

Crossties

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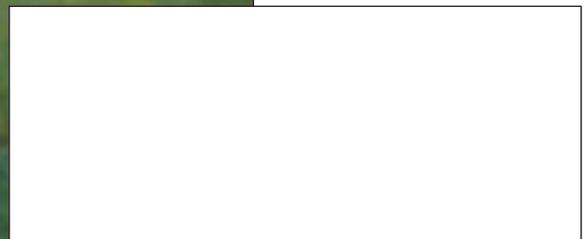
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A Study In Coal Tar Distillation

By Richard Harris,
Koppers Industries

Coal tar distillation is a global business and is the source of the creosote used by the wood-preserving industry. Although the equipment used to produce creosote is similar the world over, its major uses are not.

In North America, creosote exists at the intersection of the steel and aluminum industries. Its ultimate source is the ovens that produce coke for the steel industry. Coke, which is required for the production of steel, is made by "baking" coal at 1,100 degrees Celsius. The coking process also generates coal tar raw material.

In the United States, the primary reason for distilling this tar is to provide carbon pitch for the production of aluminum. Pitch demand dictates the amount of tar distilled and, therefore, the volume of creosote generated. Almost all of the creosote fraction produced in the United States is used in wood preservation.

This differs from other areas of the

world, where obtaining the distillate fractions is a main reason for processing coal tar, or the production of pitch may be secondary to national economic goals. The creosote fractions generated in the rest of the world are primarily used for the production of carbon black, a powder used in tires and pigments.

Major Distillate Fractions Of Coal Tar

Though no two tar plants are exactly alike, in general it can be said that two distillate streams are initially generated during the processing of coal tar (follow the black line in the chart on the next page). The first, accounting for about 20 percent of the tar, is the naphthalene fraction. It is the lighter fraction, containing from 45 to 55 percent naphthalene. The second distillate is the creosote fraction used to make wood preservative and carbon black. It makes up about 25 percent of the crude tar.

The remainder of the tar, about 55 percent, is carbon pitch for the aluminum industry, the product that drives the domestic tar distillation business.

The distillate fractions can be further processed to create other products (follow the green lines in the chart). Solvents to make resins, naphthalene to make plastics and pesticides, and correction oil to make wood-preserving creosotes are all derived from the naphthalene fraction.

In North America, almost all of the cre-



Coke Oven

osote fraction produced is combined with correction oil (or in some instances the unprocessed naphthalene fraction) to make AWPA-standard creosotes. Excess uncorrected distillate left over after wood-preserving needs are met is sold as lower value carbon black feedstock. The rest of the world does not have a large wood-treating industry, so their creosote fraction is used mostly for the production of carbon black.

Market prices for refined solvents and naphthalene exceed the price of creosote

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preservative. Wood-preserving creosote, in turn, has a greater value than carbon black feedstock. Therefore, North American tar distillers seek to minimize the amount of naphthalene in wood-preserving creosote, and to minimize carbon black feedstock sales.

Coal Tar Production

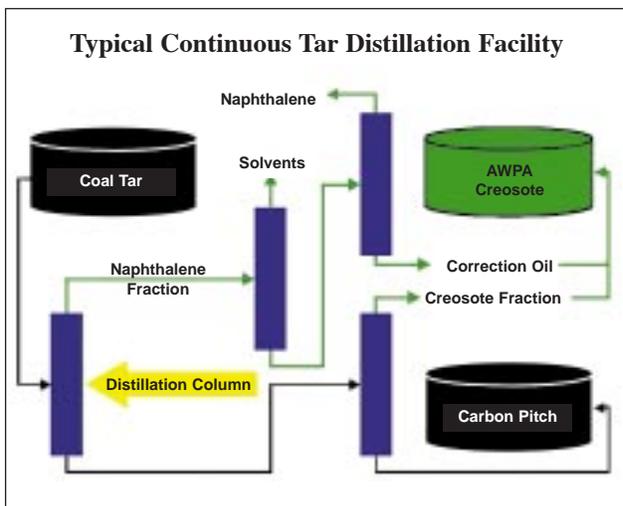
Coke and coal tar production in the United States will be reduced as environmental restrictions lead to the permanent closure of older coke batteries. In fact, three coke plants producing a total of 28 million gallons of tar annually closed in the first quarter of this year. The effects of these closures have already been noticed: higher costs for coal tar raw material and a temporarily tight supply of wood-preserving creosote.

The total world supply of coal tar should remain relatively constant at about 12 million metric tons per year over the next decade. Even the worst case projection shows only a 1 percent decline in world tar production by 2006. North America, however, will continue to see domestic coke and tar production decline.

The United States already imports coke and carbon pitch. Why not import coal tar, too? Carbon pitch is the main product. It makes up only half of the coal tar, incurs only half the freight cost, and the importer incurs no distillation costs. Although its value is higher than carbon black feedstock, most wood-preserving creosote is sold below the cost of production, making it difficult to justify importing and processing coal tar just to produce additional preservative.

Outlook For Quality And Availability

What does this mean for the United States? Our wood-treating industry consumes 72 million gallons of creosote preservatives annually. The remaining creosote fraction, on the order of 9 million gallons per year, is now sold as carbon black feedstock. As long as wood-preservative prices continue to justify the additional costs of production and regulatory compliance unique to pesticides, tar dis-



tillers likely will react to the decline in distillate availability by further reducing the amount of uncorrected creosote fraction sold to the carbon black industry. This should provide sufficient volume to meet the needs of wood treaters for the future, but product quality may decline.

Increasing the percentage of creosote fraction in the blend will yield greater volumes of wood preservatives meeting AWPA requirements, but the resulting products will be "heavier" and contain higher concentrations of PAC (phenanthrene, anthracene, carbazole). Unless tar distillers can find an economical means of overcoming this trend, a decline in the handling characteristics of the creosote preservatives may result.

In any event, the efficacy, or quality of the product as a pesticide, will remain unaffected.

Conclusion

The major factors determining future creosote availability and quality will be the quantity of coal tar produced in the United States and the economics of the competing uses for coal tar distillates.



Distillation Plant

Imports of coal tar are not likely to be a factor. Neither the decrease in coal tar distillate available nor the cost of regulatory compliance should create a shortage of creosote preservative in North America, but these factors may lead to a decline in the characteristics of the preservative and rising prices. ♦

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