RAD International
Road Construction

Sustainable Solutions For Road Maintenance, Recycling & Stabilization

Greener Roads To A Greener Future

Serving The Society,
Paving The Way For a Better Future
For Generations To Come.

In this new era of technology and information, finding solutions for more sustainable growth is the highest goal of any company that seeks continuous improvement in its products and services. As proven under the visionary leadership of the rulers of the UAE, the great successes achieved within a short span of time also become an excellent example to be followed by companies operating out of this great country.

At RAD international, we are thankful to be a small part of this progress. The highest standards of governance and service have been laid by leaders of the UAE and we believe that we have achieved and succeeded in our endeavors because we set our goals high and followed the examples set by these great visionaries.

In our quest to find solutions to be more responsible and to be able to contribute back in some form to this magnificent country, we have identified that our next key area of focus will be "Green Sustainability."

Our environment and our recourses have been stretched too much and too far. In order to minimize the effect of our activities on the environment, we invested heavily in adoption of new technologies. We also gained the technical expertise to be able to apply all sustainable technologies.

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The Essential Benefits of Introducing Sustainability

- Reduced emissions and other air pollutants
- Reduced water usage
- Reduced energy consumption
- Reduced use of virgin material in construction and increased use of recycled materials
- Reduced construction and operational impact on the environment
- Creating low impact development
- Creating safer and more integrated roadways
- Promotion of sustainable transport
- Enhanced community awareness of sustainability
- Enhanced community involvement
- Promotion of innovative solutions
- Save money
- Improve safety
- Reduce delays
- Help pavement last longer
- Improve the performance of the entire road network

AREAS of USE

Recycling / Rehabilitation

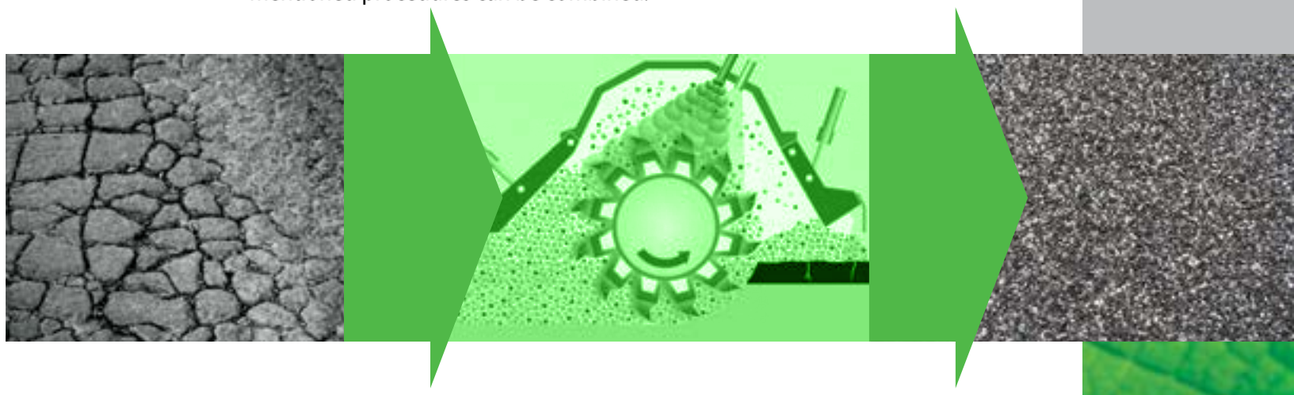
Full Depth Reclamation (FDR) / Cold in Place Recycling

It's a rehabilitation technique in which the full flexible pavement section and a predetermined portion of the underlying materials are uniformly crushed, pulverized and compacted resulting in a stabilized base layer.

In short it reduces the demand for virgin material, energy used and pollution generated as compare to the traditional method. In addition, recycling is the only way to utilize minimum virgin materials and reduce the energy consumption during the construction phase in accordance to LEED system adopted by UAE. LEED is a new system to evaluate the degree of "green" design a structure or development incorporates.
The process is generally broken down into four primary disciplines:

- **Pulverization**
  This discipline of FDR involves Pulverization of the In-situ old pavement layers and blending of the predetermined underlying material
- **Mechanical**
  This discipline of FDR involves addition of imported granular material to improve the grading thus increasing structural integrity, during the Pulverization process
- **Chemical**
  This discipline of FDR involves addition of chemical (cement etc.) to gain strength, during the Pulverization process
- **Foam Bitumen**
  This discipline of FDR involves addition of Bitumen in the shape of foam to gain stability & durability, during the Pulverization process

Note: Depending upon the site condition & design, all or some of the above mentioned procedures can be combined.



