Construction and Inspection of Pedestrian Facilities

April 25, 2018

NYSATE Conference
Cooperstown, NY
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What we'll cover today

Implementing ADA is a relatively complex topic and this short session is not going to answer all of your questions. But it should give you a basic understanding of the requirements, common misunderstandings, and where to go for more information.
The Americans with Disabilities Act (ADA) was signed over 25 years ago. It is a wide-ranging law that prohibits discrimination based on any disability.

As of the 2010 census there were a recorded 52 million people in this country with a disability. Of those 7.5 million have hearing disabilities and over 8 million have vision disabilities. The National Council for Disabilities estimates that 70% of our population will have a permanent or temporary disability that prevents them from using stairs. When we have inaccessible pedestrian routes then there is a serious safety concern for those with disabilities. Especially if they are forced to walk in the street.

Just a quick example: How many of you in the audience have been on a HMA resurfacing job in a residential area? Have you ever notified residents and had them park on a side street while you paved? Well some people can’t walk out of their house to car on a side street. So they become trapped in their homes or out of their homes depending on the notification.
The actual standard for ensuring access is in the ADA guidelines. These are developed by the US Access Board and enforced by the US Department of Justice.

The DOJ has designated FHWA to oversee compliance for highways.
ADAAG and PROWAG

- 1991 Americans with Disabilities Act Accessibility Guidelines (ADAAG)

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There are two sets of ADA Guidelines that typically apply to highway projects.

The 1991 ADAAG and 2011 PROWAG
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Even though the latest version of PROWAG is dated 2011 and is only a proposed guide, it has been adopted by NYSDOT as a standard for all new construction, and all facilities built after March 15, 2012.

ADAAG was set up primarily for buildings and in the following decades many improvements have been made to existing buildings and many people associate ADA with building improvements like ramps instead of stairs, wider hallways, wider doorways, and accessible bathrooms. The public right of way such as sidewalks and traffic lights were also included in the ADA, but overlooked when it came to application of the standards. PROWAG is an improvement to ADAAG, but there is still more room for improvement and the 2011 guidelines will hopefully be made a standard soon. We don’t want you to think that there is no flexibility in the development of these standards. If there are improvements that can be made to the standard of things that are impossible to build, then please send suggestions to the Access Board so changes can be made. Now these modifications to the standard should not simply be based on convenience, but on whether the standards can be achieved with current construction practices and equipment.
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First, we’ll clarify some of the terminology used in the current ADA guidelines

Will use an example of a newer ramp on the corner of Rt 5 and Erie Blvd. in Schenectady
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The guidelines refer to the ramp, detectable warnings and flares, which are fairly simple.

There are also turning space (at the top of this ramp), and a clear space (at the bottom of this ramp).

The turning space is a level area that is provided where a turning maneuver is needed to orient to the ramp run or direction of travel.

The clear space is an area below the lower grade break that is provided as a safe place for a wheelchair to wait or rest before crossing the road. It is located outside of the parallel vehicle travel lane and within the crosswalk.
Curb Ramps - Terminology

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Turning spaces and clear spaces can overlap. In this case, the turning space is at the bottom of the ramp.
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Slopes that are discussed in the Guidelines are:

- Running slope – parallel to pedestrian direction of travel (what we would refer to as longitudinal grade)
- Cross slope – perpendicular to direction of pedestrian travel
- Flare slope – slope of the flare, parallel to the curb line
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A blended transition is a "curb ramp" with a running slope $\leq 5\%$. All terminology is the same as a curb ramp.
Sidewalks - Terminology

Pedestrian Access Route vs. Pedestrian Circulation Path

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Sidewalks – a sidewalk can refer to either a pedestrian access route vs. pedestrian circulation path
Sidewalks - Terminology

Pedestrian Access Route vs. Pedestrian Circulation Path

A Pedestrian Circulation Path is a surface that is paved/walkable, but may not meet all the surface requirements of ADA
Sidewalks - Terminology

**Pedestrian Access Route** vs. Pedestrian Circulation Path

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A Ped. Access Route is a continuous clear route that fully accessible. It has a min. width of 48”, excluding the curb, and must meet all surface requirements of the guidelines.

Where the clear width of the Pedestrian Access Route is less than 5 ft. wide, a 5 ft. x 5 ft. passing space is required every 200’ – driveways and other paved areas can serve as passing spaces.

