2011 Midwestern Pavement Preservation Partnership Conference

Best Practices for Concrete Repair of Local Streets and County Roads

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IGGA


CAUTION KEEP OUT
CAUTION KEEP OUT
CAUTION KEEP OUT

LTAP U of MN Center for Transportation

- 1st Class October 12-13, 2005 Owatonna, MN
- 2nd class October 3-4, 2006, Mpls, Mn

- 3rd Class Oct. 2007, Olmsted County - Rochester, MN
- 4th Class April 2009, Waseca County

LTAP CLASS-Goals of Class

- Learn new State Aid Standards
- Learn how to estimate quantities
- Complete Field review of street
- Compare answers from teams
- Review State Aid Standards
- Review of Actual Repairs in Field
- One day and Half in the fall

Waseca County Rd 57

- Pavement constructed in 1980
- 6.5” Thick and 27’ wide
- Joint pattern 16.5’ effective
- Some Chemistry Problems

Joint “A”

Team #1
21 x 27 FD
94.5 Sq Ft SA-CD
472.5 Sq Ft SA-CX

Team # 5
20 x 27 FD
94.5 sq ft SA-CD
445.5 sq ft SA-CX

Joint “B”

Team #1
6’ X 14’ Full Depth
49 sq ft SA-CD
35 sq Ft SA-CX

Team # 3
16 Sq Ft Sa-BA

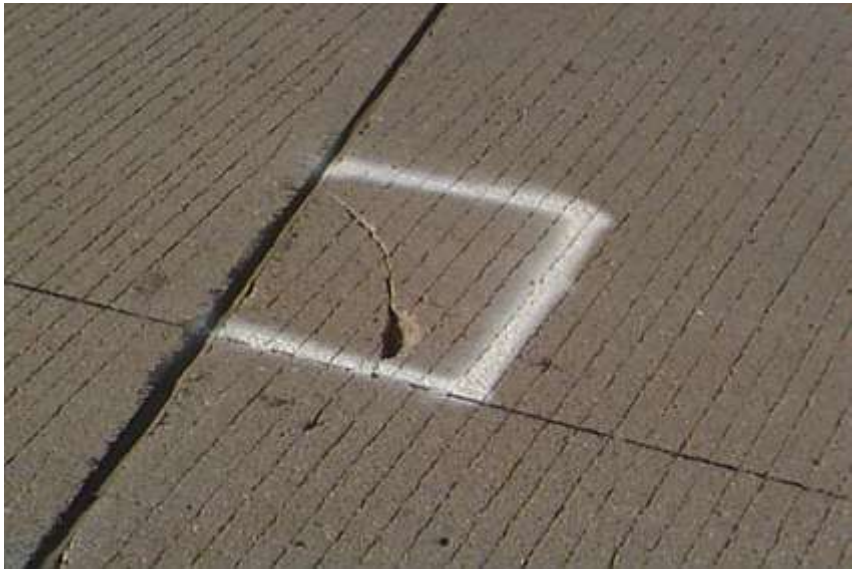
Team # 4
23 sq ft SA-BA

Team # 6
16 Sq Ft SA-BA

#9

Full Depth Repairs Yellow

Partial Depth Repairs White



Concrete Rehab Basics

- All Joint Repairs are SA-A
- All Partial Depth Repairs are SA-B
- All Full Depth Repairs are SA-C
- All Sidewalk Repairs are SA-SW
- All Curb and Gutter Repairs are SA-CG

Concrete Mixtures

Ready Mix Concrete

3U18 Partial Depth Concrete Mix

Partial Depth Mix 3U18

- Can be hand mixed on jobsite
- Can be bought in a bag
  - Comes with air entrainment
  - Comes with Type E Accelerating Admixtures

3U18 Mfg. by Twin City Concrete Products

Joint & Crack Sealing

Joint Repair Type SA-A1

Joint Repair Type SA-A2

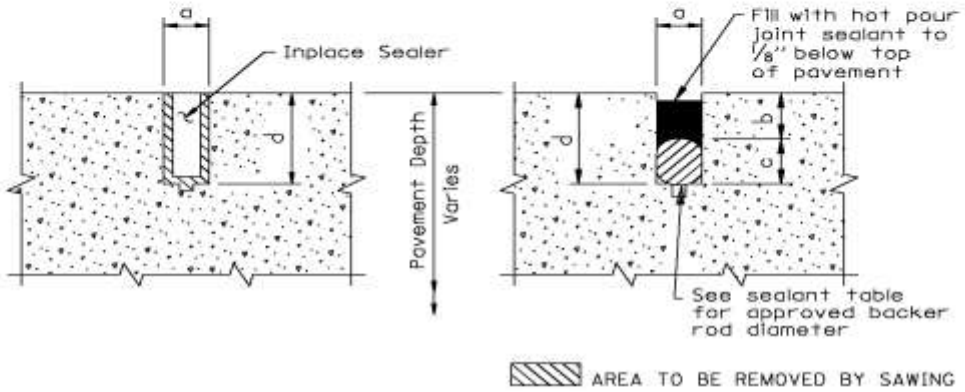
Crack Repair SA-A3

_a_ " JOINT REPAIR TYPE SA-A1

DESCRIPTION: CLEAN, SAW AND SEAL TRANSVERSE OR LONGITUDINAL PAVEMENT JOINTS.

SECTION REMOVAL

SECTION INSTALLATION



AREA TO BE REMOVED BY SAWING

WORK TO BE DONE

1. Remove inplace joint seal.
2. Saw both joint faces to configuration shown and immediately waterflush the joint.
3. Clean and dry joint by sandblasting and airblasting.
4. Place backer rod of appropriate diameter in transverse joint opening No backer rod is required in longitudinal joints.
5. Seal joint with hot pour joint sealer.
6. To prevent tracking of hot pour joint sealer, use tissue paper if necessary.

BASIS OF PAYMENT

2301 Joint Repair (Type SA-A1)
_a_ " in ft.

Backer Rod cost is included in Type SA-A1 bid item, if required.

Seal Concrete Pavement Joints (3725) is included in Type SA-A1 bid item.

