Asphalt Applications

Market & product portfolio

New Roads
- Aggregates
- Asphalt
- Prime Coat Emulsion
- Anti Stripping
- Tack Coat Emulsion

Maintenance
- Asphalt layer
- Tack Coat
- MS/ Slurry Seal

Emulsions
- Redicote emulsifiers
- Viscosity Modifier

Hot Mix
- Wetfix Adhesion Promoters

Warm Mix
- Rediset warm-mix additives and compaction Aids
Asphalt Applications

AkzoNobel Adhesion Promoter Technology:

WETFIX® series of Products,

e.g. WETFIX® BE

Advantages of using WETFIX® BE:

- Safety
- Wider aggregate selection
- Prolongs lifetime of pavement
Asphalt Applications

Passive Adhesion Loss
Philippines Field Trial (2014)

Newly paved in Jan-2014:

With 0.30% WETFIX® BE
(Left Lane)

Without WETFIX® BE
(Right Lane)
Philippines Field Trial (2014)

8 months later in Sep-2014:

With 0.30% WETFIX® BE (Left Lane)

Without WETFIX® BE (Right Lane)
Aggregate Types

Silica Content of Road Aggregates

- Marble
- Limestone
- Basalt
- Diorite
- Sandstone
- Granite
- Quartzite

Silica Content %
Active Adhesion Demonstration
Asphalt Applications

Passive Adhesion

Static Immersion Test
Asphalt Applications

Static Immersion Test

Binder Only

0.4% Wetfix BE

0.2% Wetfix BE

0.6% Wetfix BE
Asphalt Applications

Chemical Structure of WETFIX® BE

Bitumen

Amine Group

Hydrophobic

Hydrophilic

OH

Si

Aggregate
Asphalt Applications

NH₃ + OH⁻ → NH₄⁺ + H₂O

Hydrophobic

Aggregate

Si

Hydrophilic

Aggregate

Si

Bitumen

Bitumen
Application of WETFIX® BE in 
Malaysia
Asphalt Applications

Malaysia recognizes the need for Anti-Stripping agents.

Any substitute must be equivalent to Wetfix N422.
Asphalt Applications

Recent Malaysia project involving WETFIX® BE:

- Kuala Lumpur International Airport Terminal 2 (KLIA-2) runway/taxiway (2013)
- (Undertaken by Swee Construction, with a 0.30% dosage for WETFIX® BE)
Malaysia Field Trial (2006)

Condition Before Trial (5-July-2006)
The Culprits?

- Heavy Trucks
- Rains

These factors, including others, make the roads very vulnerable to Water Damage, and hence Stripping.
Malaysia Field Trial (2006)
Newly Paved – Without WETFIX® BE (5-Jul-2006)
Malaysia Field Trial (2006)

3 months later – Without WETFIX® BE (28-Oct-2006)
Asphalt Applications

Malaysia Field Trial (2006)

3 months later – With 0.30% WETFIX® BE (28-Oct-2006)
Asphalt Applications

Without WETFIX® BE

Malaysia Field Trial (2006)
Asphalt Applications

With 0.30% WETFIX® BE

Malaysia Field Trial (2006)
Application of WETFIX® BE in Indonesia
Indonesia recognizes the need for Anti-Stripping agents.

Nowadays, in some projects especially around the Jakarta regions, it is a **MUST** to use Anti-Stripping Agents. AkzoNobel's **WETFIX® BE** was the first Anti-Stripping agent to be approved and adopted by the country.

*Document from Department of Public Works, Indonesia,* stating that all Anti-Stripping Agents must first be approved by the government.
Application of WETFIX® BE in Vietnam
Asphalt Applications

AkzoNobel and EDSTACHEM have been working closely with the relevant Vietnam authorities such as the Institute of Transport Science and Technology Road Laboratory (ITST) on the implementation of WETFIX® BE since 2008.

In a report released by ITST in 2008, the conclusion is as follows:

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5. Conclusion and Recommendation:

Based on the test result which is collected in Table 1, Table 3, Table 5 and all comments from Section 4.2 and Section 4.3, we can conclude as below:

- Anti-stripping agent Wefix-BE provided by Akzo Nobel reflect many benefits when produce Bitumen Concrete with aggregate and bitumen is taken from mixing plant of Construction Joint Stock Company No.6 (JSCON06) at Long Dien – Chau Thanh Tien Giang. Specific at below:
  - Improve Coating Criteria 1 level (from level 3 to level 4)
  - Marshall durability and stability achieve significant improve.
  - Indirect Tensile Strength attain the best improvement, especially with “Bitumen concrete with everage grading”.
- Although Wefix-BE additive make the Penetration come over the limit, Softening Point reduce, but provide many benefits in Bitumen Concrete, improve many technical index of Hot Mix compare with only use bitumen ICT 60/70.
Vietnam Field Trial (2014)
Vietnam Field Trial (2014)
Asphalt Applications

Other Case References

1. Europe
   - Sweden, Denmark, Norway – In Hot Mix specification
   - Other European countries – common practices

2. USA
   - Common practices in Hotmix, Thin Overlays etc

3. Australia/New Zealand
   - Common practices in Chip Seal application
4. China
- TianJin天津市廊坊, GuangZhou 广州佛山, Hebei 河北省沧州 – Recycling
- XinJiang 新疆 - >100mt Wetfix BE – Hot Mix
- Inner Monggolia 内蒙古哈大支线 - acidic aggregates, Hot Mix
- Guangzhou – SMA, acidic aggregates
- Beijing water dam project – water proofing bitumen

5. Other Countries
- Japan - in PMA, & in Porous Asphalt
- South Korea – in PMA, & in SMA
## Cost of adding Wetfix®BE

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dosage of Wetfix®BE</td>
<td>0.30% (by weight of Bitumen in Hotmix)</td>
</tr>
<tr>
<td>Assuming Bitumen %</td>
<td>5.0% of Total Hotmix</td>
</tr>
<tr>
<td>In 1 ton of Hotmix</td>
<td>150gm of Wetfix®BE</td>
</tr>
<tr>
<td>Cost of Hotmix</td>
<td>4000 peso/ton</td>
</tr>
<tr>
<td>Cost of Wetfix®BE</td>
<td>260 peso/kg</td>
</tr>
<tr>
<td></td>
<td>39 peso/150gm</td>
</tr>
<tr>
<td>% Cost of adding Wetfix®BE</td>
<td>(39/4000) x 100%</td>
</tr>
<tr>
<td></td>
<td>~1%</td>
</tr>
</tbody>
</table>
Asphalt Applications

How to add Wetfix®BE into Hotmix Plants