Distressed asphalt pavement reclaimed and mixed with additives.

Resulting in a perfect recycled new base pavement.







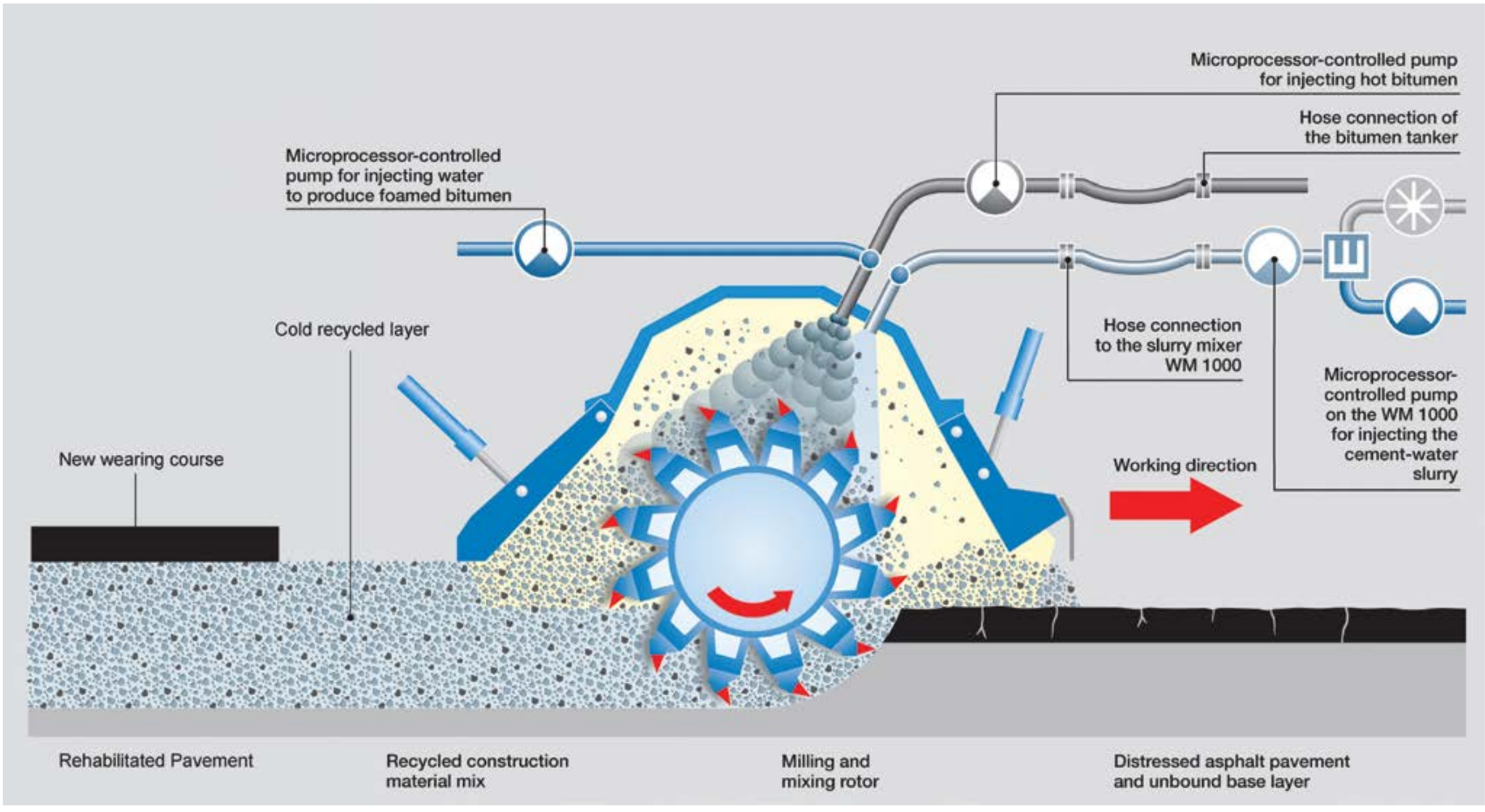
The Machinery

Cold recycler WR 2500 S grinds up the weathered, deteriorated asphalt pavement in-place and incorporate additives into the mix inside the machine "on the fly", eliminating endless truck trips, fugitive dust and the disruption of road demolition and construction.