DATE: AUG-24-2005

S.A.P. NO. SHEET OF SHEETS

Joint/Crack Resealing

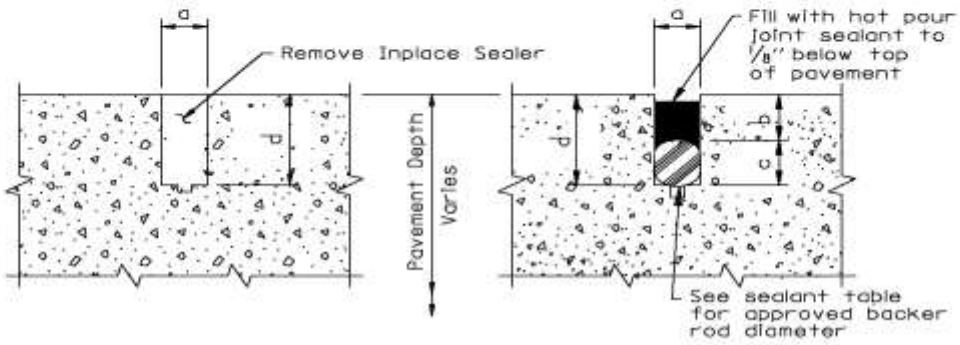
- Application of a sealant material in concrete pavement joints and cracks
- Purpose
  - Minimize moisture infiltration
  - Prevent intrusion of incompressibles
- Sealant Materials
  - Rubberized asphalt

_a_ " JOINT REPAIR TYPE SA-A2

DESCRIPTION: CLEAN AND FILL TRANSVERSE OR LONGITUDINAL PAVEMENT JOINTS.

SECTION REMOVAL

SECTION INSTALLATION



WORK TO BE DONE

1. Remove inplace joint seal.
2. Clean and dry joint by sandblasting and airblasting.
3. Place backer rod of appropriate diameter in present transverse joint opening. No backer rod is required in longitudinal joints.
4. Fill joint with hot pour joint sealer.
5. To prevent tracking of hot pour joint sealer, use tissue paper if necessary.

BASIS OF PAYMENT

2301 Joint Repair (Type SA-A2) _a_ " in ft.

Backer Rod cost is included in Type SA-A2 bid item, if required.

Fill Concrete Pavement Joints (3725) is included in Type SA-A2 bid item.

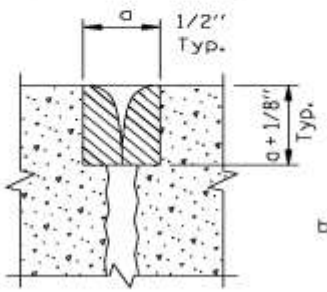
DATE: AUG-24-2005

S.A.P. NO. SHEET OF SHEETS

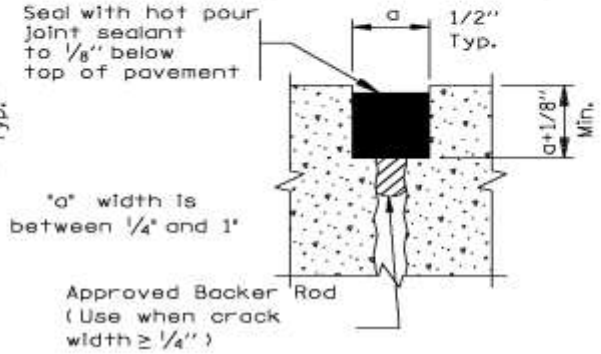
_a_ " CRACK REPAIR TYPE SA-A3

DESCRIPTION: SAW AND SEAL CRACKS.

SECTION REMOVAL



SECTION INSTALLATION



AREA TO BE REMOVED BY SAWING

WORK TO BE DONE

1. Remove any inplace seal. Saw as shown and waterflush.
2. Clean and dry crack by sandblasting and airblasting. Supply backer rod when required.
3. Seal joint with hot pour joint sealer.
4. To prevent tracking of hot pour joint sealer, use tissue paper if necessary.

BASIS OF PAYMENT

2301 Crack Repair (Type SA-A3) lin. ft.

Backer Rod cost is included in Type SA-A3 bid item, if required.

Seal Concrete Pavement Joints (3725) is included in Type SA-A3 bid item.

DATE: AUG-24-2005

S.A.P. NO. SHEET OF SHEETS

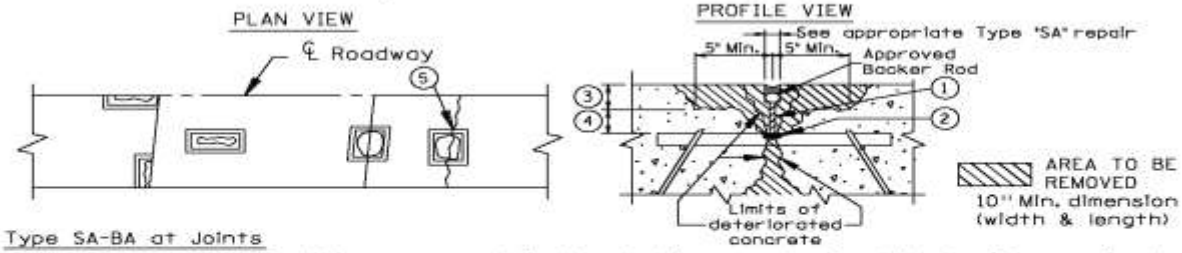
Partial Depth Repairs

Partial Depth Repair Type SA-BA

Partial Depth Repair Type SA-BE

PARTIAL DEPTH REPAIR TYPE SA-BA

DESCRIPTION: REMOVE CONCRETE, FURNISH AND PLACE CONCRETE, SAW, AND SEAL JOINTS/CRACKS.



Type SA-BA at Joints

JOINT RE-ESTABLISHMENT shall be commenced in the plastic concrete immediately after pouring to prevent failure and shall be accomplished by tooling the plastic concrete with an approved device, or by installing compression relief material prior to concrete placement. Sawing for initial joint establishment is not allowed.

① Joint compression relief for the upper part of the joint (above the top of the dowel bars) shall be provided by installing ¼" min. compression relief material prior to concrete placement, or by accomplishing a ¼" min. relief saw cut as soon as the cured concrete will allow.

② Joint compression relief for the lower part of the joint (below the top of dowel bars) shall be provided by placing clean concrete sand level with the top of the dowel bars along the entire length of the repair in any void or depression of the prepared repair area that is visible after removal of the existing concrete.

