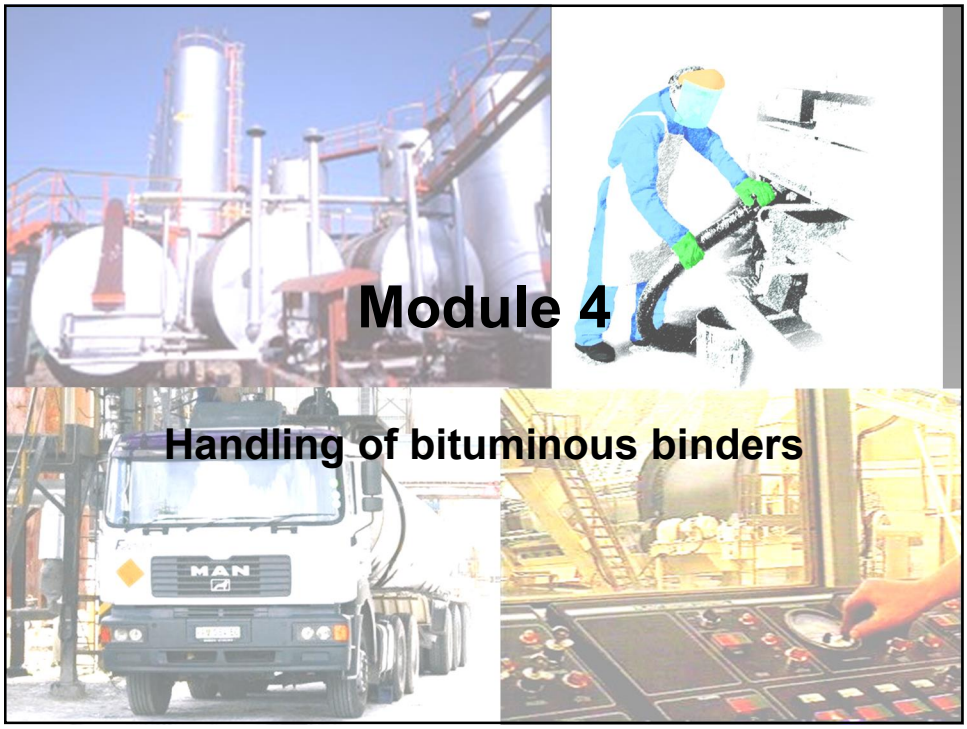

Module 4

Handling of bituminous binders

Compulsory reading

- Sabita Manual 8 covers the safe and responsible handling of bituminous products comprehensively

Safety and responsibility

- While there is often reference to the term "danger", global best practice deals with two concepts:
  - Hazard
  - Risk
- Goal - minimise the ***risk*** of exposure of personnel and the environment to inherent ***hazards*** attached to the products and operations of the bituminous product industry

Hazard and risk

The European Inventory of Existing Commercial Chemical Substances (EINICS) makes special reference to hazard and risk

- ***Hazard*** – the inherent dangerous properties of a substance
- ***Risk*** – the likelihood of the hazardous properties of a substance causing harm to people and the environment

Any safety programme should take cognisance of the potential hazards and means of mitigating their effect

Hazards

- Material Safety Data Sheets (MSDS)
- Elevated temperatures
- Contact with water
- Solvents contained in cold bitumen
- Flammable nature of products

MSDS

- Supplier is responsible for MSDS for each product in terms of regulations governing hazardous chemical substances informing on:
  - Safety of personnel and physical environment
  - Fumes generated at application temperatures
- Supplier liable for negligently incorrect data
- User liable for incorrect application of prescriptions

MATERIAL SAFETY DATASHEET

Page 1 CAS No 79016
Date Issued 05/May/2004
TRICHLOROETHYLENE

Company Details

Name	PROTEA CHEMICALS (Inland)	Emergency Phone Number	(031) 266-9035
Address	1 Berrange Road	Tel	(011) 821-3300
	Wadeville	Fax	(011) 827-4612
	Germiston		
	1407		

1.Product and Company Identification:

Trade / Commercial Name	TRICHLOROETHYLENE		
Chemical Name	trichloroethylene		
Formula	C2HCl3		
Chemical Family	HHC		
Synonyms	TRICHLOROETHENE; ETHYLENE TRICHLORIDE; TRICLENE		
Un No	1710	Hazchem Code	2z
ERG No.	KX 4	EAC	55

2.Composition:

Hazardous Components 100% Trichloroethylene, Harmful EEC Category 3 Carcinogen.

3.Hazards Identification

Poison
Poisonous; Could be fatal if inhaled, swallowed or absorbed through skin.
Contact could cause burns to skin and eyes.
Runoff from fire-control or dilution water could give off poisonous gases and cause water pollution.
Fire could produce irritating or poisonous gases.Irritating to eyes and skin.
Dizziness, incoordination, and drowsiness; may lead to unconsciousness.
Acts as a narcotic.