As the machine moves forward with the drum rotating, water from a tanker coupled to the recycler is delivered through a flexible hose and is sprayed into the recycler's mixing chamber. The rate of delivery is metered accurately through a micro processor controlled pumping system and the rotating drum mixes the water thoroughly with the recycled material to achieve the moisture content necessary for achieving high levels of compaction. Fluid stabilizing agents like cement/water slurry or bitumen emulsion, either individually or in combination, can also be introduced directly into the mixing chamber in a similar manner. In addition, foamed bitumen may be injected into the mixing chamber through a separate specially designed spray bar. Powdered stabilizing agents, such as hydrated lime, are normally spread on the surface of the existing road ahead of the recycler. The recycler passes over the powder, mixing it together with the recovered material and injected water, all in a single operation.

Slurry injection. The WM 1000 is specially designed to premix cement with water needed to reach the optimum compaction moisture content (OCMC). The slurry suspension thus formed needs to be sufficiently liquid to be pumped to the recycling machine and injected into the mixing chamber through a spraybar. The water: cement ratio is usually in the region of 1:1, but most recycling applications call for more water than cement to achieve the optimum compaction moisture content.

Full Depth Reclamation / Cold in place Recycling Process in A Closer Look



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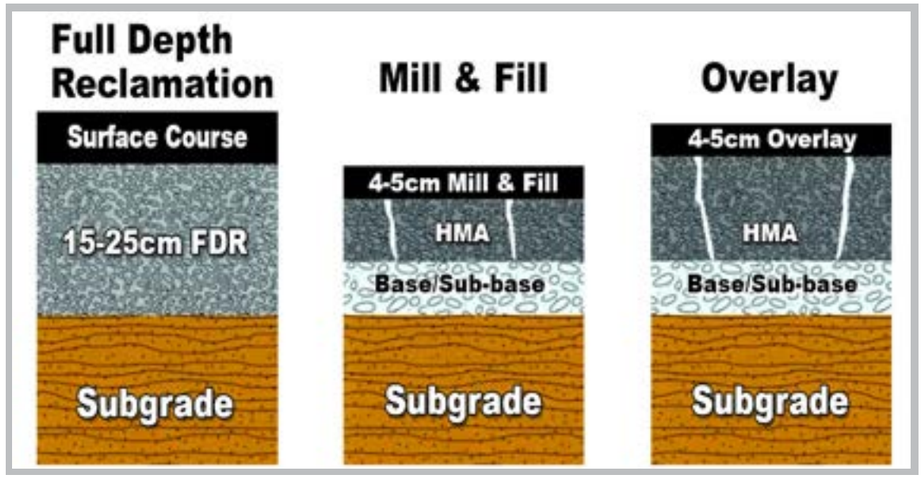
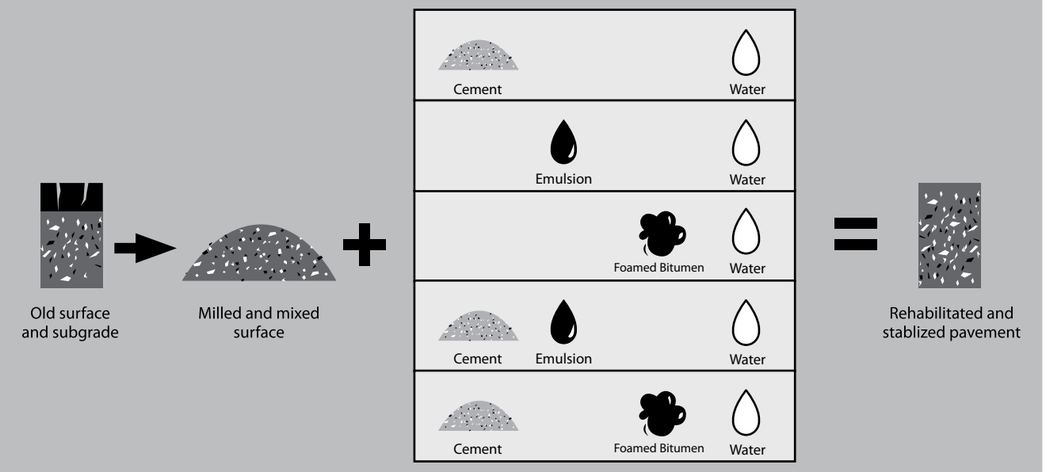
Full Depth Reclamation / Cold in place Recycling Process in A Closer Look

As shown in this graphic, Full Depth Reclamation is the only rehabilitation technique that completely eliminates an existing crack pattern, therefore significantly lowering the pavement's future **preventative/corrective maintenance costs**.