③ Removal limits by milling. Side of removal must be tapered 30° - 60° from vertical by milling or chipping by 35 lb chipping hammer at both joints and cracks, min. of 2" and max. of T/2.

④ Removal limits of unsound concrete, to be accomplished by 35 lb chipping hammer.

Type SA-BA at Cracks

⑤ Compression relief material equal to or greater than existing crack width, ¼" minimum, 1" maximum. Material to be installed at the time of concrete placement to the full depth of the repair. Edging of the restored crack is required.

WORK TO BE DONE

1. Define removal area and payment based on sq. ft. of area to be patched and to a 2" minimum depth.
2. Remove all concrete to limits shown in detail, including all unsound concrete, to a max. of T/2 the pavement depth or top of dowels, by milling and by chipping hammer.
3. Clean exposed surface by sandblasting and airblasting. Apply bonding grout immediately prior to concrete placement. Coat exposed surface of dowels, if any, with approved bond breaker.
4. Furnish & place Concrete Mix No. 3U1B. Finish to grade, slope and texture. Seal edges with grout and apply cure.
5. Restore joints and cracks using compression relief material of width equal to existing joint (¼" min.) and the appropriate Type "SA" repair. See note ① above.
6. Seal joints and cracks with appropriate sealer.

BASIS OF PAYMENT

Measurement and payment shall be made to the nearest sq. ft.

2301 Partial Depth Repair (Type SA-BA) sq. ft.

-The 30° - 60° edge taper is included in the repair.

2301 (Appropriate Type "SA" repair) lin. ft.

DATE: AUG-24-2005

S.A.P. NO. SHEET OF SHEETS

Milling for Partial Depth Repair


5 11 '00

Skid Steer for Milling Partial Depths

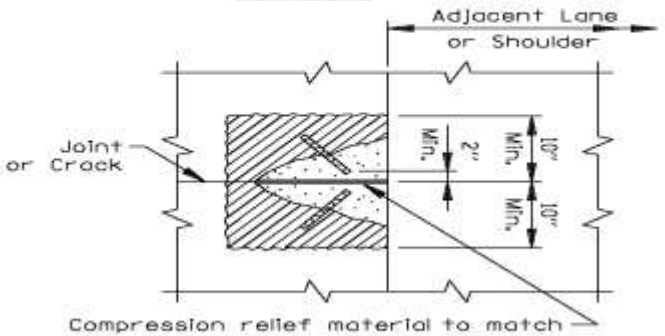
- Best suited for corner spalls and random cracks, it can maneuver better than the larger mills.
- Skid Steers weigh about 8000 pounds and can have removal rates of 2 – 3 feet per minute.
- Light weight skid steers can cause spalling at edges, but most minor spalls will be patched with concrete mix.
- It is easy to lift the front end off the ground during milling, but can be done with minor spalling.

Milled Crack and Joint

PARTIAL DEPTH REPAIR TYPE SA-BE

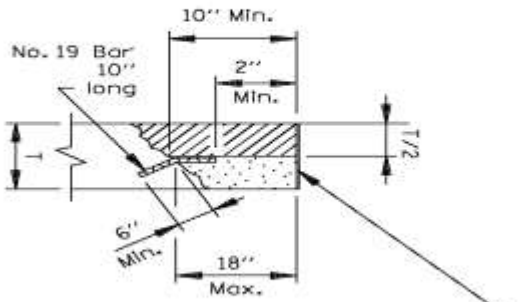
DESCRIPTION: REMOVE CONCRETE, INSTALL REINFORCING STEEL, FURNISH & PLACE CONCRETE, SAW AND SEAL JOINTS.

PLAN VIEW



Compression relief material to match width of existing joint or crack (1/4" min.) to full depth of repair. Edging required.

PROFILE VIEW



1/4" min. preformed joint filler if adjacent to conc. Edging required. Fully formed edge if adjacent to shoulder.

PAID AS PARTIAL DEPTH REPAIR (Type SA-BA)

PAID AS PARTIAL DEPTH REPAIR (Type SA-BE)

WORK TO BE DONE

1. Define removal, T/2 below inplace surface.
2. Remove all deteriorated concrete to limits shown in detail. Taper edges by chipping.
3. Clean exposed surface by sandblasting and airblasting. Apply bonding grout immediately prior to concrete placement. Coat exposed surface of dowels, if any, with approved bond breaker.
4. Furnish and install No. 19 reinforcement tie bars at mid-depth as shown. Place with an approved non-shrink grout.
5. Restore joints and cracks using compression relief material.
6. Furnish & place Concrete Mix No. 3U18. Finish to grade, slope and texture. Seal edges with grout and apply cure.

BASIS OF PAYMENT

Pay quantity dimensions will be measured at T/2 below the inplace surface. This payment will be in addition to Type "SA-BA" repair quantities for the same area. Measurement and payment shall be made to the nearest sq. ft. (minimum of 1 sq. ft)

2301 Partial Depth Repair (Type SA-BE) sq. ft.

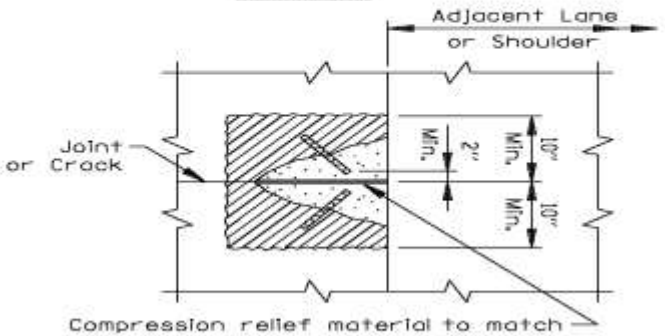
DATE: AUG-24-2005

S.A.P. NO. SHEET OF SHEETS

PARTIAL DEPTH REPAIR TYPE SA-BE

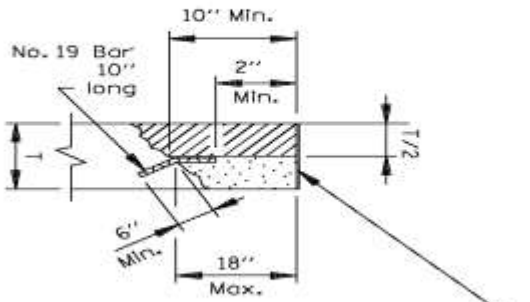
DESCRIPTION: REMOVE CONCRETE, INSTALL REINFORCING STEEL, FURNISH & PLACE CONCRETE, SAW AND SEAL JOINTS.