It should be noted that the Department’s preferred sidewalk width is 5 ft. The minimum width of 4 ft. is only used when 5 ft. isn’t practicable.
Operable Parts – Terminology

- Operable parts are used to control accessible elements within the PAR

- Examples are:
  - Ped Pushbuttons
  - Lift Controls
  - Boat Launch Platforms

Operable parts are anything within an accessible route that is a push button, plate, or bar. Can be a handle, pull or knob. Can be a latch or lock and is controls or switched for any ADA element. There are some examples up here and most notably and common is the pedestrian push button to activate a signal for crossing at a crosswalk. There are other ADA elements that are less frequently seen, but just as important to be maintained and installed properly. Some examples of this are Lift Controls and Accessible Boat Launch systems.

While construction of these items is important even more so is the maintenance of them. If there are ADA elements such as these within your project that were already constructed you need to ensure that they are operational. Also if detouring traffic or closing portions of an accessible route where these exist you need to provide a detour route or alternate facility that also provides these elements.
To ensure that pedestrian facilities are fully compliant with the standards, NYSDOT issued Engineering Directive 15-004 in 2015 entitled: “Design, Construction and Inspection of Pedestrian Facilities in the Public Right of Way”

For standards that are presented as ranges, like maximum running slopes or minimum widths, PROWAG does not allow for tolerances. The limit is the limit and you cannot exceed these values.

ED 15-004 established more conservative design and layout values to “build in” construction tolerances.

The table on the slide shows a few examples of ADA elements: the PROWAG allows up to 8.3% for a curb ramp running slope, but ED 15-004 directs that they be designed and laid out for a maximum slope of 7.5%.

The PROWAG allows up to 2% for a cross slope on a curb ramp, crosswalk or sidewalk. ED 15-004 directs that they are to be designed and laid out at 1.5% maximum.
ADA Construction and Inspection: NYSDOT-Specific Standards

ED 15-004

- Construction tolerance is built in with Design/Layout Limits.
- Measure often. Measurements must be made prior to concrete work and before acceptance of the work.
- Elements that do not meet ADA limits for work acceptance are to be fixed/replaced or be justified as nonstandard.

BOB

Since there’s no tolerance, you can’t measure too much prior to pouring. The earlier that a problem is identified, the easier it is to fix. Measurements should be taken when setting stakes, setting forms, just before pour, right after finishing, before set up, and after the concrete is set for payment. At a minimum measure prior to pour and before acceptance.

If a measurement on a finished facility exceeds the ADA limits for work acceptance, then the facility is not compliant. It either needs to be brought up to the standards, or must justified as nonstandard.

The Access Board recognizes that there are times when a facility just can’t be build to meet the standard. Usually due to physical constraints or ROW issues. Physical constraints are defined in Section R202.3.1 of the PROWAG. Every effort should be made to identify nonstandard facilities during design, but sometimes it’s not going to be evident until the job’s in construction. Nonstandard feature justifications submitted after construction need to provide solid evidence that the standard in question could not be met with better workmanship or a better design.
BOB

ED 15-004 introduced the Critical Elements for the Design, Layout and Construction of Pedestrian facilities or Critical Elements Sheet. All of the Critical Values for the most common pedestrian facilities are listed on this one 11 x 17 sheet. It lists both the design/layout values and the ADA “Limits for Work Acceptance”.

There’s no formal requirement to fill this sheet out or file it, but using it as a reference tool during design and construction is strongly encouraged. Also, it should not be included in DADs.

It’s available on the NYSDOT Highway Design Manual web page for Chapter 18
The 608 Standard Sheets for Pedestrian Facilities were revised in 2016 to reflect the new design and layout values in the Critical Elements Sheet. The revised standard sheets are those for Curb Ramps, Parking, Driveways (where pedestrian routes cross driveways), and Raised Crosswalks.

Changes also included the addition of 3D views and new details showing the transitions from curb ramps to existing highway grades and existing sidewalks.

A lot of notes were added to get the critical requirements related to the ADA standards onto the standard sheets.
Some revisions were made recently, in October 2017.

This detail, which was “Option 5”, was removed from the Detectable Warning placement details. Option 5 had allowed a straight angular placement at a corner radius with only the corners meeting the back of curb.

PROWAG requires detectable warning surfaces to extend 2 ft. minimum in the direction of pedestrian travel, across the full width of the curb ramp. This helps to ensure that a visually impaired pedestrian will not pass over or by the unit without detecting it. Option 5 didn’t meet that requirement – considerably less than 24” in the highlighted area. A pedestrian traveling through this area would not encounter 2 ft. of detectable warning width.
A note was also added to Option 6 for detectable warning placements.

