

Introduction to Road Materials Engineering

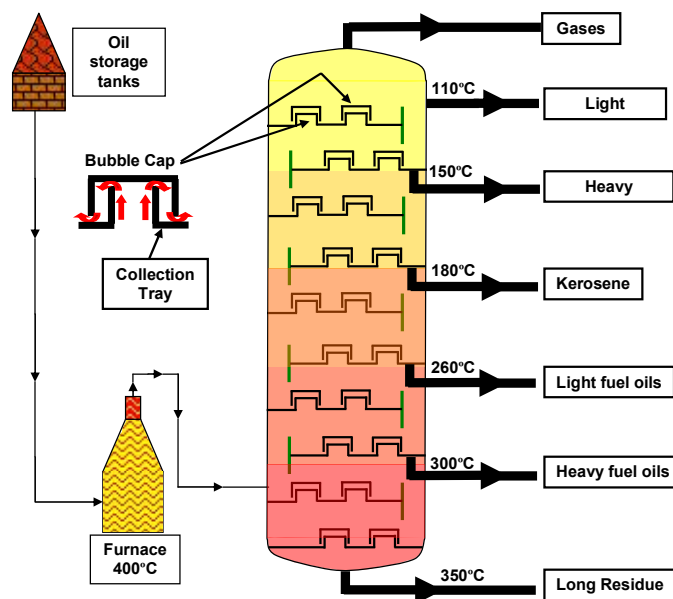
Part 3: Basic Bitumen Technology

Presented by SARF

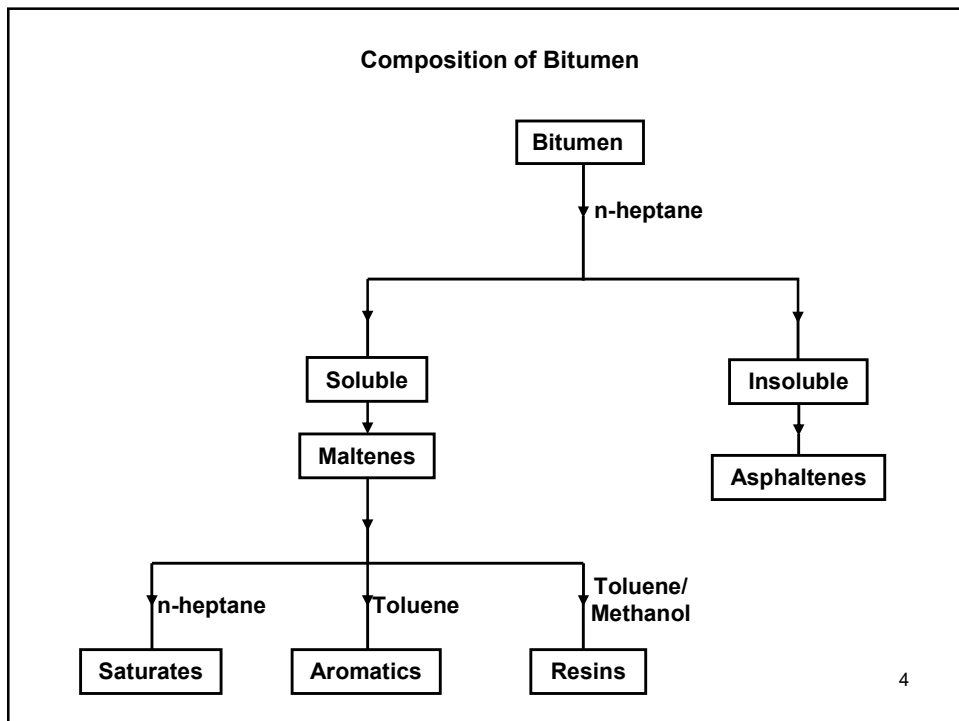
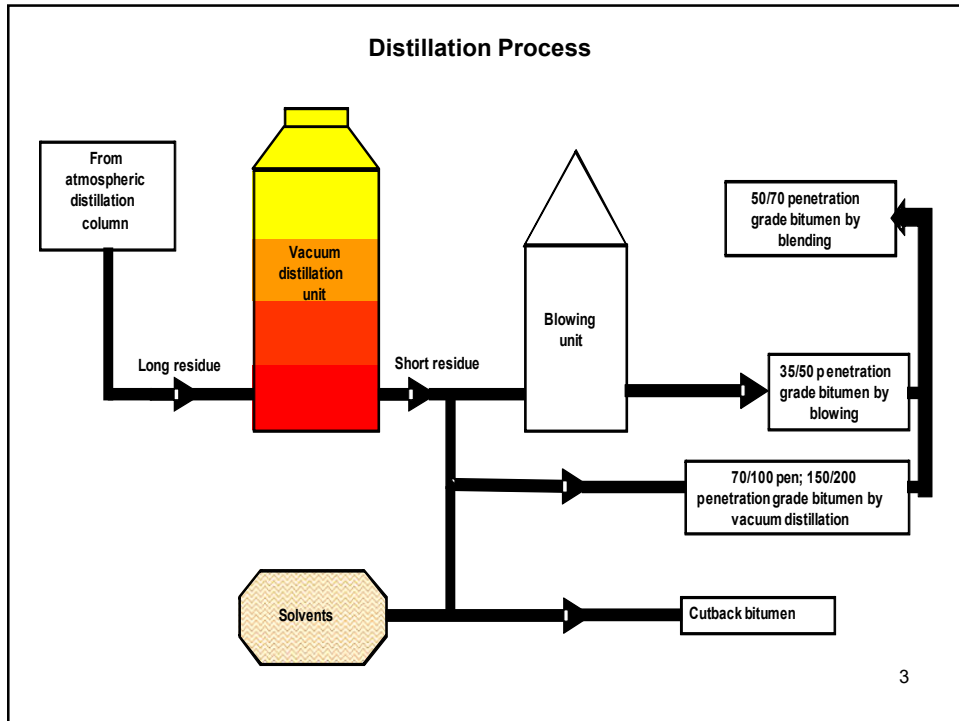
Presenter:
Ron Berkers