PLAN VIEW



Compression relief material to match width of existing joint or crack (1/4" min.) to full depth of repair. Edging required.

PROFILE VIEW



1/4" min. preformed joint filler if adjacent to conc. Edging required. Fully formed edge if adjacent to shoulder.

PAID AS PARTIAL DEPTH REPAIR (Type SA-BA)

PAID AS PARTIAL DEPTH REPAIR (Type SA-BE)

WORK TO BE DONE

1. Define removal, T/2 below inplace surface.
2. Remove all deteriorated concrete to limits shown in detail. Taper edges by chipping.
3. Clean exposed surface by sandblasting and airblasting. Apply bonding grout immediately prior to concrete placement. Coat exposed surface of dowels, if any, with approved bond breaker.
4. Furnish and install No. 19 reinforcement tie bars at mid-depth as shown. Place with an approved non-shrink grout.
5. Restore joints and cracks using compression relief material.
6. Furnish & place Concrete Mix No. 3U18. Finish to grade, slope and texture. Seal edges with grout and apply cure.

BASIS OF PAYMENT

Pay quantity dimensions will be measured at T/2 below the inplace surface. This payment will be in addition to Type "SA-BA" repair quantities for the same area. Measurement and payment shall be made to the nearest sq. ft. (minimum of 1 sq. ft)

2301 Partial Depth Repair (Type SA-BE) sq. ft.

DATE: AUG-24-2005

S.A.P. NO. SHEET OF SHEETS

Placing Sand (Com-pression Relief) in Milled Crack


Duct Tape on Dowel bars
and Sand for Compression
Relief

PRECAUTIONARY NOTE TO THE ENGINEER

Though it is an approved practice, using sand to prevent locking the joints together due to concrete infiltration when placing repairs will likely result in a reduced repair life as compared to repairing a joint where the dowels are not exposed and a tight joint exists. Therefore, an early determination is necessary to quantify the extent of this fix to determine if it is a cost effective alternative to a longer lasting full-depth repair. (Contact the Concrete Engineering Unit for Advice)

Rochester, Mn 2007 Patch Picture 2011

Ramsey County Maintenance

Concrete Mix & Mixing Plant

Isolation Material

Concrete Placement & Texture

Finished Partial Depth Patch

2 Year Old Partial Depth Patch Working But Colored continued to Deteriorate

Full Depth Repairs SA-C

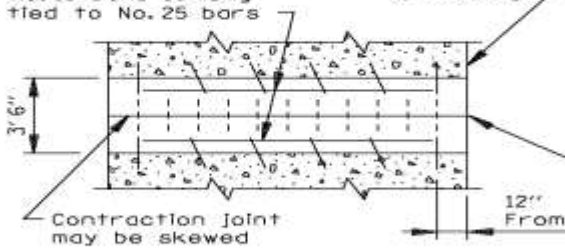
- Full Depth Repair Type SA-CA
- Full Depth Repair Type SA-CD
- Full Depth Repair Type SA-CX
- Full Depth Repair Type SA-C1
- Utility Trench Full Depth Repair Type SA-C2

FULL DEPTH REPAIR TYPE SA-CA

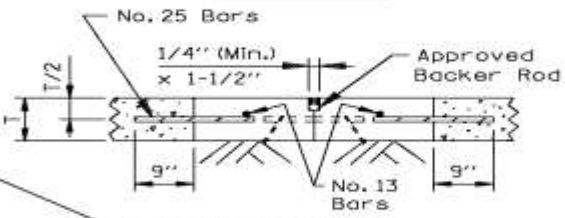
DESCRIPTION: REMOVE CONCRETE, PLACE REINFORCING STEEL, DOWEL BAR ASSEMBLY, SAW AND SEAL JOINTS. FOR FULL WIDTH LANE REPLACEMENT ONLY.

NOTE: Dowel basket assembly is optional based on existing design.

PLAN VIEW



PROFILE VIEW



NOTE: For skewed repairs, eliminate a tie bar at centerline edge with acute angle.

AREA TO BE REMOVED
Minimum dimension - 1 lane wide

WORK TO BE DONE

1. Saw cut to full depth and remove concrete pavement. Restore inplace base.
2. Furnish & install No. 25 reinforcing tie bars, 18" long at 24" C-C, skewed 20° from normal or straight to both joints at discretion of Contractor. Place reinforcement with approved non-shrink grout. Place No. 13 bar 10 ft. long as shown in detail.
3. For repairs over 12 ft. in width without a longitudinal joint, place the following supplemental steel: No. 13 bars, 6" shorter than width of repair, placed at 4' C. to C.
4. Clean surfaces of inplace concrete.
5. Furnish and place concrete. Finish to required grade, slope and texture. Seal edges with grout and apply cure.

6. When required, place dowel basket assembly, coat dowel bars with a form coating material meeting Spec. 3902

7. Re-establish joints using the appropriate Type "SA" repair.
8. Seal joints with appropriate sealer.

BASIS OF PAYMENT

2301 Full Depth Repair (Type SA-CA), sq. ft.

Supplemental steel required for Type SA-CA repairs over 12 feet in width shall be paid for under the pay item 2301 Reinforcement Bars (No. 13 Epoxy Coated), lb.

2301 Dowel Bars, each

2301 (Appropriate Type "SA" Repair) lin. ft.

