

USE of Coal Tar

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ABSTRACT

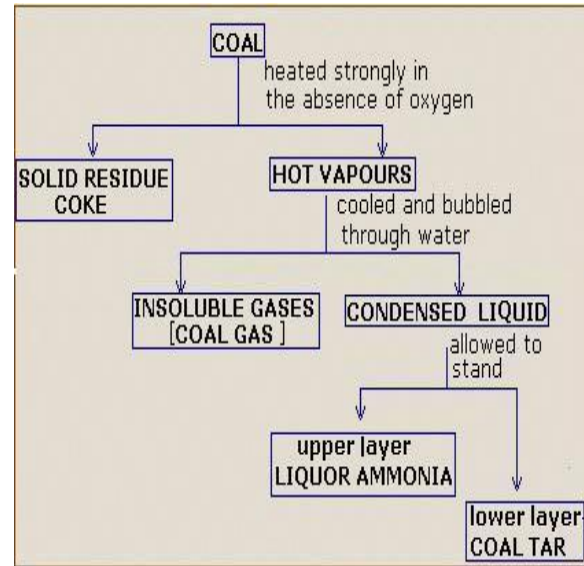
Roads are the nerve of our country. Bitumen has been used for binding purpose in flexible pavements. But the diminishing fossil fuel will force us to go with another binder than bitumen and this problem can be greatly resolved by taking coal tar into consideration.

Coal tar although a by product of the process of carbonization of coal finds various uses in our day to day life. It might have been thrown off as a waste material but its use has been defined by various researchers since very old times. Most coal tar is obtained as a by-product in pyrolysis of coal to coke for steel making. At the beginning of the 1980s world output of coal tar was about 18m. tonnes, of which 14m. tonnes came from coke production. Production of coal tar has fallen considerably in recent decades. Globally about 10-20% is used directly as fuel, road materials and in surface coatings for corrosive environments. Often, though, the functional requirements are so specialised that the requisite tar is produced by mixing pitch and suitable tar distillates. Most coal tar is distilled.

KEYWORDS- carbonization, coatings, fuel, pitch, pyrolysis, , tar.

1. INTRODUCTION

Coal tar is a brown or black liquid of extremely high viscosity. Coal tar is among the by-products when coal is carbonized to make coke or gasified to make coal gas. Coal tars are complex and variable mixtures of phenols, polycyclic aromatic hydrocarbons (PAHs), and heterocyclic compounds. The process for the formation of coal tar from coal by heating strongly in the absence of oxygen and the further steps involved are illustrated in the chart below.



2. COAL TAR

2.1 PROPERTIES

Coal tar is

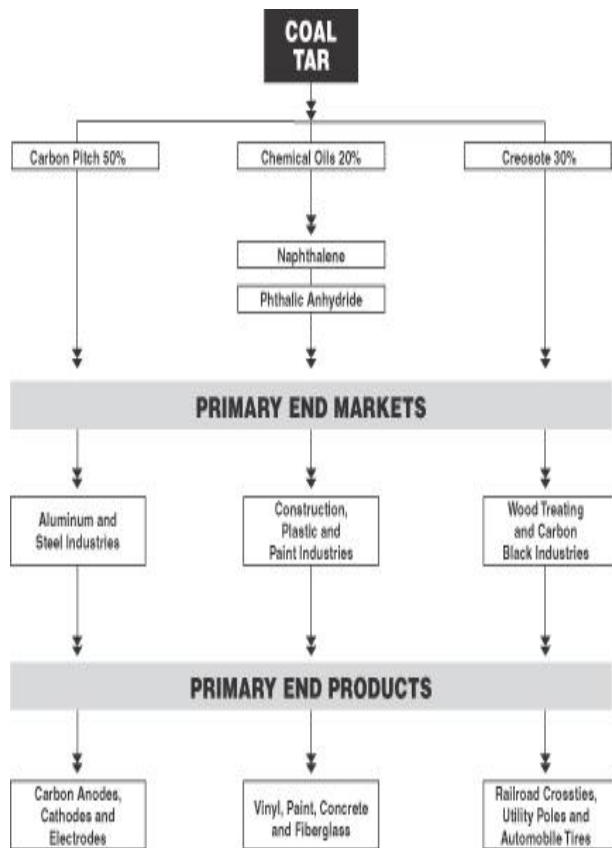
- black
- viscous fluid
- sometimes semi solid
- peculiar smell
- acidic in nature
- boiling point of 200-250 deg Celsius
- water insoluble
- fuel-resistant
- less permeable
- more temperature susceptible than asphalt cement

It smells of naphthalene, which is often the biggest single component, with concentrations of between 7 and 12% in unrefined coal tar. Tar is practically insoluble in water. Only the lighter, somewhat polar components like phenols and tar bases are slightly soluble. It is due to various useful properties of coal tar, the byproduct of destructive distillation of coal that it has been studied from various decades to make its maximum utility in our daily life.