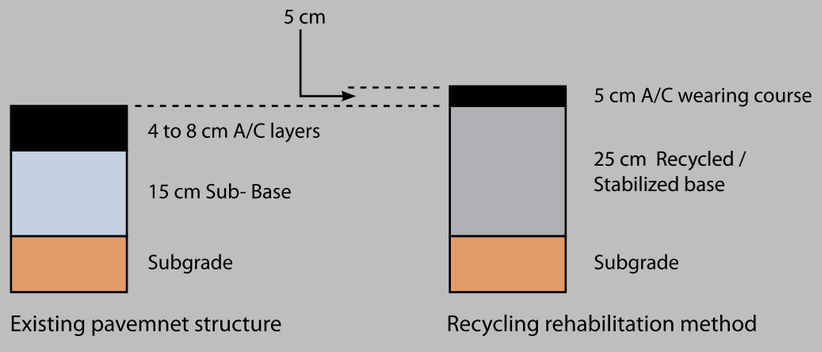
This fact, when considered in the **life cycle cost** analysis of a pavement, is why Full Depth Reclamation is the most **cost-effective** road rehabilitation technique available.



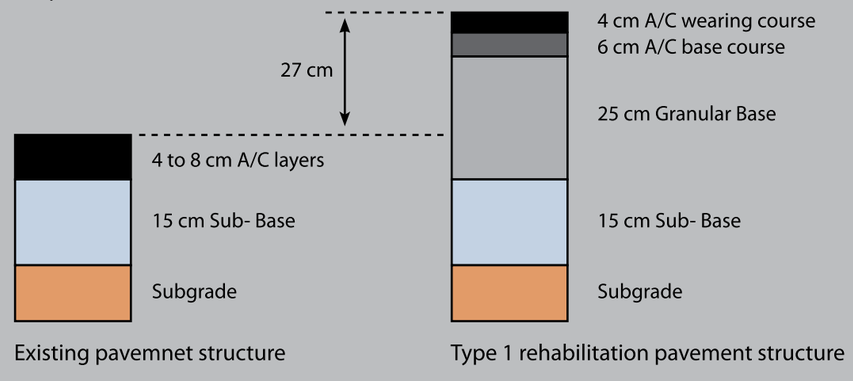
Different combinations of stabilizing agents in Full Depth Reclamation/ Recycling



Full Depth Reclamation / Recycling Pavement rehabilitation



Traditional pavement rehabilitation



Recycling trains may be configured differently, depending upon the recycling application and the type of stabilizing agent that is used. In each case the recycling machine acts as the locomotive, and either pushes or pulls the equipment that is coupled to it, by means of push bars or drawbars.

The recycling train shown, is used when the recycled material is stabilized with slurry cement. The required application rate of both cement & water is accurately metered prior to being mixed together to form a slurry that is then pumped to the recycler via a flexible hose and injected into the milling chamber. Alternatively, the cement may be spread on the existing road surface as a powder ahead of the recycler and a water tanker substituted for the slurry mixer.