DATE: AUG-24-2005

S.A.P. NO. SHEET OF SHEETS

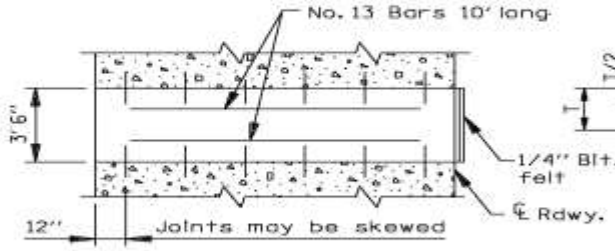
Example of Dowel Basket in Full Depth Repair

Type SA-CA (Basket is Optional)

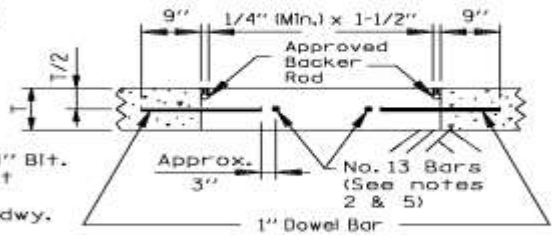
FULL DEPTH REPAIR TYPE SA-CD

DESCRIPTION: REMOVE CONCRETE, PLACE REINFORCING STEEL AND DOWELS, FURNISH AND PLACE CONCRETE, SAW AND SEAL JOINTS.

PLAN VIEW



PROFILE VIEW



NOTE: For skewed repairs, eliminate a dowel at centerline edge with acute angle.

AREA TO BE REMOVED
Minimum dimension - 1 lane wide

WORK TO BE DONE

1. Saw cut to full depth and remove concrete pavement. Restore inplace base.
2. For repairs over 12 ft. in width without a longitudinal joint, place the following supplemental steel: No. 13 bars, 6" shorter than width of repair, placed at 4 ft. C-C.
3. Furnish and install 1" dowel bars 18" long at 24" C-C. Drill with an approved jig. Place with an approved non-shrink grout. Coat free end with a form coating material meeting Spec. 3902.
4. Clean surfaces of inplace concrete.
5. Furnish and place concrete. Place No. 13 bar 10 ft. long in plastic concrete, approximately 3" from end of dowel bar at mid-depth. Finish to required grade, slope, texture and cure.
6. Re-establish joints using the appropriate Type "SA" repair.
7. Seal joints with appropriate sealer.

BASIS OF PAYMENT

2301 Full Depth Repair (Type SA-CD) sq. ft.

Supplemental steel required for Type SA-CD repairs over 12 feet in width shall be paid for under the pay item 2301 Reinforcement Bars (No. 13 Epoxy Coated), lb.

2301 (Appropriate Type "SA" Repair) lin. ft.

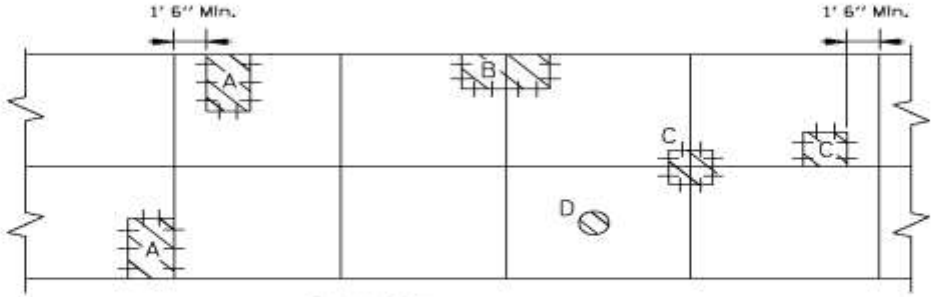
DATE: AUG-24-2005

S.A.P. NO. SHEET OF SHEETS

Owatonna Full Depth

SPOT FULL DEPTH REPAIR TYPE SA-C1

DESCRIPTION: REMOVE CONCRETE. PLACE REINFORCING AND DOWELS AS REQUIRED. FURNISH AND PLACE CONCRETE, SAW AND SEAL JOINTS AS NECESSARY.



PLAN VIEW

AREA TO BE REMOVED

WORK TO BE DONE

1. Define removal area. Choose repair layout options as shown above. Repair layout options A, B, C, and D as explained below.
   A) Exterior Edge, 3' 6" x 6' min. for a one half lane repair.
   B) Exterior edge at a joint location, 4' x 4' min. size.
   C) Interior edge at centerline, 4' x 4' min. size.
   D) Gas line or exploratory hole 4" diameter minimum size and 12" diameter maximum size. Backfill "D" repair with Mn/DOT 3U18 or equivalent HE ready mix concrete. For 8" diameter or larger holes, drill and grout No. 13 reinforcing bars into existing concrete.
2. Saw cut full depth and remove concrete pavement. Restore inplace base.
3. Furnish and install No. 25 x 18" long reinforcing tie bars at 24" C-C parallel to concrete surface at mid depth of existing concrete pavement on all sides. All bars shall be a min. 1' from edge or joint. If one side of repair is along a longitudinal tied joint, retain or replace existing bars as necessary. If one side of repair matches an existing joint use 1" dowel bars, 18" long at 24" C-C parallel to concrete surface. Coat free end of dowelbars with a form coating material meeting Mn/DOT Specification 3902.
4. Clean surfaces of inplace concrete.
5. Furnish and place concrete. Finish to required grade, slope, texture, and cure.
6. Re-establish transverse joints and longitudinal joints and seal if necessary, using the appropriate Type "SA-A___" repair.

BASIS OF PAYMENT

Measurement and payment shall be made to the nearest sq. ft.

2301 Spot Full Depth Repair (Type SA-C1) sq. ft.

2301 (Appropriate Type "SA" repair) lin. ft.

DATE: AUG-24-2005

S.A.P. NO. SHEET OF SHEETS

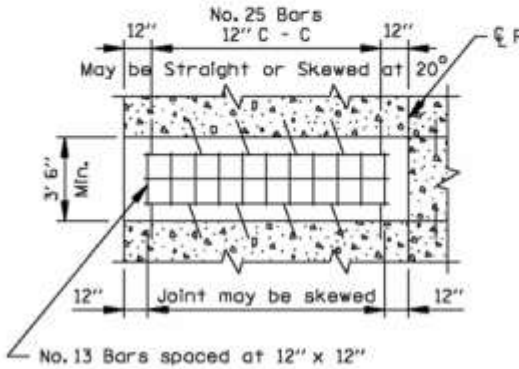
Owatonna SA – C1

S.A.P. NO.

