



**Introduction to Microsurfacing with fibers for
Maintenance of Highways/Major Bridges /Flyovers/ Runways/
Concrete Roads**

About Us

Markolines was founded in 2002. We started out as a road marking company. Over the years, we have transformed this single product company into a leading Highway O&M service provider.

Today, we have a complete gamut of products under four verticals. We have established a well-equipped Technology Centre that steers the Company's goal of enhancing the on-ground performance of the technology.

We place our customer at the heart of everything we do and in all our projects, we adopt a customer-focused approach, committed to delivering a service that directly addresses the needs of our clients and the society we work in.

Our Offerings

Highway Operations	Highway Maintenance	Specialised Maintenance Services
<ul style="list-style-type: none">•Toll Operations•Route Patrolling•Incident Mgmt	<ul style="list-style-type: none">•Routine Maintenance•Preventive Maintenance•Major Maintenance & Repairs	<ul style="list-style-type: none">•Microsurfacing•Base and Subbase Stabilization•CIPR & CCPR•Full Depth Reclamation (FDR)•Rehabilitation with Glass Grid.•Hot in Plant RAP

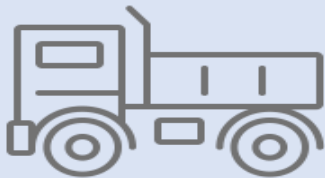
OUR EXPERTISE IN MICROSURFACING



Executed more than 7.5 million SQMs (equivalent to 2150 lane Kms) of Microsurfacing



Technology Centre for pavement preservation solutions



Ownership of Microsurfacing pavers



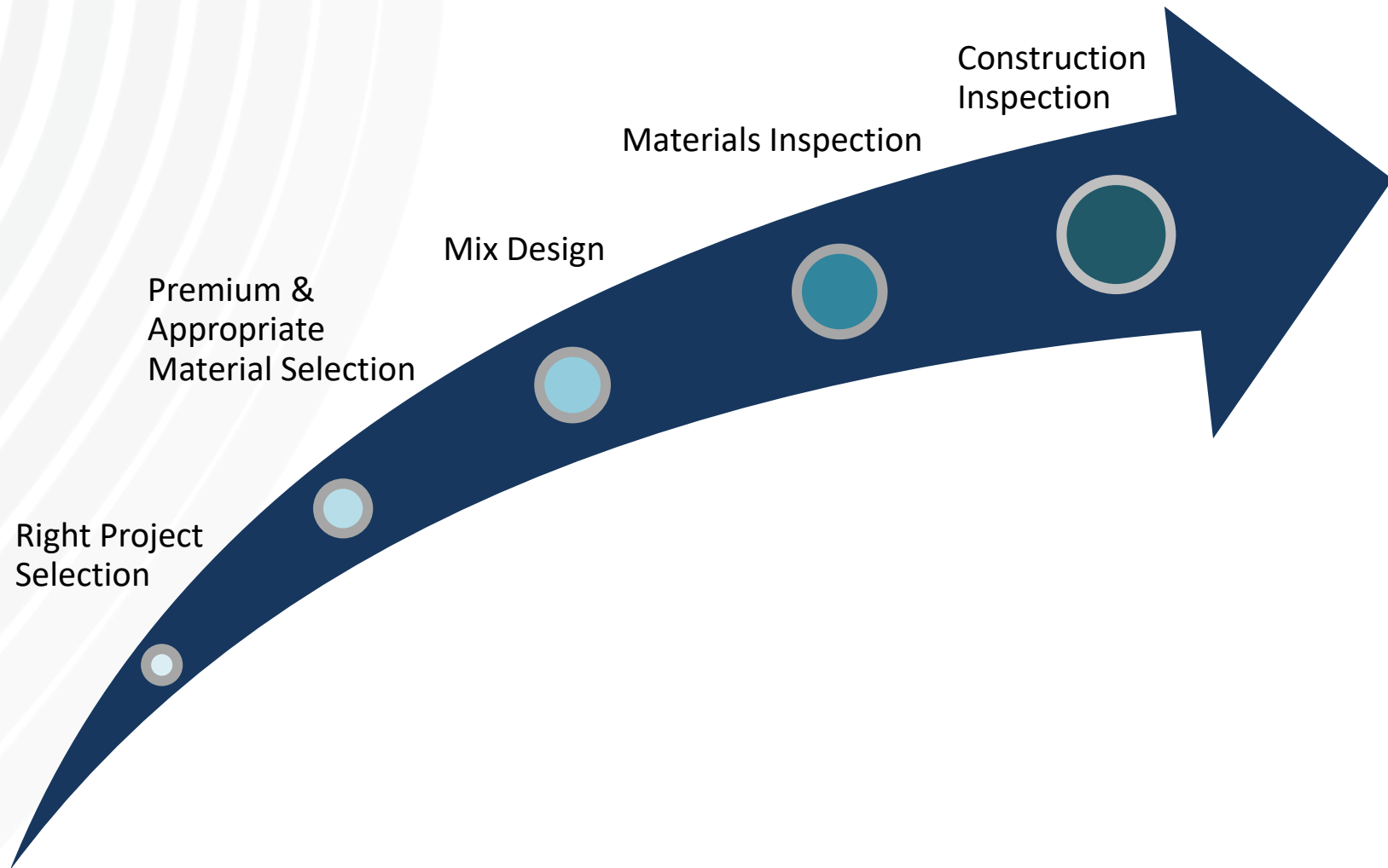
Tie-up with international organizations such as Bergkamp, Ingevity and Owens Corning for technical back-up