4.First Aid Measures

First Aid Skin	Wash off with water. Remove clothing. Shower thoroughly.
First Aid Eyes	Flush eyes with water for 15 minutes. Hold eyelids open while washing.
First Aid Ingested	Drink water. Induce vomiting. Give oxygen. Obtain medical attention.
First Aid Inhalation	Remove from contaminated area. Give oxygen. CPR if indicated.

5.Fire Fighting Measures

SMALL FIRES: Dry chemical, CO2, Halon, water spray or standard foam.
LARGE FIRES: Water spray, fog or standard foam is recommended.
Move container from fire area if you can do it without risk. Fight fire from maximum distance. Stay away from ends of tank. Dike fire control water for later disposal; do not scatter the material.
Keep unnecessary people away; isolate hazard area and deny entry.
Stay upwind; keep out of low areas, and ventilate closed spaces before entering.
Positive-pressure self-contained breathing apparatus (SCBA) and chemical protective clothing that is specifically recommended by the shipper or manufacturer may be worn. It will provide little or no thermal protection.
Structural firefighter's protective clothing is NOT effective

All information is given in good faith but without guarantee in respect of accuracy & no responsibility is accepted for errors or omissions or the consequences thereof.

Hazards

- Material Safety Data Sheets (MSDS)
- Elevated temperatures
- Contact with water
- Flammable nature of products
- Noxious vapours

Elevated temperatures

- Bitumen handled at temperatures of 50 - 210°C
- ***Skin contact at these temperatures will cause severe burns, shock and could be fatal***
- Storage tanks, pipelines carrying hot bitumen or heated – shielded or lagged
- Personal protection equipment should be worn at all times when working with bitumen:
  - Overalls
  - Heat resistant gloves
  - Face shield
  - Safety boots

Hazards

- Material Safety Data Sheets (MSDS)
- Elevated temperatures
- Contact with water
- Flammable nature of products
- Noxious vapours

Contact with water

- Bitumen storage temp > boiling point water
- Water in contact with bitumen at elevated temperatures:
  - Converts to steam
  - Volume expansion of by a factor of 1 400
  - spitting, foaming & boil-overs
- When it reaches hot objects, burners – cause fires
- May envelop plant and personnel in vicinity
- ***Ensure all tanks (and additives) are free of water before loading bitumen***

Hazards

- Material Safety Data Sheets (MSDS)
- Elevated temperatures
- Contact with water
- Flammable nature of products
- Noxious vapours

Flammable nature

- Penetration grade bitumen normally handled below its flash point (auto-ignition temperature) of ≈ 400° C
- Cutback bitumens normally above the flash point of the solvent (38° C)
- Explosion/fire hazard (high temperatures and presence of oxygen)
- Manhole or tank hatch covers should be shut or at least lowered

Hazards

- Material Safety Data Sheets (MSDS)
- Elevated temperatures
- Contact with water
- Flammable nature of products
- Noxious vapours

Noxious vapours

- Above 150°C visible vapours and fumes develop
- Emissions can double for every 10°C increase in temperature
- Fumes are composed of:
  - Hydrocarbons
  - Small quantities of H_2S

Noxious vapours/cont…

- H_2S is a particular concern:
  - Exposure could be fatal at low concentrations (500 ppm)
  - All spaces where H_2S may be present should be tested and approved before entry is permitted
- Fumes also contain small concentrations of PAH's
  - Do not pose a risk if sound work practices adopted

Treatment of burns

- See Sabita Manual 8 and DVD420
- This course will briefly cover the critical issues
- First aid not a substitute for prompt medical attention – it protects life and manages pain and injury prior to professional medical treatment

Burns

- Skin burns
  - Cooled as quickly as possible with running water
  - ***No attempt should ever be made to remove bitumen***
- Circumferential burns
  - When limb is completely encircled by hot bitumen – tourniquet effect
  - Bitumen should be softened or split to allow blood circulation
- Eye burns
  - Injured referred to specialist medical attention
  - ***No attempt to be made to remove bitumen***

Again …

First aid not a substitute for prompt medical attention

It protects life and manages pain and injury prior to professional medical treatment

Module 4 - Summary

- All persons involved in the handling of bituminous binders should have received training from their employer
- They should be fully conversant with Sabita Manual 8 - *The Safe and Responsible Handling of Bituminous Products*
- Key idea - ***Risk*** of exposure of personnel and the environment to inherent ***hazards*** attached to the products and operations of the industry should be minimised
- Personnel should at all times be protected from the hazards of elevated temperatures by wearing the correct PPE