Distillation Process

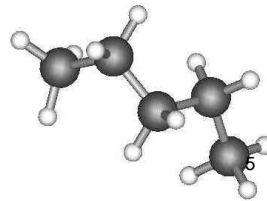


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Composition of Bitumen

S – Saturates
A – Aromatics
R – Resins
A - Asphaltenes



Composition of Bitumen

Saturates:

An increase in saturates tends to soften the bitumen.

Aromatics:

Aromatics are the compounds that give bitumen its fluidity, as they are part of the oils in bitumen. As such they are a major part of the medium in which the asphaltenes are dispersed (peptized)

Resins:

Resins tend to inhibit the oxidation of bitumen, but when oxidation of bitumen occurs it is the resins which, by taking on oxygen, are converted to asphaltenes and in so doing change the thickness, and thus the stiffness, of the bitumen.

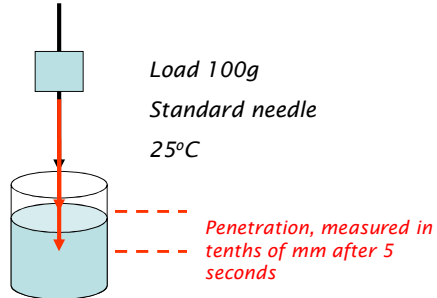
Asphaltenes:

Asphaltenes give bitumen its thickness. Increasing the asphaltenes content of bitumen produces a harder bitumen with a lower penetration, a higher softening point and thus a higher viscosity.

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BASIC BITUMEN TECHNOLOGY

Penetration grade bitumen



Commonly used grades:

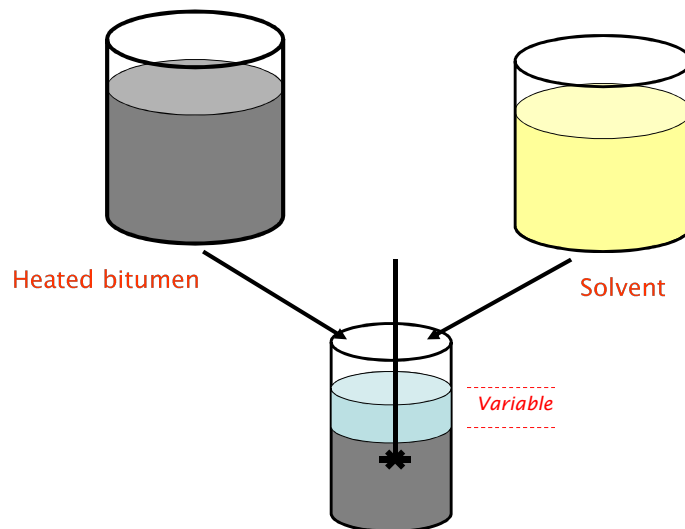
35/50 pen
50/70 pen
70/100 pen
150/200 pen