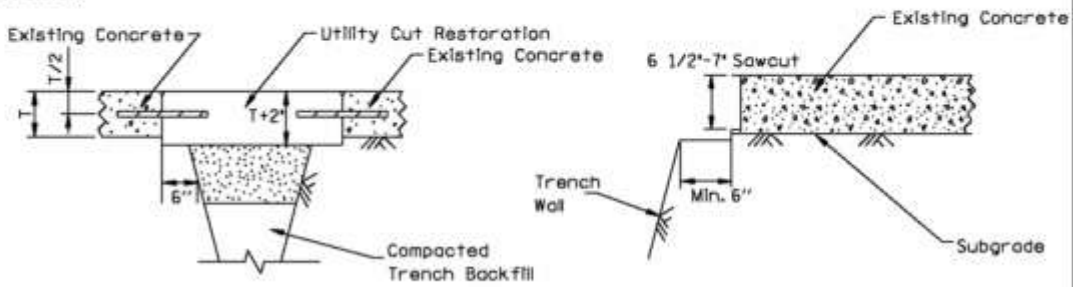
UTILITY TRENCH FULL DEPTH REPAIR TYPE SA-C2

DESCRIPTION: REMOVE CONCRETE, PLACE REINFORCING AND DOWELS AS REQUIRED.
FURNISH AND PLACE CONCRETE, SAW OR FORM JOINTS AS NECESSARY.

PLAN VIEW



PROFILE VIEW



AREA TO BE REMOVED

12" CLASS 2 OR CLASS 5

WORK TO BE DONE

1. Define removal area. Saw cut full depth and remove concrete pavement. Remove material to utility structure if necessary. Backfill trench with existing soils if acceptable to the Engineer. Place a minimum of 12" of MN/DOT Class 2 or Class 5 material on top trench compacted material and compact Class 2 or Class 5 to 95% of optimum proctor, cost to be incidental to SA-C2. Leave top of aggregate base 2" below bottom of existing concrete pavement.
2. Furnish and install No. 25 X 18" long reinforcing tie bars at 24" C-C parallel to concrete surface at mid depth of existing concrete pavement. If one side of repair matches an existing joint use 1" dowel bars 18" long at 24" C-C parallel to concrete surface. Coat free end of dowel bars with a form coating material meeting Spec. 3902.
3. Place reinforcing steel mat of No. 13 bars placed on a C-C spacing of 12", throughout the Utility Trench Repair area.
4. Clean surfaces of inplace concrete.
5. Furnish and place concrete. Finish to required grade, slope, texture and cure.
6. Re-establish joints and longitudinal joints and seal if necessary, using the appropriate Type SA-"A_" repair.

BASIS OF PAYMENT

2301 Utility Trench Full Depth Repair (Type SA-C2) sq. ft.

2301 (Appropriate Type "SA" Repair) lin. ft.

DATE: AUG-24-2005

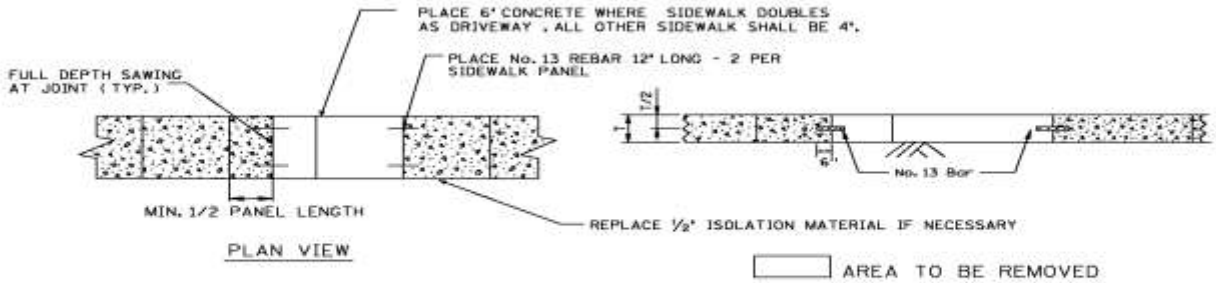
SHEET OF SHEETS

Owatonna SA – C2

Sidewalk and Median Repair
Curb and Gutter Repair

SIDEWALK OR MEDIAN REPAIR TYPE SA-SW

DESCRIPTION: REMOVE CONCRETE. RESTORE BASE. PLACE REINFORCING STEEL. FURNISH AND PLACE CONCRETE. REFORM JOINTS AS NECESSARY.



PLAN VIEW

AREA TO BE REMOVED

WORK TO BE DONE

1. Define removal area at existing joint or if necessary saw full depth of sidewalk. Remove concrete sidewalk.
2. If existing Aggregate Base Is Inadequate place 4" of Class 5 aggregate. Restore subgrade by compaction with a hand operated vibratory compactor.
3. Furnish and Install 2 - No.13 Reinforcing tie bars 12" long at each end of removal area to restore load transfer. Drill and grout one-half of bars with an approved non-shrink grout.
4. Place ½" isolation material only at ends of city blocks abuting pedestrian ramp areas or to isloate driveway concrete. Median concrete shall have Isolation material placed around its perimeter.
5. Place 6" thick concrete where sidewalk doubles as a driveway. All other sidewalk and median concrete shall be 4" thick.
6. Clean Inplace vertical slab surface. Place structural concrete. Finish to grade, slope, and texture. Apply cure.
7. Restore joints by green sawing or hand tooling to match existing joint pattern.

BASIS OF PAYMENT

Measurement and payment shall be made to the nearest sq. ft.

2301 Sidewalk or Median Repair (Type SA-SW) sq. ft.

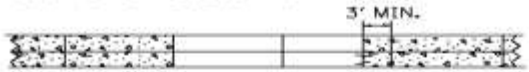
DATE: AUG-24-2005

S.A.P. NO. SHEET OF SHEETS

CURB AND GUTTER REPAIR TYPE SA-CG

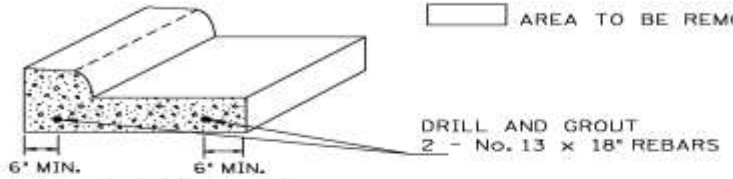
DESCRIPTION: REMOVE CONCRETE. RESTORE BASE. PLACE REINFORCING STEEL. FURNISH AND PLACE CONCRETE. REFORM JOINTS AS NECESSARY.

