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LATEST FLEXIBLE PAVEMENT TECHNOLOGIES

- **WORLD WIDE TREND**
 - More rehabilitation of existing pavements
 - Less new construction
- **MODIFIED BINDERS**
 - Asphalts
 - Surface Seals
- **COLD RECYCLING (In place & in plant)**
- **HOT MIX ASPHALT RECYCLING**
- **WARM MIX ASPHALT (WMA)**

MODIFIED BINDERS

- Non-Homogeneous : Rubber-Crumb
 - Homogeneous : SBR, SBS & EVA
 - Latex : SBR polymer in emulsion form
- ✓ Increases viscosity and hence ability to tolerate deformation.
 - ✓ Improves adhesion & resists raveling
 - ✓ Large difference between modifiers

Reference material:- TG1 “Modified Binders in Road Construction” Asphalt Academy

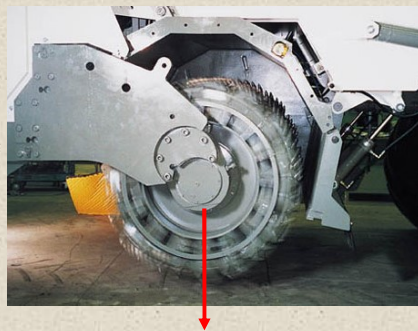
Modern specialized recyclers



The milling drum



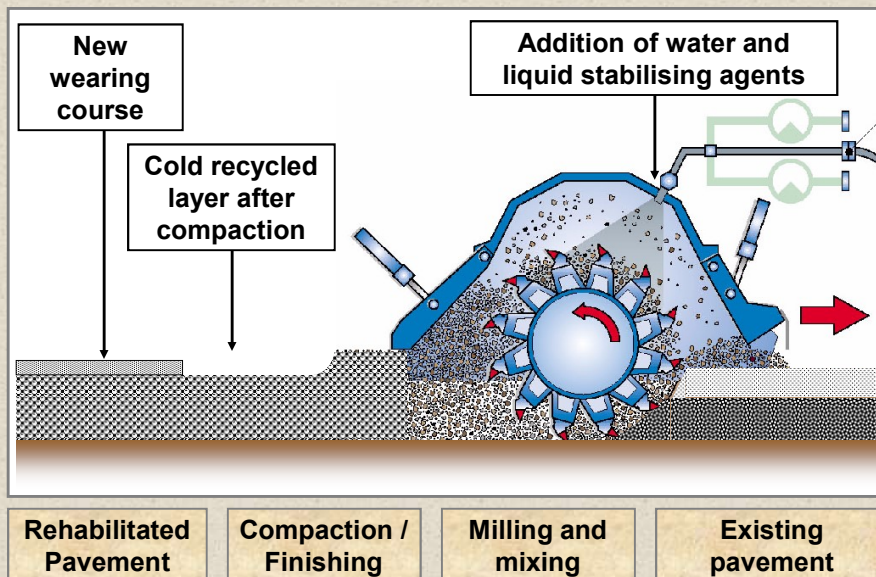
The milling drum is lowered, milling the material in the old pavement



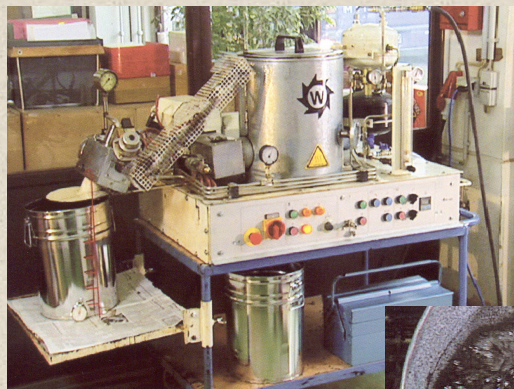
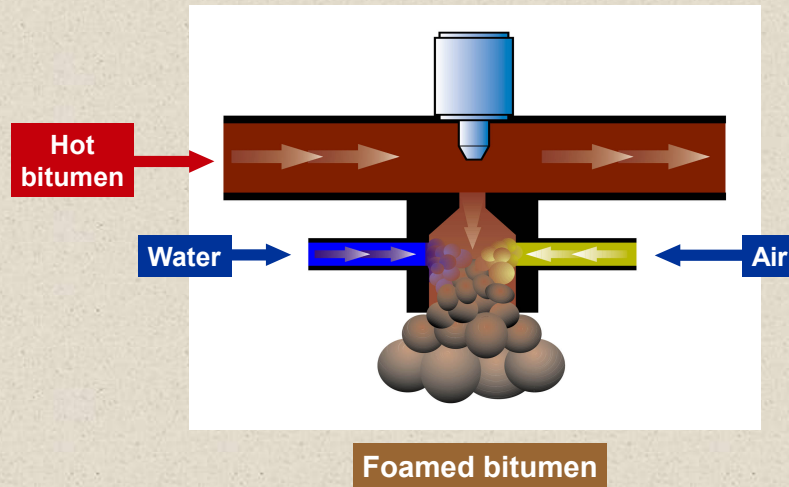
The recycler is capable of milling into tough pavements with thick layers of asphalt



