

Hot Mix Asphalt Materials and Characteristics

Source of Lecture Materials

- HMA for Seniors and Graduate Students, Manual developed by NCAT.

Asphalt Materials



Bitumen

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graph TD; Bitumen --> Tar; Bitumen --> AsphaltBinder[Asphalt Binder];
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Tar

(from coal)

- road tar
- coal tar

Asphalt Binder

(from petroleum crude)

- asphaltic bitumen
- asphaltic binder

Asphalt

- Asphalt Binders
- Cutbacks
- Emulsions

Hot Mix Asphalt (HMA)

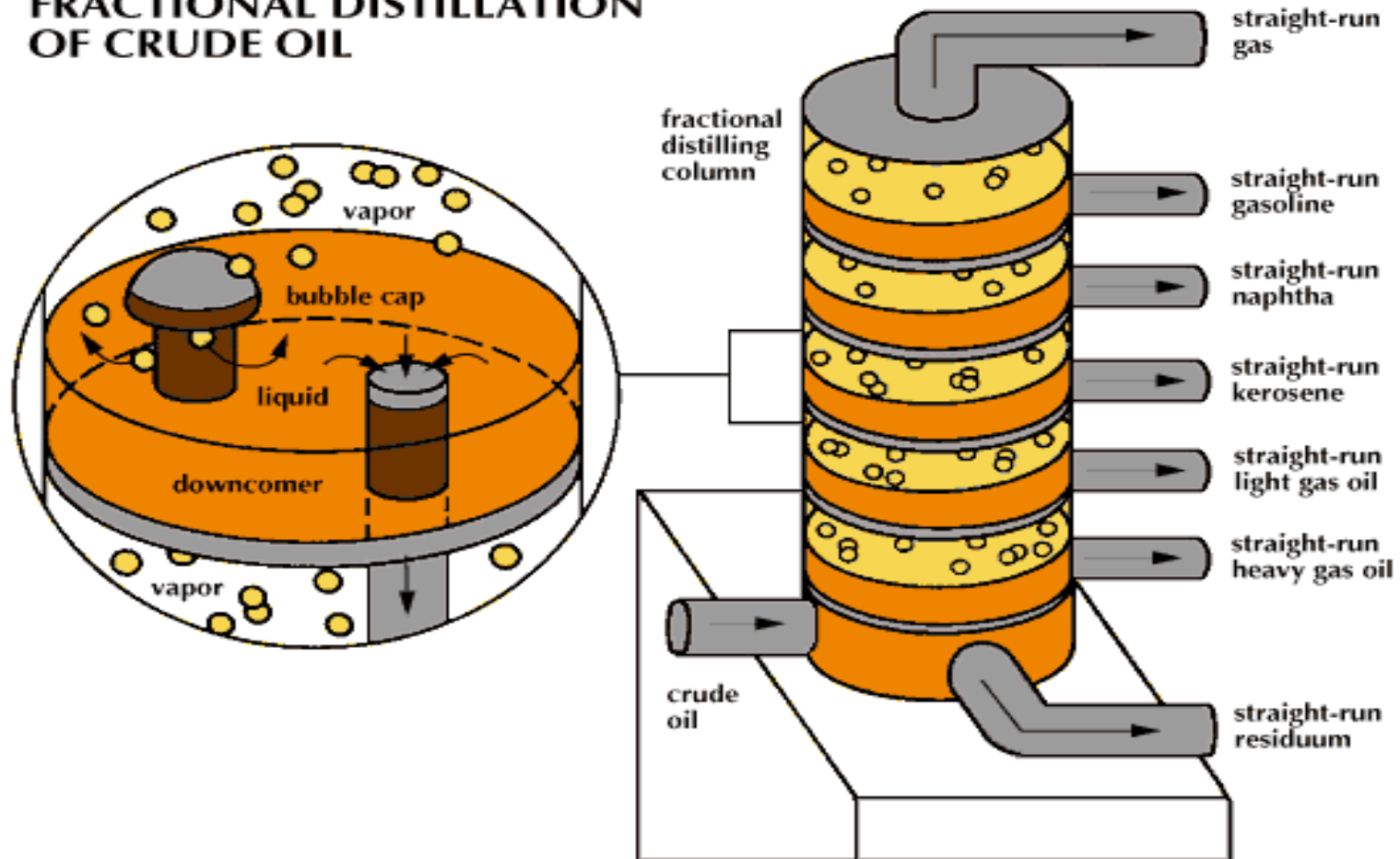
- Asphalt concrete
- Asphalt paving mix
- Asphalt mix
- Asphalt
- Bituminous concrete
- Bituminous paving mix
- Bituminous mix