PLAN VIEW



PROFILE VIEW

AREA TO BE REMOVED



CROSS SECTION VIEW

WORK TO BE DONE

1. Define removal area at existing joint or if necessary saw full depth of curb gutter pan and as much as possible of curb. Remove concrete curb and gutter section.

   If existing curb and gutter is an Integral Curb and Gutter design. Saw full depth of pavement at on a line 1' from face of curb and parallel to back of curb to define removal area.

2. Restore load transfer at each end of removal area by the following: At each end of the removal area furnish and install No. 13 reinforcing steel bars 18" long. Drill and grout ½ of the bar with an approved non-shrink grout.

3. If existing Aggregate Base is inadequate place 4" of Class 5 aggregate. Restore subgrade by compaction with a hand operated vibratory compactor.

4. Place ½" isolation material only at ends of city blocks abuting pedestrian ramp areas or to isolate driveway concrete.

5. Clean inplace vertical slab surface. Place structural concrete. Finish to grade, slope, and texture. Apply cure.

6. Restore joints by green sawing or hand tooling to match existing joint pattern.

BASIS OF PAYMENT

Measurement and payment shall be paid by the lineal foot for the type of curb and gutter section.

2301 Curb and Gutter Repair (Type SA-CG) lin. ft.

DATE: AUG-24-2005

S.A.P. NO. SHEET OF SHEETS

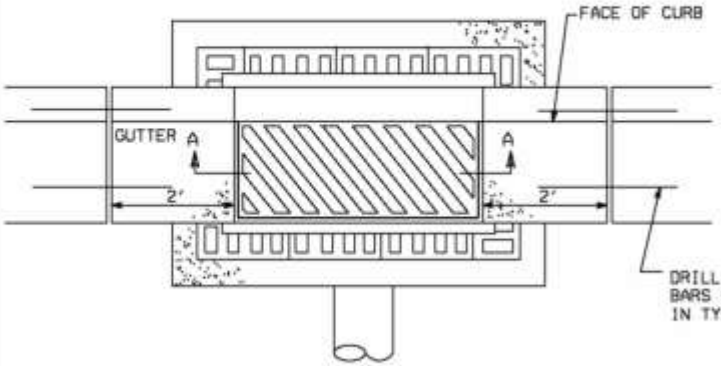
Curb & Gutter Removal

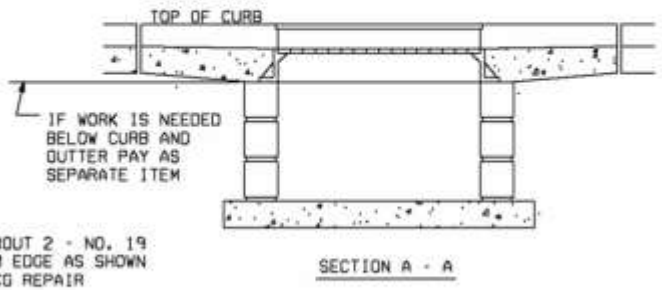
S.A.P. NO.

CATCH BASIN REPAIR TYPE SA-CB

THIS PLATE IS INTENDED TO FIX SUNKEN CATCH BASINS OR TO IMPROVE DRAINAGE PROBLEMS.

DESCRIPTION: REMOVE CONCRETE. RESTORE BASE. PLACE REINFORCING STEEL. FURNISH AND PLACE CONCRETE. REFORM JOINTS AS NECESSARY.





WORK TO BE DONE

1. Define removal area at existing catch basin and if necessary saw full depth of curb gutter pan and as much as possible of curb. Remove concrete curb and gutter section, on each side of the catch basin.

   If existing curb and gutter is an integral Curb and Gutter design. Saw full depth of pavement at on a line 1' from face of curb and parallel to back of curb to define removal area.

2. Restore load transfer at each end of removal area by the following: At each end of the removal area furnish and install No. 19 reinforcing steel bars 18" long. Drill and grout ½ of the bar with an approved non-shrink grout.

3. If existing Aggregate Base is inadequate place 4" of Class 5 aggregate. Restore subgrade by compaction with a hand operated vibratory compactor.

4. Clean inplace vertical slab surface. Place structural concrete. Finish to grade, slope, and texture. Apply cure.

5. Restore joints by green sawing or hand tooling to match existing joint pattern.

BASIS OF PAYMENT

Measurement and payment shall be paid by the lineal foot for the type of curb and gutter section, including the length of the catch basin.

