Description: The flexible slurry system is a mixture of emulsified asphalt, high quality crushed aggregate, and water. Depending upon the design, flexible slurry can be used in place of a blade leveling course prior to bituminous overlay or as a wear course. Flexible slurry is constructed using a micro surfacing machine, but is less brittle than a usual micro surface mixture. Historically Minnesota has used one type of emulsified asphalt (PG 64-22); but recent experimentation with binder grades shows that enhanced rutting and cracking performance is possible. Low speed traffic can aid in the curing and consolidation of flexible slurries.

Traffic Range: As an overlay preparation course – Very Low to High (AADT < 200,000). As a wear course – not clearly defined.

Substrate requirements: Flexible slurry may be constructed over any existing pavement type. Flexible slurry does not add structural capacity to the roadway; the existing pavement structure must have adequate structural capacity to support the anticipated traffic loading.

Materials: ISSA type 2 gradation consisting of 100 percent crushed Class A aggregate. PGxx-34 latex modified emulsified asphalt. Portland cement is used as mineral filler. Normal micro surfacing applications normally have asphalt emulsion contents near 13.5 percent. Scratch course applications have material requirements near 15 to 20 lb/yd², depending on existing pavement conditions. When using flexible slurry as a scratch or “liquid tight blade” course, the emulsion content may be increased approximately three percent when composed of PG xx-34 asphalt binder. Rut fill and wear course material treatments are from 20 to 40 lb/yd², depending on existing conditions. When using flexible slurry for rut filling applications the emulsion content may be lowered approximately one percent when it is composed of a softer asphalt binder such as PGxx-34.

Equipment: Equipment required for Flexible Slurry construction includes: micro surfacing machine, asphalt distributor, chip spreader, pneumatic-tired roller, and mechanical broom. The micro machine should be appropriately configured with a screed or rut filling box.

Placement Process: When severely rutted conditions exist it is recommended that the appropriate flexible slurry is applied to each wheel path using a rut box with a V-shaped adjustable screed. Normal traffic may then be allowed to travel over the treatment for 24 hours to help consolidate the mixture. A wearing course application of flexible slurry may occur immediately following the consolidation period.
**Lane Closure Requirements**: The roadway lane being constructed is closed during construction, so adequate traffic control is needed. A flexible slurry surface can be opened to light traffic to enhance the breaking process of the emulsified binder as soon as it is placed.

**Reliability and Performance History**: Micro surfacing is the parent technology to flexible slurry, and was developed in Europe in the late 1960’s as a method to preserve pavement markings and perform maintenance treatments in non-marked areas such as wheel paths.

**Life Expectancy**: Life expectancy varies depending on construction materials used, environmental conditions, and traffic volumes.

**Ride Quality**: Short term ride improvement has been measured for flexibly slurry treatments at the MnROAD research facility. Results show that 30 percent improvement was attained on normally rutted sections and over 50 percent improvement on severely rutted sections. Ride quality deteriorates over the serviceable life.

**Ability to Recycle/Reuse**: Flexible slurry applications can be milled along with the bituminous pavement substrate or overlay and reused recycled asphalt pavement material.

**Appearance**: Flexible slurry treatments appear black in color, similar to an asphalt seal coat treatment.

**Supply+Install Price**: Cost is generally calculated by weight of rock and gallon of asphalt emulsion.

**EXAMPLE PROJECTS**

- Overlay preparation on McLeod County State Aid Road 15, north of Glencoe, MN.
- Maintenance surface treatment on MnROAD Low Volume Road, near Albertville, MN.

**SELECT RESOURCES**


NEED MORE INFORMATION ON FLEXIBLE SLURRY SEAL OR THE MINNESOTA ROAD RESEARCH PROJECT (MN/ROAD)?

Contact: Minnesota Department of Transportation

OFFICE OF MATERIALS & ROAD RESEARCH
1400 GERVAIS AVE. MS 645
MAPLEWOOD, MN  55109

ROGER OLSON  (651)366-5517
ED JOHNSON  (651)366-5465

Mn/ROAD
Office of Materials
1400 Gervais Avenue
Maplewood, MN 55109

http://mnroad.dot.state.mn.us