Experienced & Well Trained Execution Team

Quality of finished Microsurfacing project greatly depends on the quality of Emulsion and Aggregates..

WHY US



INTRODUCTION TO MICROSURFACING- ROADS PRESERVATION TREATMENT

PROCESS

It is an eco-friendly laboratory designed mixture of Polymer modified emulsion, aggregates, mineral filler, water and other additives accurately proportioned, mixed and uniformly spread over a properly prepared surface

TYPES

Available as Type II (4 to 6 mm thick) and Type III (6 to 8 mm thick).

USES

Can be used both for Preventive Maintenance (to prevent surface distresses on good pavement) and Corrective Maintenance (to correct surface distresses like rutting on older pavement)

APPROVALS

- IRC: SP: 81-2008 : Tentative Specifications for Slurry Seal & Microsurfacing.
- Ministry of Road Transport & Highways (MoRTH – Fifth Edition (2013), Clause – 514)
- IRC:SP:100-2014 : Use of Cold Mix Technology in Construction of Road & Maintenance by Emulsions.
- MoRTH letter dated 28th Sep. 2016 mandating use of Micro Surfacing for renewal course , maintenance and repair on National Highways

MICRO SURFACING COMPONENTS



HISTORY

1960's

Developed in Germany in 1970's for Rut filling of Autobahns

1980's

Introduced at International Slurry Surfacing Assn. - ISSA in U.S. by Dr. Raschig as Ralumac system and is now extensively being used worldwide

2000's

Introduced in India in 2000, acceptance was limited as necessary guidelines for Microsurfacing was approved in 2008 vide IRC:SP:81 and final specifications vide SP:100:2014.

MICROSURFACING MIX DESIGN

Particulars	Type II 4 – 6 mm	Type III 6 – 8 mm
Premium Quality Aggregate	8.4 to 10.8 kg per sqm.	11.1 to 16.3 kg per sqm.
Binder (Polymer Modified Emulsion)	13 – 15% by weight of aggregate	10 – 15% by weight of aggregate
Additive	Up to 2% by wt of aggregate	Up to 2% by wt of aggregate
Cement/Filler	0.5 – 2.0% by weight of aggregate	0.5 – 2.0% by weight of aggregate
Water	13 – 15% by weight of aggregate	10-15 % by weight of aggregate

ADVANTAGES

- ✓ Quick Application with minimum traffic hold up and traffic opening in max 2 hrs, causes minimum traffic disruption. Night placement is possible.
- ✓ Cost effective as compared to Hot-Mix (BC) and extends life span of the road.
- ✓ Rectifies surface defects and Ruts including minor cracks, hungry surface due to ageing & surface Oxidation.
- ✓ Environment friendly - Nonpolluting for environment since no heating or hot paving required
- ✓ Restores surface structure, slows the age hardening in the original road surface.
- ✓ Microsurfacing can also be done on concrete pavement to improve the riding quality. It reduces Tyre burst of Cars and ensure smother ride with less noise.
- ✓ Seals the surface and prevents ingress of water as it is a dense bitumen rich mix having polymer bitumen from 6.8% to 7.5%.
- ✓ Does not increase pavement height significantly (Road furniture, drainage is not disturbed). Saving of Natural resources.