**Asphalt Binder is
Generally Produced
in a Refinery**



Basics of Refining Crude Oil

FRACTIONAL DISTILLATION OF CRUDE OIL

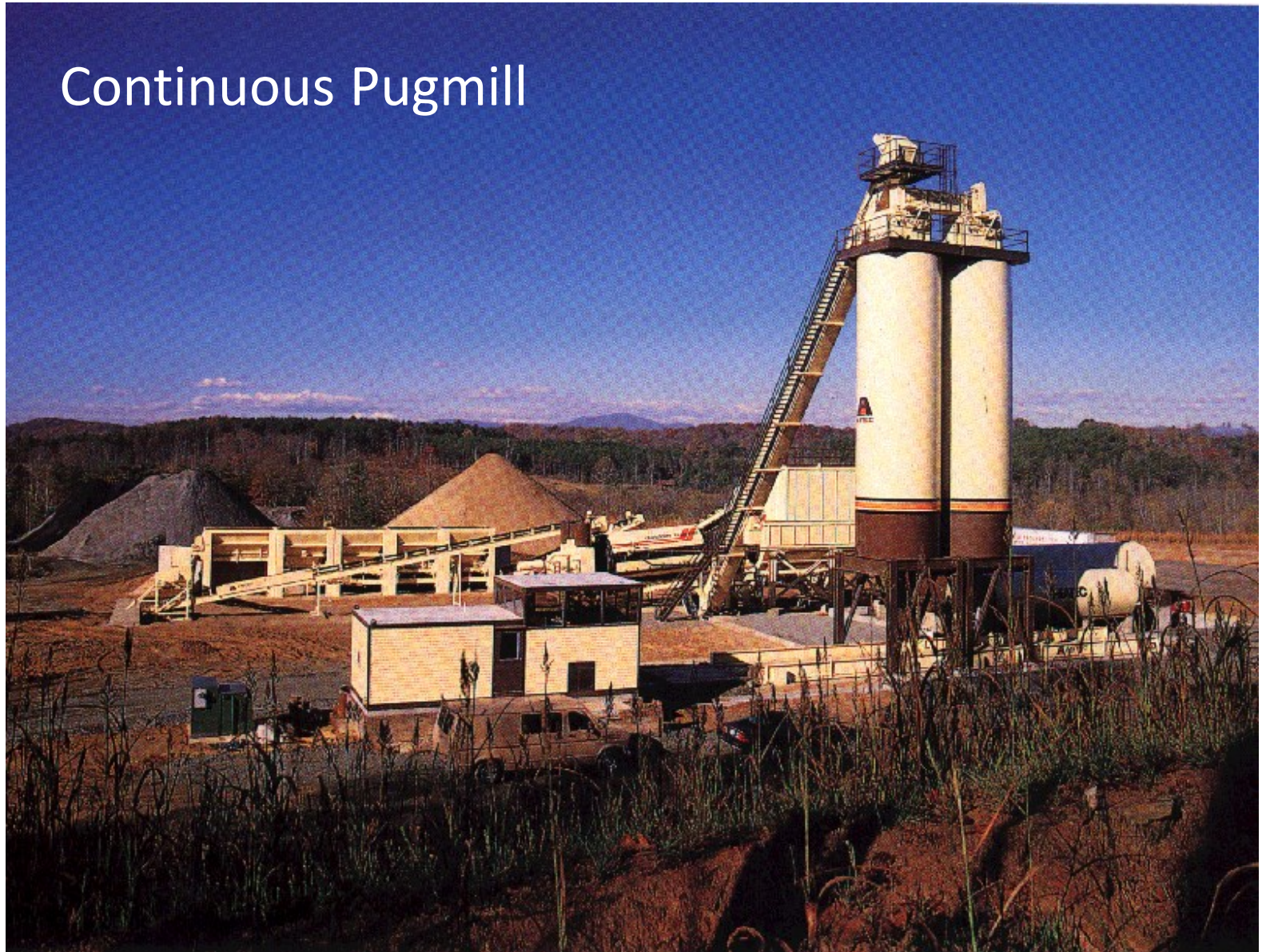


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Batch Plant




Continuous Pugmill









 The Aberdeen Group
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Cutback Asphalts