2301 Catch Basin Repair (Type SA-CB) lin. ft.

DATE: AUG-24-2005

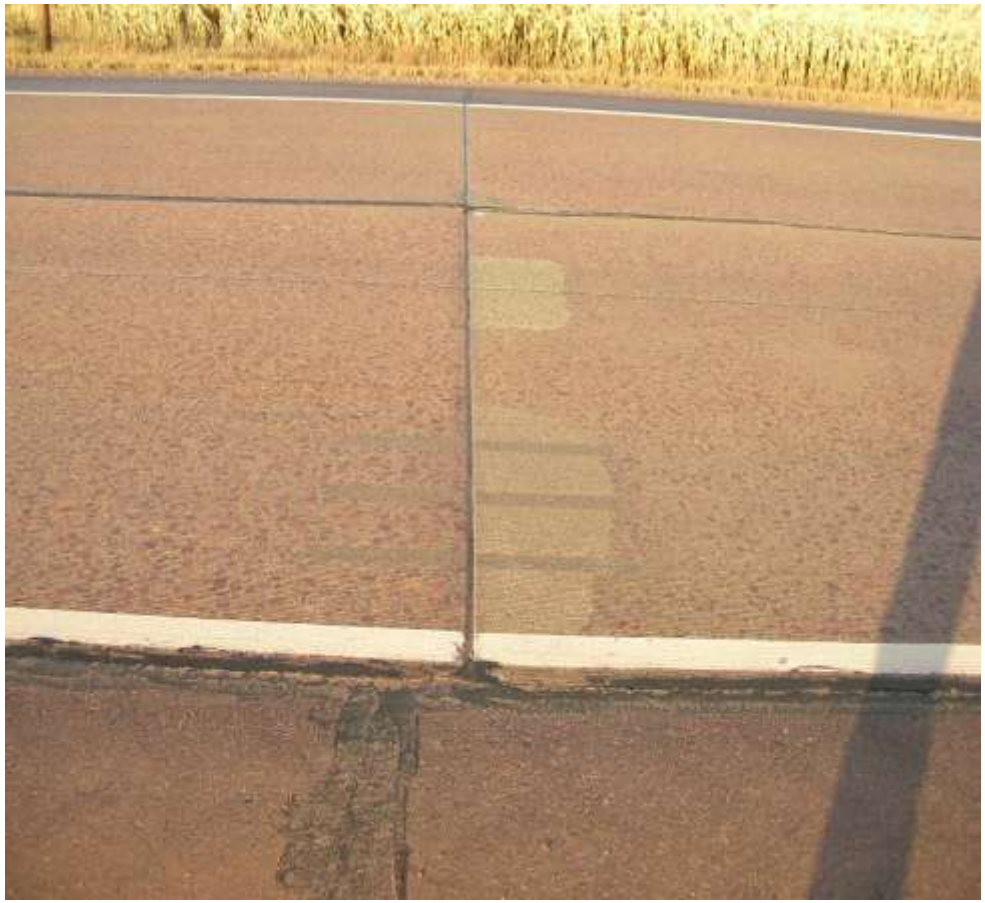
SHEET OF SHEETS

Catch Basin Needs Repair

Finished Catch Basin Repair

DOWEL BAR RETROFIT

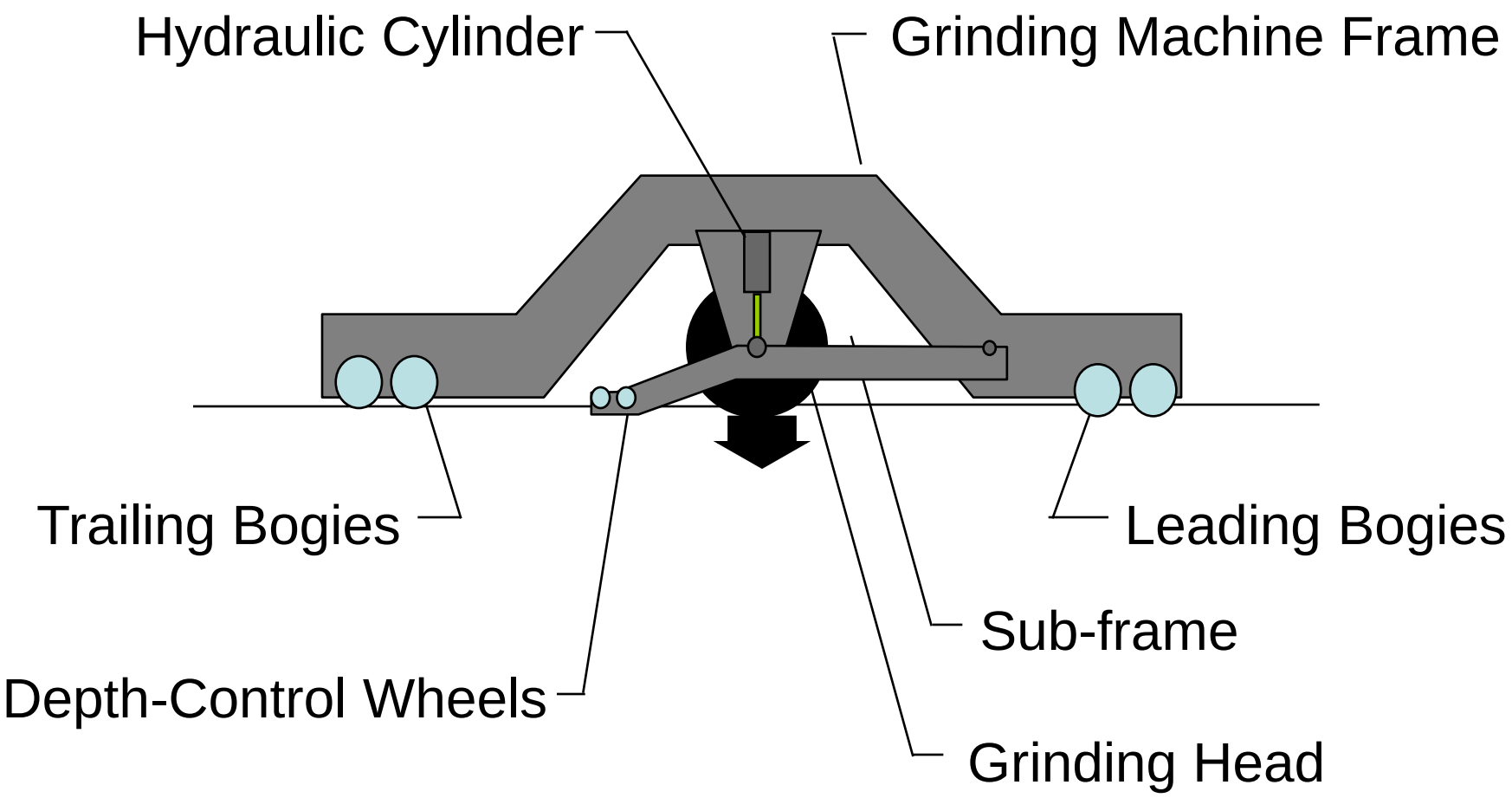
- Hwy 71 North of Windom, MN
- Built in 1962 with Quartzite Rock
- Partial Depth and Dowel Bar Retrofit, Diamond Grinding in 2007



Local Diamond Grinding

Chapter 10

Basic Components



Conventional Diamond Grinding

- Cuts a 10’ – 14’ Flat Surface
- From wheels behind the grinding head
- To the front wheels

Pavement Problems Addressed

- Faulting at joints and cracks
- Built-in or construction roughness
- Polished concrete surface
- Wheelpath rutting caused by studded tires
- Unacceptable tire impact noise levels
- Slab warping caused by moisture or curling
- Inadequate transverse slope

Diamond Grinding Removes Significant Curling

Diamond Grinding Removes Warping

- Curling

- Temperature

Cold

Hot

Moisture

Wet

Dry

Warping


STOP
NO
ONE HOUR PARKING

International Grooving and Grinding Association

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