ENERGY-SECTOR BRIEF

Maintenance Division, Roadway Asset Management

15-06 PAVEMENT STRENGTHENING

A variety of roadway maintenance repair techniques and materials are used by TxDOT Districts to extend pavement life. This brief documents techniques and materials most used by districts in South and West Texas for "Pavement Strengthening" of pavements damaged by traffic generated by the development of the energy sector of the Texas economy. Other Energy Sector Briefs available include the following:

- 14-03 Shoulder/Edge Repair Techniques
- 15-01 Maintenance Repair Techniques
- 15-02 Shallow Patching
- 15-03 Deep Patching
- 15-04 Level-Up Patching
- 15-05 Surface Treatment/ Seal Coat/Chip Seal

The maintenance methods summarized in these briefs represent current practices of the districts in these two regions of the state. As materials and equipment change, these methods will be altered. Feedback on performance of various maintenance treatments used in the energy sector will also result in change to these methods, materials and techniques. Report 409186-01 "Current TxDOT Practices for Repair of Road Damage Associated with Energy Development and Production" provides additional details for these routine maintenance operations. This report and related documents are available on the TxDOT Maintenance Division (MNT) SharePoint site at https://txdot.sharepoint.com/sites/division-mnt/SitePages/Home.aspx.

DESCRIPTION

- Improve the load carrying ability of a pavement by adding thickness to the pavement section and/or stabilizing existing materials by Full Depth Recycling (FDR)
- Pulverization, stabilization, addition of new material and the addition of an asphalt bound surface are common steps in the process

CONDITIONS FAVORING USE

- Use on pavements that exhibit considerable structural distress including fatigue cracking, rutting, pot holes, patches, pavement edge raveling
- Use when heavy truck traffic uses facility

PROCEDURE

- Several procedures are utilized
- Pulverize existing base and asphalt bound materials
- Spread pulverized materials to a provide a pavement of desired width
- Stabilize the pulverized materials with 2–4 percent portland cement, asphalt emulsion or foamed asphalt
- Compact the pulverized and stabilized material
- Add new flexible base material as needed
- Apply asphalt bound surface material (surface treatments or hot mix asphalt)
- Determine the depth of pavement repair based on the pavement design catalog available on the following link: https://txdot.sharepoint.com/sites/ division-mnt/SitePages/Home.aspx.

SCHEDULING

- Perform during warm or hot, dry weather to aid strength gain of the stabilized material
- Try to avoid performing during heavy traffic periods
- Open pavement to traffic at the end of every work day if possible

PERFORMANCE

- Pulverizing to quarter points on the pavement is practiced by some districts. Less than desirable performance has been noted with the use of this practice by several districts
- Proper thickness design, materials selection and construction practices will result in pavements with life expectancies of 8 to 12 years
- Bleeding of surface treatments is not uncommon. Surface treatment design methods should be used
- Premature pavement distress is expected if not structurally designed (thickness and type of pavement layers)

MATERIALS/EQUIPMENT/CREW SIZE/PRODUCTION

Typical materials, equipment, crew size and production as reported by some districts are shown below.

Pavement Strengthening Maintenance Crews-South Texas

Materials	Equipment	Crew Size	Production	Comments
2-CST course, HFRS-2 (0.30-0.35 gal/ sq. yd. in summer and 0.42 gal/sq. yd. in winter) with Grade 4 chip: 2nd course, HFRS-2 (0.29 gal/sq. yd. in summer and 0.34 gal/sq. yd. in winter) with Grade 4 aggregate			Quarter Point Repair-3,000 to 4,000 linear ft. per week	No longer use quarter point repairs
				May bleed in summer
FB-Type A, Grade 1 or 2				Use one or two course surface treatment on top of FB
2-CST, CRS-2/CRS-2P with Grade 4 over Grade 3 aggregate				Quarter repair 5,000 to 5,500 linear ft. per week

Pavement Strengthening Maintenance Crews-West Texas

Materials	Equipment	Crew Size	Production	Comments
Salvaged base, RAP, fly ash, new FB, CRS-1, CRS-2P, MC-250, MC-800, RC-250 with Grade 4 aggregate				No binder added to RAP, RAP placed in 12-inch lifts on some projects
Salvage base, new FB, 2-ST with CRS-2, CRS-2P, 0.45 to 0.50 insert gal./sq. yd. with Gr. 4 aggregate				FDR-CM with cement or fly ash, 2-ST
HM-CL	2 ft. milling machine on Bobcat			Quarter point level-up used by some districts Some districts do not use quarter point repairs
2-CST, new FB, FDR-CM with 4% cement	Pulverizer, maintainer	2-3 traffic control, 5 to 7 operations	1,000 ft. per day	Special jobs crew, relatively short sections, widen to 28 ft., strip 12 ft. lanes
Commercial Patching mixture			1 lane mile per day	Thin overlay only

CRS-Catatonic Rapid Set Emulsion

FB-Flexible Base (aggregate base)-Item 247

FDR-CM-Full Depth Recycling-Cement Modified

HFRS-High Float Rapid Set Emulsion

HM-CL-Hot Mix-Cold Laid-Item 334

MC-Medium Curing Cutback Asphalt

P-Polymer

RAP-Reclaimed Asphalt Pavement

RC-Rapid Curing Cutback Asphalt

ST-Surface Treatment (seal coat/chip seal)-Item 316

COMMENTS

- Traffic control plans should be developed for lane closures
- Some districts have pulverizer/mixer equipment
- Equipment sharing among districts may be necessary to perform project of quality
- Obtaining density in stabilized layers is difficult

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