When the lower grade break of a ramp is more than 5 ft. from the back of curb, the detectable warning is placed at the back of the curb, rather than on the ramp itself.

There’s an existing requirement in PROWAG for a 2 in. maximum distance between the back of curb and the DWs. This dimension was added to the Option 6 detail to clarify that rectilinear DW plates placed along a radius must be arranged in a way that will not exceed the maximum distance to the back of curb.

This is more of an issue on 1R and similar projects, where a ramp is being retrofitted into a set radius. We’ll talk a little more about this later -
BOB

There will be situations where greater detail or information is needed in the construction documents for a Contractor to build a compliant ramp and/or adjacent sidewalk. For instance, buildings abutting the sidewalk, steep grades or tight spaces can require modeling and the provision of more detailed, specific information than the standard sheets can offer (such as spot elevations).

Design issues are much easier to fix before construction begins. When there are questions in the field, the designer should be consulted. Each region has an assigned ADA Specialist, and this is part of their job – to help resolve issues, clarify requirements, and come up with solutions.
NYSDOT Standard Specifications Section 608

- ACI certification as a Concrete Flatwork Technician for installation of sidewalks and driveways.

- ACI certification as a Concrete Flatwork Finisher supervision of 10 cu.yd. of sidewalks/driveways (was 65 cu. yd.).

BOB

Certification requirements found in NYSDOT’s 608 Standard Specs have also been revised. These revisions were issued with EI 16-017.

Because of the tight tolerances for concrete work and due to the fact that errors can be problematic and costly, a requirement for American Concrete Institute (ACI) certification as a Concrete Flatwork Technician was added for personnel installing sidewalks and driveways.

The requirement for ACI certification as a Concrete Flatwork Finisher for personnel supervising installation was revised to apply to a quantity of 10 cubic yards of sidewalks and driveways, down from a quantity of 65 cubic yards.
ADA Construction and Inspection: Common Issues

Inconsistent Measurement Methods

- Use standardized methods and tools
- Methods on back of “Critical Elements” sheet, Note 2 at bottom

Some common issues

There were always problems with inconsistent methods of measurement for compliance.

For instance, 5 different people asked to measure the running slope of a ramp would probably do it 5 different ways. Some would measure corner to corner; some would measure dead in the center; some would pick the steepest area; some would pick the least steep area. To ensure that everyone is measuring in the same way, the methods and the tools to be used have all been standardized. Directions are on the back of the Critical Elements sheet.
When to Measure

- Before pouring – meet “design and layout” values
- Before acceptance – must meet “acceptance” values
- There is no “construction tolerance” beyond acceptance values

This was mentioned earlier, but it bears repetition. The more you check measurements, the better.

Measurements before pouring should meet the conservative “design and layout” values. Measurements after the concrete is set have to meet the “acceptance” values. The acceptance values are the end of the line – if they’re not met, it needs to be fixed, replaced, or justified.

Pedestrian facilities are justified using the Nonstandard Feature Justification for Pedestrian Facilities found on the HDM Chapter 2 webpage.
Detectable Warnings

- Replaces the curb as a cue for visually impaired pedestrians

- DWs do not indicate correct direction of travel

- DWs are not a universal “danger” warning

Detectable Warnings are surprisingly probably one of the foremost sources of confusion.

They have one primary purpose: they notify visually impaired pedestrians that they’re leaving crossing the boundary between the “pedestrian zone” and the “vehicle zone”. The flush curb at a curb ramp does not provide a cue for blind pedestrians of a crossing like a raised curb would, so detectable warnings provide that cue.

Visually impaired pedestrians don’t use them for wayfinding.

They are not a universal hazard warning – shouldn’t be used haphazardly. They are typically placed at major vehicular and railway crossings.
Detectable Warnings

- Must cover **entire width** of curb ramp (or crossing) for **24 in.** in direction of pedestrian travel
- **2” from back of curb**

Detectable warnings are often placed incorrectly when they’re needed at the back of curb on larger radius corners. In the examples, the requirement to fully cover 24” in the direction of travel, across the whole ramp, isn’t met. A blind pedestrian could miss these dw’s at the edges.

Radial units are a good solution, when they can be used. Standard premade radial units come in standard sizes meeting certain radii. Often, particularly with 1R and similar projects where the curb line is set, they may not work. When the radial option does not work, it will be necessary to cut rectilinear units to fit. Note that this can eat up time and could potentially affect the DW anchoring system.

