

Montana Department of Transportation



2019

Concrete Sidewalk Warranty Administration Guide

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Introduction

This guide presents criteria for evaluating concrete sidewalk, curb, gutter, and median islands. Although concrete sidewalk, curb and gutter, and median islands may eventually show additional distresses, this guide seeks to identify and describe those most relevant to a yearlong warranty period post construction.

Throughout the warranty period MDT inspectors must use video, photos and notes to document concrete defects, condition, deterioration, and changes in condition.

The Project Manager will conduct an inspection when the warranty period expires and identify locations needing mitigation under the contract warranty. Inspection records and documentation will be saved to the Project File. In the interest of statewide uniform sidewalk warranty administration, Project Managers are encouraged to share and discuss warranty determinations with appropriate Department staff.

This Concrete Sidewalk Warranty Assessment Guide has been developed to assist Project Managers and field crews in identifying concrete sidewalk, curb and gutter, and median islands that fail to meet contract requirements, but may still serve the design purpose as stipulated in the MDT Standard Specifications, Section 105. This document is only a guide providing information, recommendations, and visual examples to help evaluate work covered under a yearlong warranty. This guide does not supersede or replace contract governing specifications or special provisions, and is not intended to replace engineering judgment. This guide includes typical examples of concrete distresses and deficiencies likely to be identified during a one-year warranty period. Project Managers, District Construction Engineers, Field Inspectors and other Department personnel are suggested as additional resources to aid in concrete performance and evaluation.

Further input on this guide is welcome. Please contact Stephen McEvoy (stmcevoy@mt.gov or 444-6295) to comment on or suggest revision.

Panel Condition: Ideal



- Both pictures exhibit a smooth panel surface with no evidence of scaling, cracking, spalling, or unusual wear.

Panel Condition: Surface Scaling (mild)



- Surface paste formation causes concrete surface to flake off in “scales”.
- Exposed subsurface aggregate.
- <10% of panel affected.
- **Recommendation:** Accept work without deduction.

Panel Condition: Surface Scaling (Moderate)



- 10-50% of panel affected by scaling.
- **Recommendation:** 50% price deduction for panels with 10-50% scaling.

Panel Condition: Surface Scaling (Severe)



- Scaling covers > 50% of panel, and may penetrate deeper than ¼ inch.
- **Recommendation:** Remove and replace.

Panel Condition: Subsidence/Faulting



(Source: <https://www.coinaphoto.com/stock-photos/keywords/damaged>)



(Source: <https://www.justanswer.com/home-improvement/55ram-advice-leveling-concrete-sidewalk.html>)

- Faulting panel due to improper base preparation and differential settlement in pour area. Panels may tilt in different directions due to inconsistent base support.
- **Recommendation:** If panel is faulted and cracked (top picture), remove and replace. For faulted panels without cracking (bottom picture), repair panel if faulting is greater than 1/8-inch.

Note: Frost Heaving also causes faulting, but is caused by improper drainage. Faulting resulting from conditions beyond contractor control may not be subject to warranty work.

Panel Condition: Overloading



(Sources: <https://www.coinaphoto.com/stock-photos/keywords/damaged>,
<https://www.ardexbuildingproducts.ie/why-concrete-cracks/>)

- Structural cracking caused by overloading often occurs diagonally across corners and along edges as curves or half-circles.
- **Recommendation:** Remove and replace.

Panel Condition: Frost Heaving



(Sources: <https://www.publicworks.ca/media/36776/heaved-catch-basin-presentation-apwa-distribution.pdf>, <http://safetyawakenings.com/sidewalk-safety/>)

- Frost heave occurs when moisture under the sidewalk freezes, and the panel is forced upward. Heaves often are alleviated with warmer weather. Frost heaving and subsidence may both cause faulting, but frost heaving is an upward movement caused by inadequately drained base materials, whereas subsidence is usually a downward movement caused by inadequate compaction. Frost heaving elevates affected areas, whereas subsidence lowers an affected area. Frost heaving may not be subject to warranty work in cases where drainage is beyond contractor control.