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graph TD; CA[Cutback Asphalts] --- RC[Rapid Curing (RC)]; CA --- MC[Medium Curing (MC)]; CA --- SC[Slow Curing (SC)]; RC --- RC_App[Asphalt + Naphtha Surface Treatment]; MC --- MC_App[Asphalt + Kerosene Stockpile Patch Prime Coat]; SC --- SC_App[Asphalt + Oil]; RC --- RC_Gr[RC - 30 RC - 70 RC - 250 RC - 800]; MC --- MC_Gr[MC - 30 MC - 70 MC - 250 MC - 800]; SC --- SC_Gr[SC - 70 SC - 250 SC - 800 SC - 3000];
```

Rapid Curing (RC)
Asphalt + Naphtha
Surface Treatment

RC - 30
RC - 70
RC - 250
RC - 800

Medium Curing (MC)
Asphalt + Kerosene
Stockpile Patch
Prime Coat

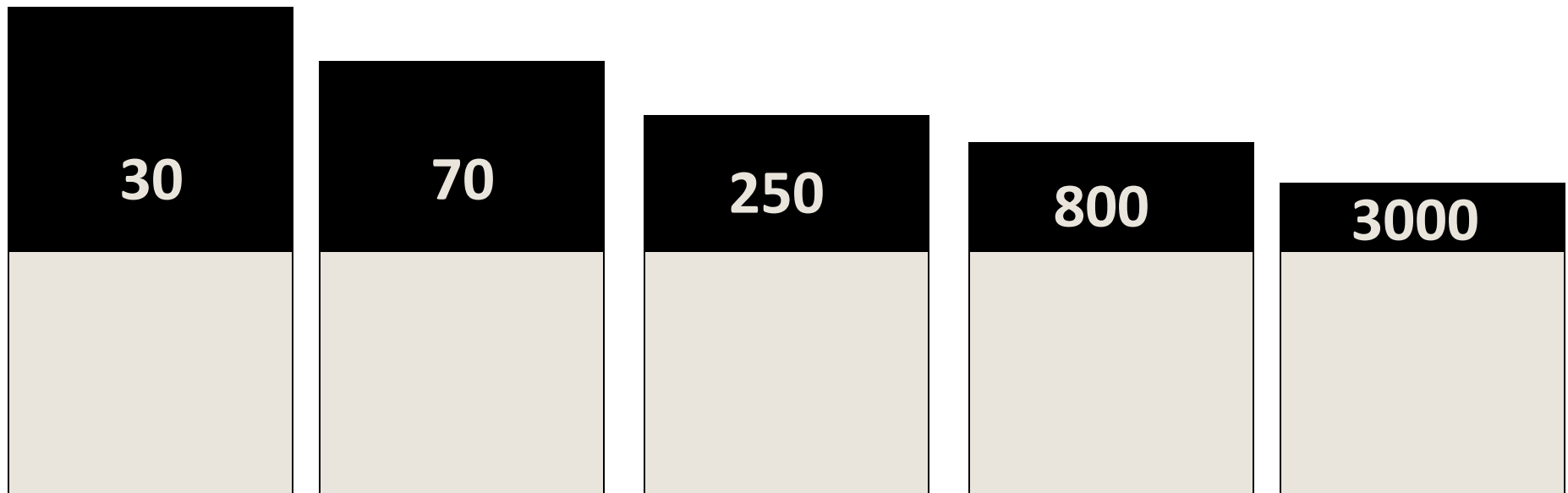
MC - 30
MC - 70
MC - 250
MC - 800

Slow Curing (SC)
Asphalt + Oil

SC - 70
SC - 250
SC - 800
SC - 3000

COMPOSITION OF CUTBACK ASPHALTS

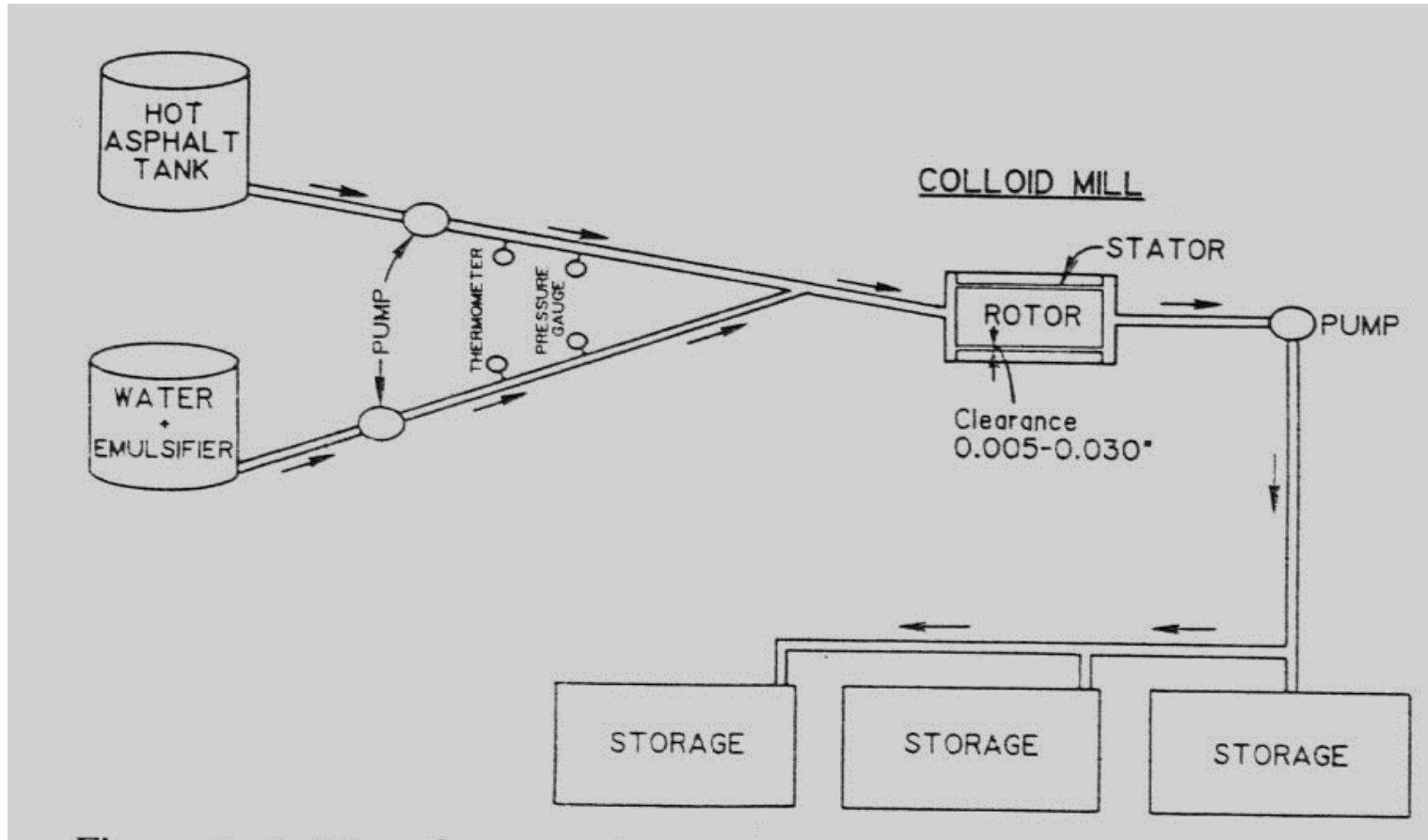
RC = Naphtha; MC = Kerosene SC = Light Oil



Cutbacks-Uses

- Rapid Curing
 - Tack coats
 - Surface treatments
- Medium curing
 - Prime coats
 - Stockpile patching materials
 - Road Mixing Operations
- Slow curing
 - Prime Coats
 - Stockpiling
 - Road mixing

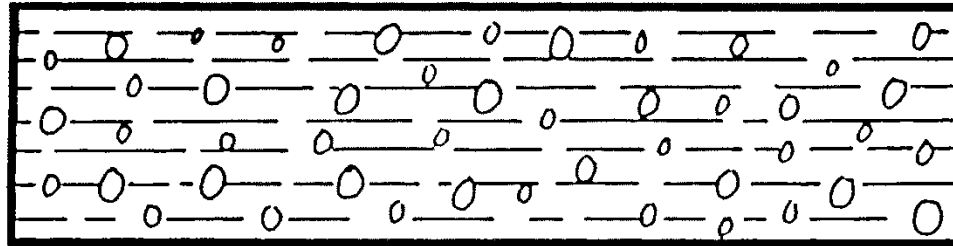
Emulsions-Manufacture



Emulsions-Uses

- Slow Setting (SS)
 - Tack coats, fog seals, dense-graded cold mixes