In construction when questions or issues arise about the placement of the DWS, the designer and/or ADA Specialist should be consulted. A Contractor should not make a change to either the slopes of a ramp or the orientation of the DWS without asking the designer.

The NYSDOT approved dw units are found on the Dept’s DW Approved List maintained by the Materials Bureau.
Detectable Warnings

- For running slopes over 5%, dome rows oriented perpendicular to bottom grade break

BOB

There’s a persistent belief that the domes need to be oriented in the direction of the crosswalk. The belief is that blind pedestrians may use the dome direction as a cue for crossing direction. Detectable warnings are not meant to be used for wayfinding. They are intended only to warn of the crossing.

The orientation of the domes becomes an issue where dw’s are placed at the base of curb ramps or on slopes over 5%; in these instances, they should be oriented perpendicular to the bottom grade break to the extent possible. This is meant to make passage of wheeled assistance devices as easy and stable as possible.

The photo on the right on the slide shows the optimal orientation of the dw – perpendicular to the grade break and note that it is not aligned with the crosswalk.
Detectable Warnings and Driveways

- DWs not needed for most driveways

- DWs are used at signal, stop- or yield-controlled commercial driveways

We see a lot of detectable warnings placed at driveways. DWs are not needed for MOST driveways and can lose their effectiveness when overdone. Note in the top photo that the pedestrian right-of-way continues across the driveway, so the pedestrian isn’t leaving the “pedestrian zone” - the sidewalk.

DWs are only needed at stop- or yield-controlled commercial driveways. These crossings typically have higher vehicular volumes and function like an intersection, so detectable warnings should be placed in these locations.
Curb Ramps - “Old Habits”

- Curb ramps should be planar
- Grade breaks should be perpendicular to direction of travel
- Edges and joints should not be rounded
- Concrete should not be deeply scored for “traction”. (“Broom finish” is fine.)

BOB

All ramp surfaces should be flat or planar.

Grade breaks should be perp. to direction of travel for better stability of wheeled assistance devices

Concave or convex surfaces, and rounded grade breaks, make it difficult for people with low vision to “read” a ramp and distinguish sloped areas from flat areas. These surfaces also make it more difficult to use wheeled assistance devices. On the ramp in the bottom photo you can’t tell where the ramp ends and the flares or top of ramp begin; this creates a difficult situation for disabled pedestrians.

Concrete shouldn’t be deeply scored for traction or to serve as a detectable surface. A broom finish is fine since it does not deeply score the surface.
Curb Ramps – Tying In

- Transitions to existing sidewalks and highway grade

BOB

Tying new curb ramps into existing facilities and making them compliant can be a challenge particularly on 1R/alteration projects where the street grade is set. Tying in to the existing highway grade and an existing sidewalk seems to cause the most problems.

You have set points at the top (existing sidewalk), and set points at the bottom (existing highway grade), and must do the best you can in between. Sometimes a NSFJ will be required.

The standard sheets allow a 5-10 ft. warped transition zone between the existing sidewalk and the top grade break of a new ramp, so at the top of the curb ramp there should be a compliant max. cross slope.
Curb Ramps – Tying In

- Cross slope transitions

*Highway grade exceeds 2% and isn’t being adjusted*

BOB

There’s less leeway at the bottom of the curb ramp when the highway grade exceeds 2% and cannot be adjusted within the scope of the project. Sometimes there’s no way to achieve full compliance without a reconstruction project.

There’s a detail on the 608 standard sheets for this situation.

Can match highway grade at bottom, but must transition up to compliant cross slope (or as close as practicable) within the ramp and for the turning space.

This is an extreme situation – very steep highway and sidewalk grade, but it shows how important the level 2% turning space is – turning a wheelchair or walker on the sidewalk in the top image would be difficult.