Tar occurs in the incomplete combustion of carboniferous materials. Most coal tar is obtained as a by-product in pyrolysis of coal to coke for steel making. The processes are conducted at very different temperatures, resulting in tars of widely varying composition. The substances in tar are not originally in the carbon but are formed by disintegration, radical reactions, condensations and secondary disintegration in contact with the hot surface of the coke. Over 450 different substances have been identified in coal tar.

2.2 USE OF COAL TAR

Coal tar is used either as it is, after expelling the lightest phenols and aromates or as a starting material for fractionated distillations. All parts of this tar are combustible and use as fuel is a constantly relevant option.



- Coal tar is used above all for making electrodes for the aluminium and steel industries.
- Coal tar is also used as a binder in clay-pigeons for sport shooting.
- Substances like phenols, naphthalene and cumarone, which used to be obtained from coal tar, can today be made more cheaply by

- petrochemical means, and nowadays most of the classic tar substances are produced in this way.
 - Various intermediate distillates and residual products are mixed for use as wood impregnating agents and washing liquid, under product names like creosote and wash-oil.
 - Coal tar is used as fuel either for heating the gas retorts or for other purposes.
 - Coal tar is employed for painting wood, iron, brick work or stone as a preventive against the influence of weather or the far more potent action of corrosive chemicals. Coal tar should not be used for tarring the wood work and ropes of ships(a purpose for which wood tar is most suitable).
 - Coal tar is used in the manufacture of roofing-felt. For this purpose, the tar is previously dehydrated and is deprived of its more volatile portions by heating in a still. The roofing felt is used as a cheap covering both by itself and as a grounding for tiles and slates.
 - Coal tar is employed for the manufacture of lamp black.
 - Coal tar topical medication is used on the skin to treat the itching, scaling, and flaking due to skin conditions such as psoriasis or seborrheic dermatitis. Coal tar belongs to a class of drugs known as keratoplastics. It works by causing the skin to shed dead cells from its top layer and slow down the growth of skin cells. This effect decreases scaling and dryness. Coal tar can also decrease itchiness from these skin conditions.
 - Coal tar is incorporated into some parking-lot sealcoat products, which are used to protect and beautify the underlying pavement. Sealcoat products that are coal-tar based typically contain 20 to 35 percent coal-tar pitch.
 - Being flammable, coal tar is sometimes used for heating or to fire boilers. Like most heavy oils, it must be heated before it will flow easily.
 - Coal tar is also used to manufacture paints, synthetic dyes, and photographic materials.
 - it can be used in medicated shampoo, soap and ointment, as a treatment for dandruff and psoriasis, as well as being used to kill and repel head lice.
 - Various phenolic coal tar derivatives have analgesic (pain-killer) properties. These included acetanilide, phenacetin, & paracetamol.
- Thus coal tar has various uses in our life in many aspects which may be in industries as chemicals or in medical sciences or in civil engineering. Depending on its requirements coal tar can be treated differently for different purposes. It has been in use since old times for its various purposes. Its use might have been overlooked by the scientists as it is a by product

but due to the efforts of various research scientists, it has found widespread use in human life.

3. CONCLUSION

Coal tar has not been popular in India due to some unknown reasons but has been popular in other industries. Its properties should be taken of as much advantage as possible by the Indian researchers too as it is highly economical and easily available. Although coal tar has been highly useful in various sectors but the studies in America have given its drawback as being carcinogenic i.e. cancer causing. Coal tar causes increased sensitivity to sunlight, so skin treated with topical coal tar preparations should be protected from sunlight. Polyaromatic hydrocarbons(PAH) in coal tar are considered to be the major cause of cancer when directly exposed to tar. Due to these certain drawbacks in the use of coal tar, it should be used with some care and proper safety measures must be used while its storage and handling.

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