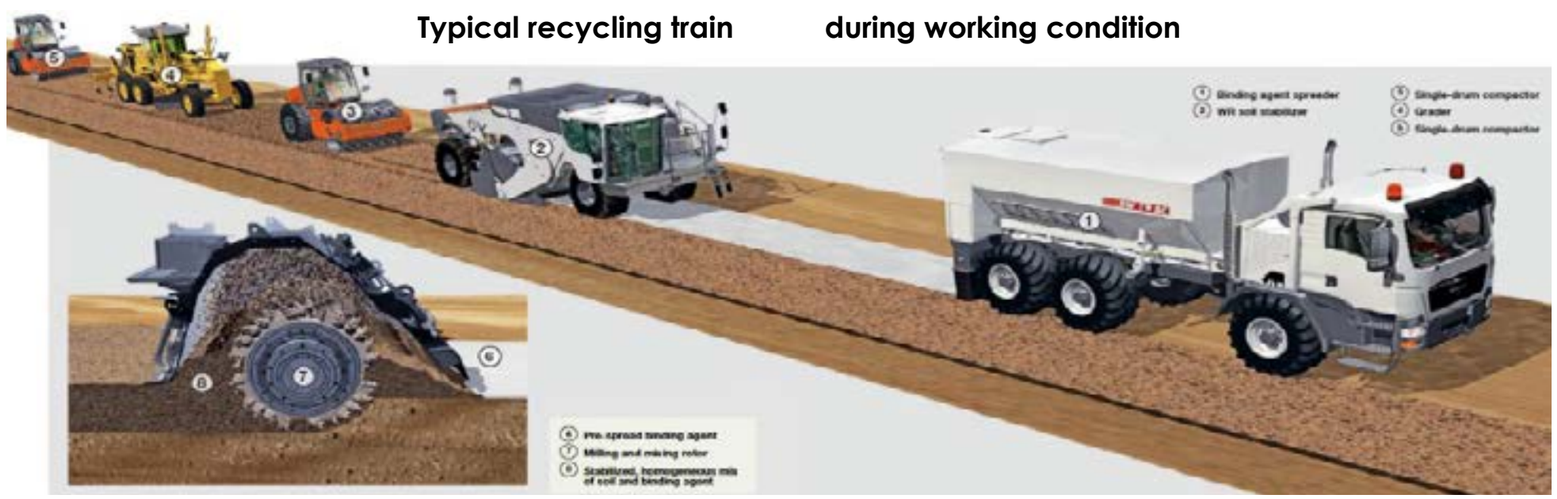
Sand and Soil Stabilization

Soil Stabilization is the long-term physical and chemical alteration of soils to enhance their physical and engineering properties.

Dune Sand and Soil Stabilization using Cement, Chemical and Hydraulic Binders.

Transportation of materials from long distances to the job sites especially in the areas with poor availability of the suitable material will impose huge over-head to the overall cost. Adopting innovative and green technologies enables us to overcome this problem. Stabilization as general term is referring to a process in which additives like cement, bitumen emulsion, foamed –bitumen and their combinations is added to the poor quality material in order to improve their quality. Sand could be mixed with cement to obtain higher CBR values.

Typical recycling train during working condition

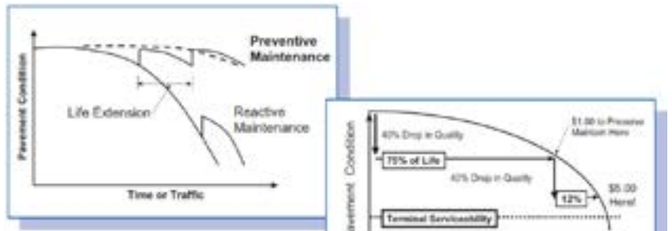


Maintenance

Preventive / Corrective Maintenance

When the dentist fills a tooth, that's a corrective maintenance technique. When the dental hygienist cleans your teeth, that's a preventive maintenance technique. Regular visits to the dentist combined with a "conscientious program of oral hygiene" - that is a preventive maintenance program.

A. The Right Pavement
B. The Right Time
C. The Right Treatment



Crack Sealing

Sealing Cracks in a timely manner is one of the most effective ways to maintain the quality of pavement

- Prevents moisture and debris from getting into cracks
- Prevents water damage to the pavements structure

Chip Sealing

A Uniform application of asphalt emulsion to a prepared pavement surface followed by a rolled aggregate cover. Can postpone the need for heavier surface treatment or resurfacing for 2 to 4 years.

- Improves surface friction
- Slows surface raveling and oxidation
- Corrects minor deformations and seals small cracks
- Service life 5-7 years

Micro Surfacing

The application of a cold mix aggregates, asphalt emulsion, water and mineral fillers

- Improves Surface Friction
- Slows surface raveling and seals small cracks
- Improves ride quality and corrects surface irregularities
- Service life 5-7 years

People are prepared to spend money to maintain their cars,
Why wouldn't they be equally prepared to spend money to maintain their roads.?

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www.rad.ae

P.O.Box: 49823, Dubai, United Arab Emirates
Tel: 04 4541491, Fax: 04 4541492
Email: info@rad.ae