

Mata Kuliah Topik Khusus Perkerasan Lanjut

Perkerasan Jalan Lanjut

Dr. Florentina Pungky Pramesti, ST., MT.



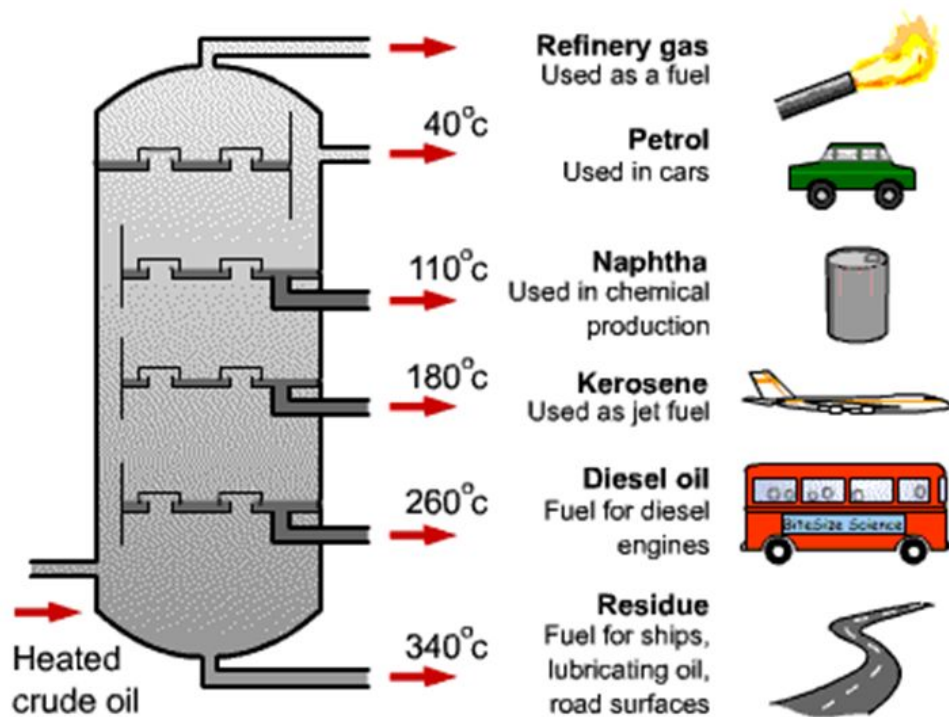
Proses Destilasi

Oil
+
normal alkane
solvents

(Propane, n-butane, n-pentane, n-hexane, n-heptane)



Precipitation of
black friable solids
(Asphaltenes)



Fractional distillation is used in oil refineries to separate crude oil into useful substances (or fractions) having different hydrocarbons of different boiling points

Karakteristik Binder

Viscosity → highly viscous

Dependent on temperature

Kohesi vs Adhesi

Mengalami oksidasi → aging

Mengapa Kelemahan binder harus diantisipasi

Heavier loading of roads due to increased amount of traffic and its increasing weight.

The increased safety expectations for skid resistance and state of the roads surface over its lifetime

Improved ride comfort for the road user.

Need to reduce overall cost to authorities and users including maintenance costs and delays together with the insurance related vehicle damage

Ease and speed of construction, to optimise building costs and minimise end product quality variations.

Reduced impact on the living environment by, for instance, noise emission reduction.

Durability
Stability
Fatigue resistance

Skid resistance

Roughness

Fatigue resistance
Cheaper material
Impermeability

Viscosity,
Workability

Environmental effect such as:
toxic, noise

- Durability
- Stability
- Fatigue resistance
 - Skid resistance
 - Impermeability
 - Workability
 - Less almost zero Environmental effect such as: toxic, noise

Structural & Functional requirements of bitumen



Modifikasi Binder

Ada 3 macam bitumen modifier:

1. Physical modification
2. Chemical modification
3. Other type modification

Modified bitumens generally use a traditional waterproofing medium -- asphalt -- modified with atactic polypropylene (APP), styrene butadiene styrene (SBS), synthetic rubber or other agents that create a uniform matrix that enhances the physical properties of the asphalt. SBS and APP are the most common bitumen modifiers



Modifikasi Binder

type of physical modifier and additive used in the material
(Read and Whiteoak, 2003)

TYPE OF MODIFIER	TYPE OF ADDITIVE
(1) Thermoplastic Elastomers	<ul style="list-style-type: none">• Styrene – butadiene – styrene (SBS)• Styrene – butadiene – rubber (SBR)• Styrene – isoprene – styrene (SIS)• Styrene – ethylene – butadiene – styrene (SEBS)• Ethylene – propylene – diene terpolymer (EPDM)• Isobutene – isoprene copolymer (IIR)• Natural rubber• Crumb tyre rubber• Polybutadiene (PBD)• Polyisoprene
(2) Thermoplastic Polymer	<ul style="list-style-type: none">• Ethylene vinyl acetate (EVA)• Ethylene methyl acrylate (EMA)• Ethylene butyl acrylate (EBA)• Atactic polypropylene (APP)• Polyethylene (PE)• Polypropylene (PP)• Polyvinyl Chloride (PVC)• Polystyrene (PS)
(3) Thermosetting Polymers	<ul style="list-style-type: none">• Epoxy Resin• Polyurethane Resin• Acrylic Resin• Phenolic resin



TYPE OF MODIFIER	TYPE OF ADDITIVE
Chemical Modifiers	<ul style="list-style-type: none">• Organo-metallic compounds• Sulphur• Lignin
Fiber	<ul style="list-style-type: none">• Cellulose• Alumino-magnesium silicate• Glass fiber• Asbestos• Polyester• Polypropylene
Adhesion improvers	<ul style="list-style-type: none">• Organic amines• Amides
Antioxidants	<ul style="list-style-type: none">• Amines• Phenols• Organo-zinc/organo-lead compounds
Natural asphalts	<ul style="list-style-type: none">• Trinidad Lake Asphalt (TLA)• Gilsonite• Rock asphalt
Fillers	<ul style="list-style-type: none">• Carbon black• Hydrated lime• Lime• Fly ash
Extender	<ul style="list-style-type: none">• Sulphur

Modifikasi Binder

Type of additive adding to chemical modifier (Read and Whiteoak, 2003; Asphalt Academy, 2007)



Tugas Membuat 5 halaman slide presentasi tentang:

1. Bentuk asphalt
 - a. Emulsified asphalt
 - b. Cutback asphalt
 - c. Foamed asphalt
2. Aspal alam
 - a. TLA
 - b. Asbuton
3. Aspal modifikasi
 - a. Styrene Butadiene Styrene
 - b. Atactic Polypropylene
 - c. Yang lain



Tugas merangkum hasil penelitian tentang campuran aspal di Lab Jalan UNS:

1. Aspal buton (Semarbut)
 - a. Variasi filler
 - b. Variasi lain
2. Damar aspal (Daspal)
 - a. Variasi filler
 - b. Variasi emulsifier
 - c. Variasi pengikat
3. Aspal modifikasi
 - a. Styrene Butadiene Styrene
 - b. EVA
 - c. Yang lain



thank you

bedankt

maturnuwun

ashanti

Terimakasih

grazie

gracias

arigato

merci