Panel Condition: Cracking



(Source: <https://www.shutterstock.com/search/cracked+concrete+walkway>)

- **Recommendation:** If panel is cracked into three or more sections between control joints, remove and replace.

Panel Condition: Spalling (incidental)



(Source: <https://www.sakrete.com/projects/repairing-cracks--spalling-concrete>)



(Source: <https://faapaveair.faa.gov/Help/default.htm?turl=Documents%2Fjointspalling14.htm>)

- Damage usually occurs near edges and relief joints.
- **Recommendation:** Price reduction based on defect severity and frequency per panel. If > three spalls greater than 1" are present on a single panel, remove and replace. If >40% panels within the job are price reduced or assessed as remove and replace, replace all panels. If more than 40% of adjoining panels are identified by the Project Manager to be replaced, replace all panels in that span.

Curb Condition: Desired Final Appearance



(Source: <http://nugentsealcoatingandpaving.com/concrete/>)

- **Ideal Curb:** no evidence of scaling, cracking, spalling, or un-usual signs of wear on curb and gutter.

Curb Condition: Moderate Scaling



- Inadequate Curb: presence of scaling deterioration on curb and gutter.
- **Recommendation:** 10-50% affected area corresponds to a 50% reduction in contract bid price for square yard curb and gutter affected. Remove and replace curb with > 50% scaling between relief joints, or those identified by Project Manager.

Curb Condition: Significant Spalling and Scaling



- Significant spalling (left) and significant scaling (right).
- **Recommendation:** Remove and replace if >10% of curb length between relief joints is affected, or prescribe warranty work as decided by Project Manager.

Median Cap and Curb: Ideal Condition



- Ideal Median Curb: No scaling, cracking, spalling, or unusual signs of wear.

Median Cap Condition: Minor Deterioration



- Minor scaling on < 10% of panel surface.
Recommendation: Accept work.
- If median surface is scaled over 10-50%, impose 50% price reduction. Remove and replace panels with >50% scaling.

Median Cap Condition: Severe Deterioration



- Significant panel cracking with minor scaling
- **Recommendation:** Remove and replace.

Median Curb Condition: Faulting



- Edge of curb faulted upwards at relief joint.
- Curb susceptible to snow plow damage.
- **Recommendation:** Accept work if acceptable to Project Manager.

Panel Condition: Rain Damage



- Pock marks distributed over entire panel surface from rainfall not long after concrete finishing.
- **Recommendation:** Negotiate price reduction or remove and replace depending on pock mark severity.

Condition: Snow Plow Damage



- Damage results from plow blade impacts to concrete edges and joints, typically near curbs or ramps.
- Ordinarily contractor is not responsible, unless defects such as construction related faulting or settlement may have significantly exposed edges to blade impact.

Condition: Contractor Equipment Damage



- Damage results from equipment dragging on freshly placed concrete.
- Contractor is responsible for defect.
- **Recommendation:** 50% price deduction or remove and replace based upon defect severity.

Panel Condition: Pedestrian Damage



- Imprints or vandalism.
- Imprints may be caused by placing cold weather concrete protection on green concrete. The contractor is at fault for this form of damage.
- If pedestrian traffic control meets specifications, contractor may not be at fault.
- Negotiate price reduction if damage is significant.

Example Price Reduction Calculation for Scaling



Given:

- panel is greater than 10% and less than 50% affected
- standard price reduction is 50%
- panel area 2.5 sq yd
- panel thickness 4 in
- concrete price \$90 sq yd

Panel surface: $S = (2.5 \text{ yd}^2)$

Concrete bid price for sidewalk per sq yard = \$90

Price reduction: $R = \text{price per sq yd } (2.5 * 90) (.5) = \112.50 per panel