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BASIC BITUMEN TECHNOLOGY

Bitumen cutbacks



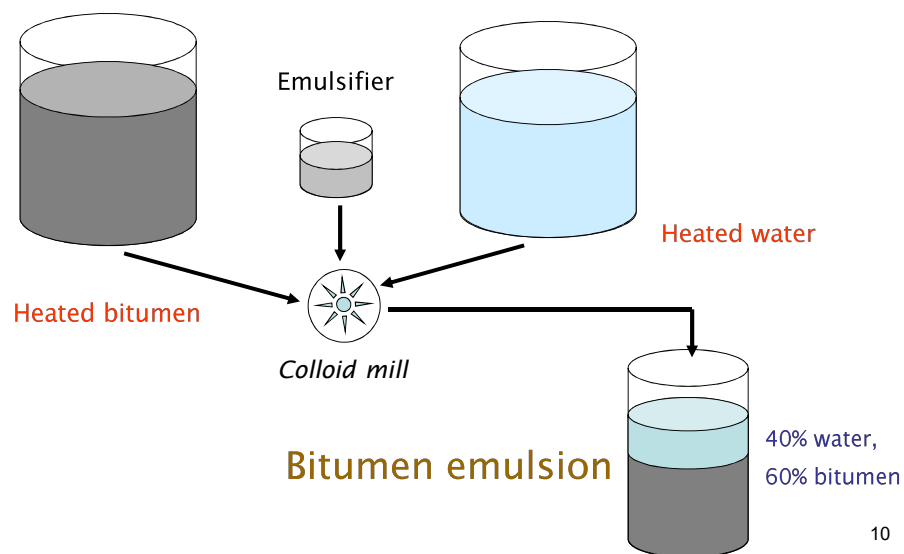
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Bitumen cutbacks

Reduced use due to environmental considerations

TYPE	USE
MC10	Prime
MC30	Prime
MC3000	Binder for sand seals
RC250	Prime

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Bitumen emulsion

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Bitumen emulsion

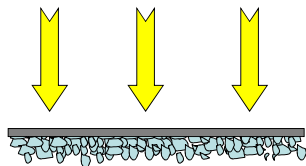
Main bitumen emulsion types and uses:

ANIONIC Negative charge	Mix grade Stable grade Spray grade	Manufacture of cold mixes for patching Stabilisation Chip seals – tack and fog coats sprays
CATIONIC Positive charge	Stable grade Spray grade	Stabilisation Chip seals – tack and fog coat sprays Asphalt tack coat
INVERTED	Prime	Prime granular bases

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Primes and Tack Coats

The main purpose of the **PRIME** is to penetrate into the finished base layer, improving the bond between base and surfacing



Prime types:

MC 30 Bitumen cutback

MSP1 Inverted bitumen emulsion



Typical spray rate 0.7 L/m²

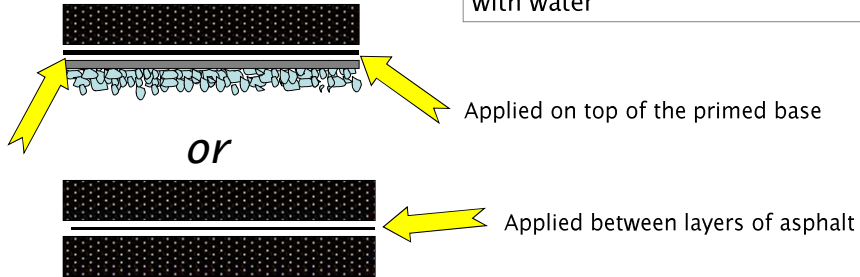
The use of tar primes is prohibited for health reasons

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Primes and Tack Coats

The main purpose of the **TACK COAT** is to provide a dust-free bond between the primed base and the asphalt, or between layers of asphalt

Tack coat material: typically anionic stable grade diluted 1:1 with water



Typical spray rate 0.5 L/m²