The recycling process using a modern recycler

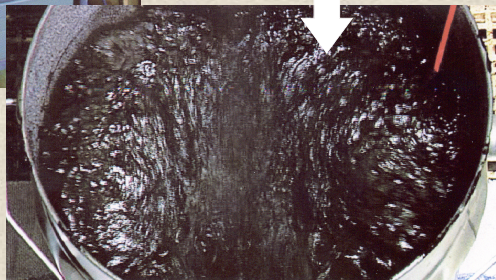


Principles of foamed bitumen

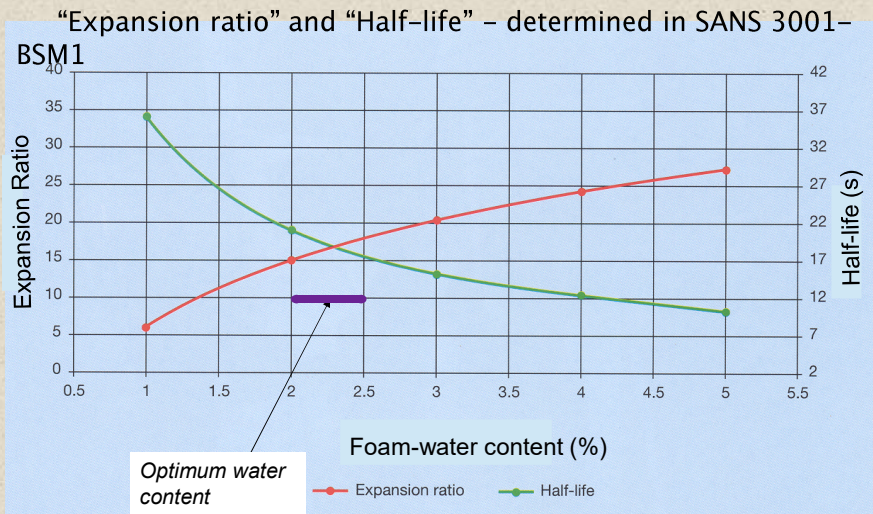


**LABORATORY MIX
DESIGN: SANS
3001-BSM1**

*Measure expansion
ratio and half life of
the foamed bitumen*



Foamed bitumen characteristics



CIPR (Cold in place Recycling)

• ADVANTAGES

Excellent uniform mixing

Good depth control

Shorter construction time

Less reliant on weather conditions

Reduces traffic disruption

• DISADVANTAGES

Densities on lifts > 200 mm

Fixed width (most large machines 2,5 m)

No transverse or longitudinal mixing

Cost – need to optimise utilisation

ASPHALT RECYCLING



Milling distressed pavement

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Refer to TRH 21 2009 Hot Asphalt Recycling

Cold in plant recycling



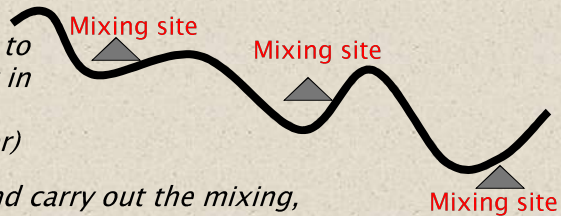
Cold in Plant Recycling



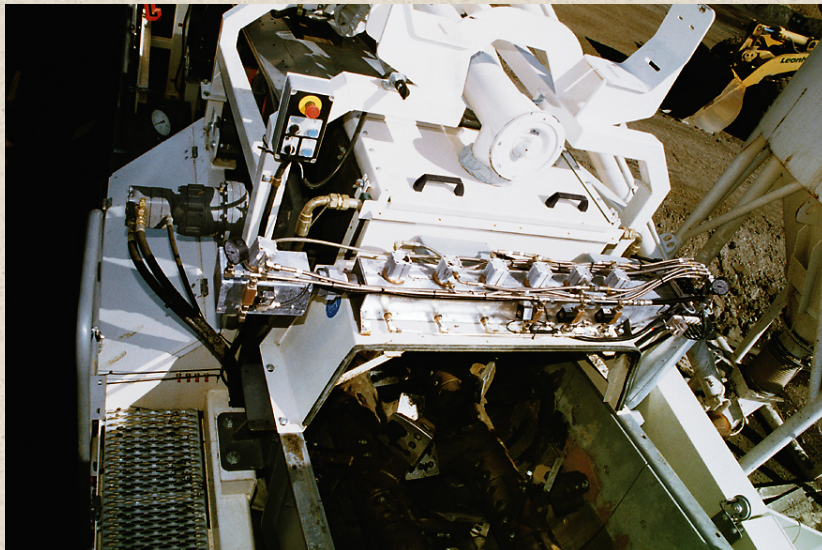
Choose the best locations to establish the mixing plant in terms of materials supply (aggregate, bitumen, water)