If it’s not clear how to address all or part of the ramp, ask for more information from Design.
The typical process of building an ADA ramp is a project is selected and scoped generally by planners with the assistance of designers. The project is then designed and passed off to construction. During the process of construction an inspector should be involved to confirm that ADA standards are being met. After the project is done it is the responsibility of maintenance personnel to ensure the continued compliance of the ADA element that was constructed including debris removal or repairs. Frequently we have seen that there are communication issues between construction and inspection, design and construction, maintenance and design, planning and maintenance and this is an issue that will take effort to solve, but is much easier than reconstructing or being stuck with something that is not compliant.
It would be great if the diagram looked like this.
IAN

And even better if it looked like this. If there are issues with constructing ADA elements then not only should design be offered an opportunity to come up with a solution, but word needs to get back to planners that this location will still be on the transition plan and possibly if there is a systemic issue carry the concern back to the Access Board for standard revisions. Issues from Construction need to be conveyed to the inspector and then also if there will be maintenance concerns on to the appropriate management agency. Now this makes it look like it all relies on Construction and the Contractor, but it doesn’t.
This diagram is most representative of the relationship that should exist. If maintenance has a concern it should be conveyed to designers to avoid possibly using a particular type of ADA ramp. If planners are grouping ADA project locations together that don’t make sense for economical construction staging or efficiency then that is a conversation that needs to happen. These issues aren’t specific to ADA accessible design of sidewalk ramps, but they have a spotlight shone on them when we construct things that are a non-compliant and then find out that it was avoidable. Schedules are important, but constructing something twice is not good for anyone’s schedule. We want to help you provide a compliant product that can be used for generations. So have project meetings and start the critical elements checklists in the planning stage and carry them through the process making sure to be update as things change. Have conversations about any element where there is a change from design to construction or if there is any question about how something should be placed. Do not try to interpret the intention of the design if you are not completely confident in your familiarity with ADAAG and PROWAG.
Facility Can’t Be Built to ADA Standards?

- Notify EIC
- Facility may need to be adjusted, redesigned, or formally justified as a nonstandard feature
- Nonstandard justifications include:
  - Underlying Terrain
  - ROW Availability
  - Underground Structures
  - Adjacent Developed Facilities
  - Drainage
  - Presence of a Notable Natural Feature
  - Presence of a Notable Historic Feature
  - Other

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If you realize that a curb ramp or other facility isn’t going to meet the ADA guidelines

Notify the EIC

May need more information from design, may need a re-design, or it may be that there’s physically no way to build a facility that will meet the standards.

In the latter case, the situation is acknowledged and justifiable, but some paperwork needs to be done.

Recognized reasons for this include

Underlying Terrain
ROW Availability
Underground Structures
Adjacent Developed Facilities
Drainage
Presence of a Notable Natural Feature
Presence of a Notable Historic Feature
Other
Quiz – 5 Questions

1. A newly installed curb ramp has a running slope of 7.7%. Is it compliant?
Quiz – 5 Questions

1. A newly installed curb ramp has a running slope of 7.7%. Is it compliant?

   YES.

BOB

Yes. The ADA guideline calls for 8.3%. On a NYSDOT project, it should have been 7.5% at design and layout, but if the finished product is 7.7%, that's fine.
2. TRUE or FALSE
Detectable warning domes should always be oriented in the direction of the crosswalk.
Quiz – 5 Questions

2. TRUE or FALSE
Detectable warning domes should always be oriented in the direction of the crosswalk.

FALSE.

BOB
They should be oriented to the lower grade break of the ramp. That may or may not be lined up with the crosswalk.
Quiz – 5 Questions

3. When must cross slope, width and grade for a new curb ramp be checked?

A. Prior to pouring  
B. Prior to acceptance  
C. 1 year after completion
### Quiz – 5 Questions

3. When must cross slope, width and grade for a new curb ramp be checked?

   A. Prior to pouring  
   B. Prior to acceptance  
   C. 1 year after completion

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**BOB**

At a minimum, measurements should be taken prior to the pour and for acceptance, but the more you measure, the better.
### Quiz – 5 Questions

4. What type of driveway requires detectable warnings at a pedestrian crossing?

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>Driveways never require detectable warnings</td>
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Quiz – 5 Questions

4. What type of driveway requires detectable warnings at a pedestrian crossing?

A. Driveways never require detectable warnings
B. All residential and commercial driveways
C. Only commercial driveways
D. Driveways that are signal-, stop- or yield-controlled.

BOB

Driveways that are signal, stop or yield-controlled. These function like intersections, so they're treated like intersections with detectable warnings.
Quiz – 5 Questions

5. What ADA guidelines are the standard for construction of new pedestrian facilities on NYSDOT projects?

A. 1991 Americans with Disabilities Act Accessibility Guidelines (ADAAG)
Quiz – 5 Questions

5.  What ADA guidelines are the standard for construction of new pedestrian facilities on NYSDOT projects?

A. 1991 Americans with Disabilities Act Accessibility Guidelines (ADAAG)

Questions?