is an area of future growth in the arena of visually impaired pedestrians. Several different styles and methods for conveying critical information to pedestrians. As with other forms of accessible construction, consistency of application is necessary to insure that the user is able to gather and use the information properly. A great deal of work and research beyond the scope of this Task Force is needed on this subject.

Pedestrian mobility is a critical component of a multi-modal transportation network. The installation of facilities to provide increased accessibility to the disabled community is an essential part of this network.

VIII. Acknowledgements

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