



SDOT POLICY MEMORANDUM

Date: September 15, 2015
To: Scott Kubly, SDOT Director
From: SDOT ADA Committee
Subject: SDOT Policy for Curb Ramp Construction Tolerances

Statement of Intent

To enable a policy that establishes allowable construction tolerances to avoid removing and replacing built curb ramps that are constructed within a reasonable margin of error and are reasonably accessible and functional for disabled users. This policy applies to both existing and newly constructed curb ramps assessed within the public right of way and within the jurisdiction of the City of Seattle.

Overview and Purpose

Constructing curb ramps with fully compliant features in the existing built environment can be challenging due to site constraints that may be present. At times, a curb ramp may need to be designed and built to the maximum allowable slopes to fit within the available right of way. While it is not generally recommended to design a curb ramp to the maximum allowable slope due to the possibility of exceeding that slope, current federal accessibility standards and guidelines refer to “conventional industry tolerances” to allow for a margin of error during the construction of a curb ramp. Refer to references for requirements and guidance at the end of this document for additional information.

Note: Currently there is not adequate guidance from the U.S. DOT, the FHWA, or the U.S. Access Board relative to allowable tolerances for curb ramp construction. A report produced for the Access Board in 2011, the *Dimensional Tolerances for Construction and Surface Accessibility Final Report* (David Kent Ballast, January 2011), recommends allowable curb ramp slope tolerances of up to 0.5%, but the methods suggested to be used to measure the slope of ramps are laborious and impractical. For example, it is recommended that ramp slopes be measured using a rotating laser level to determine rise over run; this type of equipment is not typically carried by crews installing curb ramps. The report also recommends taking a series of measurements and calculations to determine the flatness of slopes, and this type of analysis would be time consuming and counter-productive. SDOT will allow for a minimal tolerance that is more stringent than the allowable slopes demonstrated in that report.

In addition to construction tolerance, it should be noted the equipment used to measure and survey components of curb ramps is also limited in accuracy and must be considered. For example, depending on the digital level used (manufacturer/model) to measure ramp slopes, the level of accuracy of the device may be up to +/- 0.2% or more. A curb ramp specified to and constructed at 8.3% maximum running slope may be measured at 8.5% due to the margin of error for the measuring tool used.





Curb Ramp Construction Tolerance Policy

Where an existing or newly constructed curb ramp is being evaluated within the Seattle public right of way, dimensions are subject to conventional industry tolerances. The tolerances to be applied allow for rounding down for values less than one half of one unit of measurement (i.e. 1 percent of slope or 1 inch of a horizontally measured dimension). For example, the slope must be within less than half of one percent of the required slope to be considered within tolerance; horizontal measurements must be within less than half of one inch to be within tolerance.

| Curb Ramp Measurement | Typical Unit of Measurement | Acceptable Tolerance |
|-----------------------|-----------------------------|----------------------|
| Slope | Percent Slope (1%) | 0.4% Maximum |
| Horizontal Dimension | Inch (1") | 3/8" Maximum |

The following construction tolerances may be applied to both existing and newly constructed curb ramps when evaluating for ADA compliance. All slopes are absolute and may not be exceeded:

Allowable Curb Ramp Construction Tolerances

| Curb Ramp Measurement | Requirement | Acceptable Tolerance | Final Acceptable Measurement |
|---------------------------------|------------------|----------------------|----------------------------------|
| Curb Ramp Running Slope | 8.3% max. | 0.4% | 8.7% max. |
| Curb Ramp Cross Slope | 2.0% max. | 0.4% | 2.4% max. |
| Curb Ramp Landing Slope | 2.0% max. | 0.4% | 2.4% max. |
| Curb Ramp Side Flare Slope | 10.0% max. | 0.4% | 10.4% max. |
| Curb Ramp Counter Slope | 5.0% max. | 0.4% | 5.4% max. |
| Curb Ramp Width (New Ramp) | 48" min. | 3/8" | 47-5/8" min. |
| Curb Ramp Width (Existing Ramp) | 36" min. | 3/8" | 35-5/8" min. |
| Detectable Warning Placement | Match Ramp Width | 3/8" | Within 3/8" of Ramp Edges |

Note: There will be no tolerance for vertical surface discontinuities (1/4" maximum or 1/2" maximum with a 1:2 beveled edge).

While these tolerances may be used when evaluating existing or constructed curb ramps, they may not be applied to the design of curb ramps. If possible, curb ramps should be designed with slopes that are lower than the maximum allowable to allow for a margin of error during the construction of the ramp. For example, the design running slopes should be 7.5% and the cross and landing slopes should be 1.5%. These preferred design slopes are congruent with recommended design slopes found in the *WSDOT Design Manual M 22-01-10*, sections 1510.09(2)(b), 1510.09(2)(c), and 1510.09(2)(d).





References for Requirements and Guidance

1) 2010 ADA Standards for Accessible Design / 2006 DOT ADA Standards

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

104.2 Calculation of Percentages. Where the required number of *elements* or *facilities* to be provided is determined by calculations of ratios or percentages and remainders or fractions result, the next greater whole number of such *elements* or *facilities* shall be provided. Where the determination of the required size or dimension of an *element* or *facility* involves ratios or percentages, rounding down for values less than one half shall be permitted.

405.2 Slope. Ramp runs shall have a *running slope* not steeper than 1:12.

2) Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way (2011)

R103.1 Conventional Industry Tolerances. Dimensions are subject to conventional industry tolerances except where dimensions are stated as a range.

Advisory R103.1 Conventional Industry Tolerances. Conventional industry tolerances for field conditions and tolerances that may be a necessary consequence of a manufacturing process. Conventional industry tolerances do not apply to design work.

103.2 Calculation of Percentages. Where the required number of elements or facilities to be provided is determined by calculations of ratios or percentages and remainder or fractions result, the next greater whole number of such elements shall be provided. Where the determination of the required size or dimension of an element involves ratios or percentages, rounding down for values less than one half is permitted.

R304.2.2 Running Slope. The running slope of the curb ramp shall cut through or shall be built up to the curb at right angles or shall meet the gutter grade break at right angles where the curb is curved. The running slope of the curb ramp shall be 5 percent minimum and 8.3 percent maximum but shall not require the ramp length to exceed 4.5 m (15.0 ft.) The running slope of the turning space shall be 2 percent maximum.

Note: It is acknowledged that the curb ramp slope requirements as shown in the 2011 PROWAG are stated in a range, and therefore are not subject to conventional industry tolerances. At this time, the PROWAG guidelines have not been adopted by the U.S. Department of Justice, and therefore are not yet enforceable standards under Title II of the ADA.

The ramp running slope requirement in the 2010 ADA Standards is not identified in a range. For this policy only the 2010 ADA Standards requirements will be acknowledged as they are the most current enforceable standards.

This policy will be reviewed upon the adoption of the PROWAG by the DOJ.