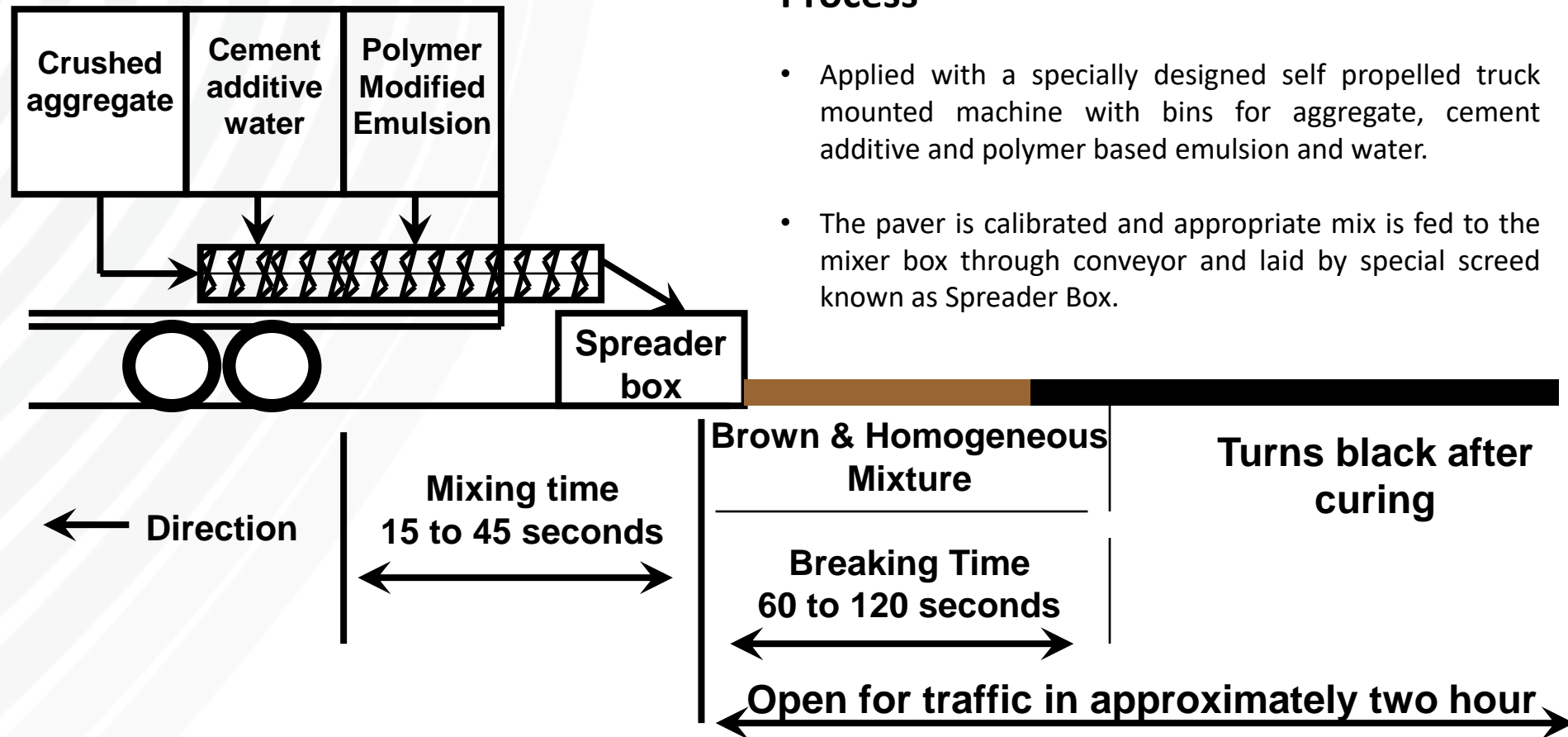
APPLICATION METHODOLOGY

Prerequisite:

- Clean surface to ensure its free of dust and soil etc.
- Fill pot holes, cracks and Ruts.

Process

- Applied with a specially designed self propelled truck mounted machine with bins for aggregate, cement additive and polymer based emulsion and water.
- The paver is calibrated and appropriate mix is fed to the mixer box through conveyor and laid by special screed known as Spreader Box.



INNOVATIONS IN MICRO SURFACING

- ❖ **Highly Modified Micro surfacing** - Protects road in Demanding situations and gives High pavement life - Very Heavy Traffic, extreme temperatures
 - 4.5 %+ Polymer Loadings
 - Often with Polymer Modified Bitumen
- ❖ **Fiberized Micro surfacing**
 - 2% Pre-cut special grade Fiberglass is added with special equipment to the mix. The fibers form a mesh to provide longer life, resistance to raveling , increase flexibility and delay reflective cracking.

Photo of Attachment - for Adding Slurry Fil Glass Fiber



Slurry Fil fibers being added on Aggregate belt prior to discharge in Mixer box.