Set up the mixing plant and carry out the mixing, place the foamed bitumen treated material in stockpile

The stockpiled material can be used over a period of several weeks



Cold in Plant Recycling





Recycled Material

Paving Recycled
Material



Recycled Material

Paving Recycled
Material



HOT-MIX ASPHALT RECYCLING



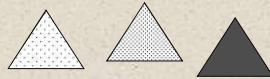
HOT-MIX ASPHALT RECYCLING

Phase 1



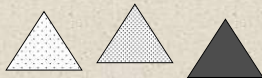
Stockpile reclaimed asphalt delivered from site

Phase 2



RA is crushed and screened into separate stockpiles

Phase 3



Grading, binder content and properties determined, the stockpile is marked as approved for use in the recycled mix

HOT-MIX ASPHALT RECYCLING



RA typically contains 95% high quality aggregate and 5% bitumen – valuable non-renewable resources

HOT-MIX ASPHALT RECYCLING



The binder has most probably aged and become brittle but the aggregate quality will not have altered

A valuable asset

Alternative aggregate source – linear quarry

Batch type mixing plants – Hot Mix Recycling

The RA is introduced into the hot elevator



Additional cold feed bins for RA

Continuous drum type mixing plants – Hot Mix Recycling



Conveyor transfers RA from cold feed bins to centre collar of the mixing drum

RA cold feed bins



Advanced double barrel & double drum mixing plants



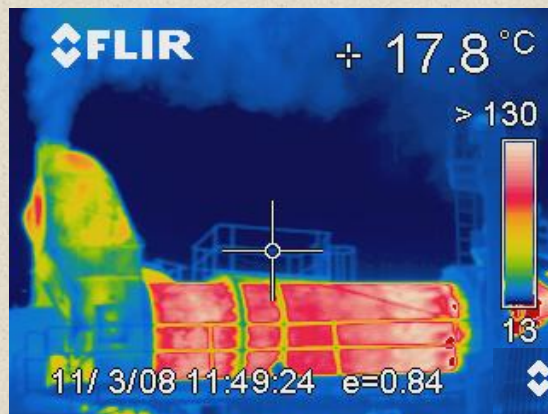
WARM MIX ASPHALT

We're striving to achieve significant:

- Cost savings – mix and burner fuel
- Reductions in emissions
- Improvements in compaction window

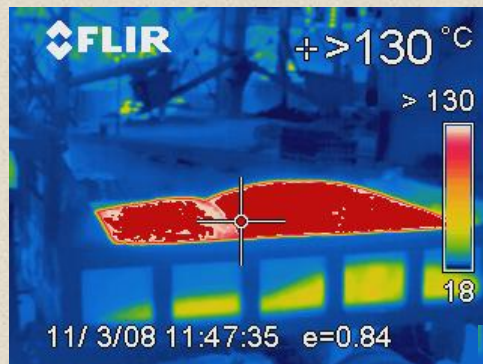


*IMPROVE THE SUSTAINABILITY OF OUR
ROAD PAVEMENTS*



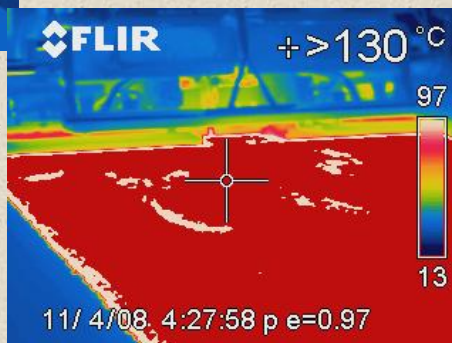
Thermal image showing the drier/heater drum

Thermal image showing the skip and hot-mix silo



Hot asphalt in the truck

Hot asphalt behind the paver



WARM MIX ASPHALT

Aim: Mix and pave asphalt at temperatures at least 20°C below those of conventional HMA

WMA technologies:

- Organic
- Inorganic
- Foam

Performance of WMA should be at least that of HMA

WMA

Manufacture & Pave asphalt 20°C to 30°C below conventional temperatures

+

RECYCLED MIXES

Utilize reclaimed asphalt (RA) in WMA