- Medium Setting (MS)
 - Open graded cold asphalt-aggregate mixtures
- Rapid Setting
 - Surface treatments

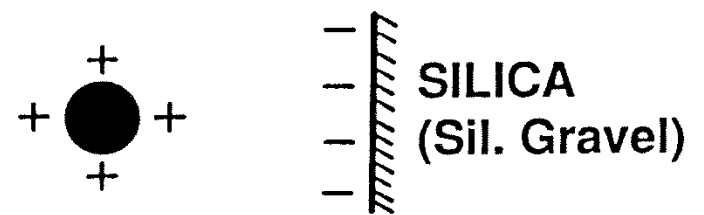
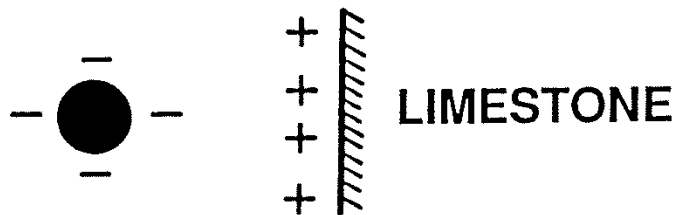
EMULSIONS



ASPHALT
+
WATER
+
EMULSIFIER

ANIONIC
(-)
ALKALINE

CATIONIC
(+)
ACID



Emulsions

RAPID SETTING
Tack Coat
Surface Treatment

RS-1	CRS-1
RS-2	CRS-2
HFRS-2	

MEDIUM SETTING
Road Mix (Open)

MS-1	CMS-1
MS-2	CMS-2
MS-2h	CMS-2h
HFMS-2	

SLOW SETTING
Road Mix (Dense)
Slurry Seals
Tack Coat
Fog Seal

SS-1	CSS-1
SS-1h	CSS-1h

HF = High Float
h = harder base asphalt











Single Machine Recycling