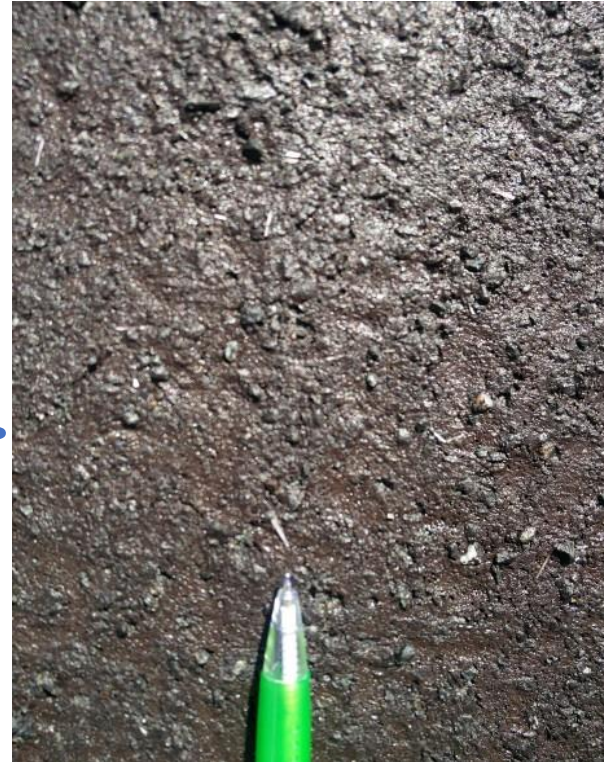
MICRO SURFACING WITH FIBRES



BEFORE



AFTER



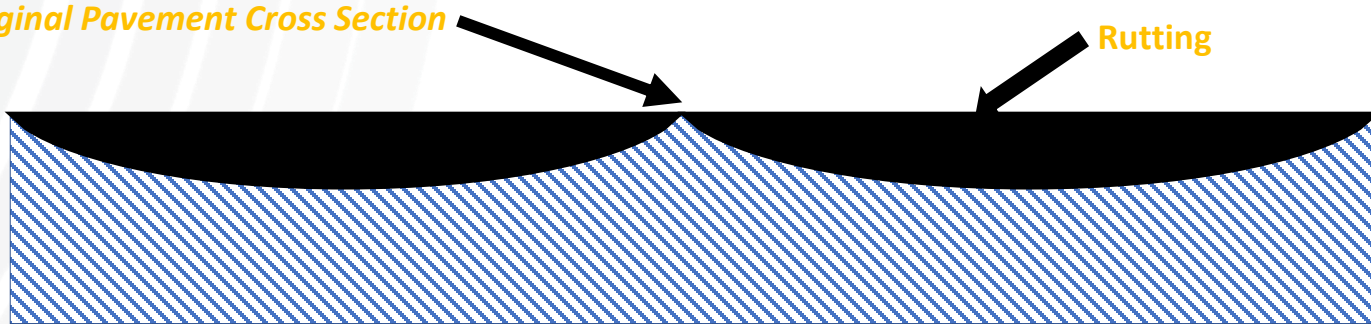
MULTI-LAYER SYSTEMS

- Can be laid in Double or multiple lifts.
- Combination Treatments
 - ✓ Cape Seals
 - Micro surfacing provided over Chip Seal/ Surface dressing
 - ✓ Triple Seals
 - Micro surfacing used as Rut Course followed by
 - Chip Seal followed by
 - Micro surface course
 - ✓ Micro surfacing Leveling/ PCC Course w/HMA Overlay
 - ✓ Fog Seal over Micro Surfacing
 - ✓ Micro surfacing can be done on pre mix carpet without seal coat and on DBM thereby eliminating costly BC treatment
 - ✓ On Cement concrete road Micro-surfacing is done in two layers as recommended in IRC SP: 100

REPROFILING RUTTED WHEELPATHS WITH MICROSURFACING

For each inch of applied micro surface mix add 1/8" to 1/4" crown to each rut fill to compensate for return traffic compaction

Original Pavement Cross Section



RUTS 1/2 " & OVER MUST USE THE RUT BOX



Rut Box

POST - APPLICATION



**Project - Mahua-Jaipur Section Of NH-21 (Earlier NH-11) from Km 120.012 to 174.741 (MS-1)
in the State of Rajasthan**

Photo Gallery



Right Materials , Machinery and Manpower are crucial factor in determining the success of Microsurfacing

Photo Gallery



Micro surfacing is a versatile product that has many uses beyond surface sealing of roadways.



First project in India, where highly modified Micro surfacing with fibres was executed on an active runway at Ahmedabad Airport Sep 2018 of AAI.



Markolines Pavement Technologies Limited

A Wing, 6th Floor, Shree Nand Dham,
Sector 11, CBD Belapur, Navi Mumbai - 400 614.
Maharashtra, INDIA
EMAIL: info@markolines.com
Phone: +91 22 6266 1111

Contact Person Details

Dr. J B Singh

Director

jb.singh@markolines.com

+91-9820808707

Mr. S.P. Nagarkar

Director -Technical

sp.nagarkar@markolines.com

+91-7710002487