

ENCLOSURE (B) 16

RESEARCH ON THE PREPARATION
OF LUBRICATING OILS
FROM BROWN-COAL TAR

by

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ENCLOSURE (B)16SUMMARY

The object of this project was to obtain an aero-engine oil by the condensation of a distilled fraction of brown coal tar and cracked distillate of paraffine waxes in the presence of $AlCl_3$.

Only the analyses of the fractions of the tar were carried out and no significant results were obtained before the termination of the war.

I. INTRODUCTIONA. History of Project

As the stock-pile of raw material for aero-engine oil had decreased gradually since April 1945, studies were carried on to utilize brown coal tar as the raw material for the preparation of aero-engine oil.

B. Key Research Personnel Working on Project

Naval Assistant Engineer M. TOYAMA

II. DETAILED DESCRIPTION

The high boiling fractions of coal tar consist mainly of aromatic hydrocarbons, and a stable aero-engine oil can be obtained by condensing a suitable fraction of coal tar with the cracked distillate of paraffin waxes in the presence of aluminium chloride.

The first experiment was the analysis and pre-refining of the fraction of brown coal tar boiling above $250^{\circ}C$, (consisting mainly of aromatic hydrocarbons and a small amount of acidic and basic compounds). In general, brown coal tar was separated with the following fractions and its fractions were used as gasoline and fuel oil.

Another method of treating brown coal tar was as follows: the brown coal tar was heated to $60^{\circ}C$ for one hour to dehydrate it, and was topped at $250^{\circ}C$. The residual oil was distilled into several fractions at a vacuum of 15mm Hg.

The fraction boiling from 140 to $200^{\circ}C$ was 17.6% by weight of the dehydrated tar.

This fraction was washed with one volume of 20% Na_2CO_3 solution and one volume of 10% NaOH solution.

The amount of oil lost by NaOH washing was 18% of the fraction by weight.

The alkali treated oil was then dewaxed with 3 volumes of acetone-benzene mixture (ratio 35:65) at $-5^{\circ}C$.

The alkali-treated and dewaxed oil was 8.6% by weight of the dehydrated tar. It was distilled into three fractions and their properties determined.

These results are shown in Table I(B)16 and II(B)16.

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Table I(B)16
 PROPERTIES OF FRACTIONS OF ALKALI TREATED DEWAXED OIL

	Yield (Vol%)	Density (25/4°C)	Refractive Index (25°C)
140-160°C/11mm Hg	46.6	0.9718	1.5525
160-180°C/11mm Hg	28.3	0.9971	1.5682
180°- /11mm Hg	Residue black pitch-like substance		

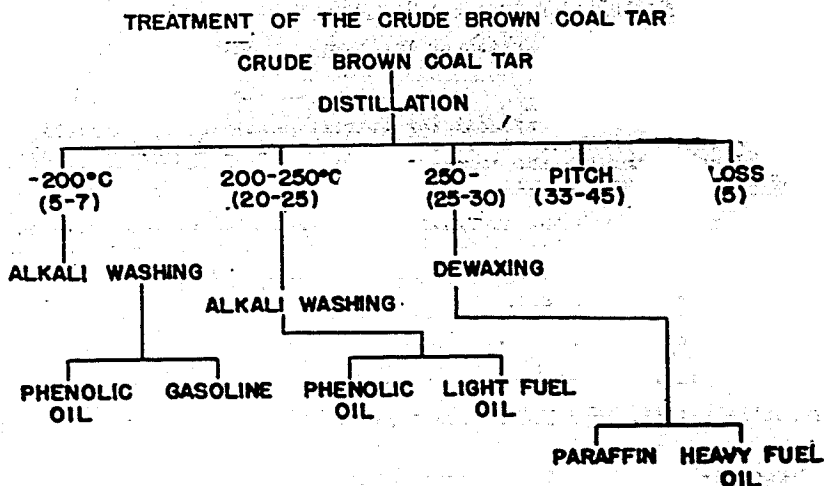


Figure 1(B)16
 TREATMENT OF THE CRUDE BROWN COAL TAR

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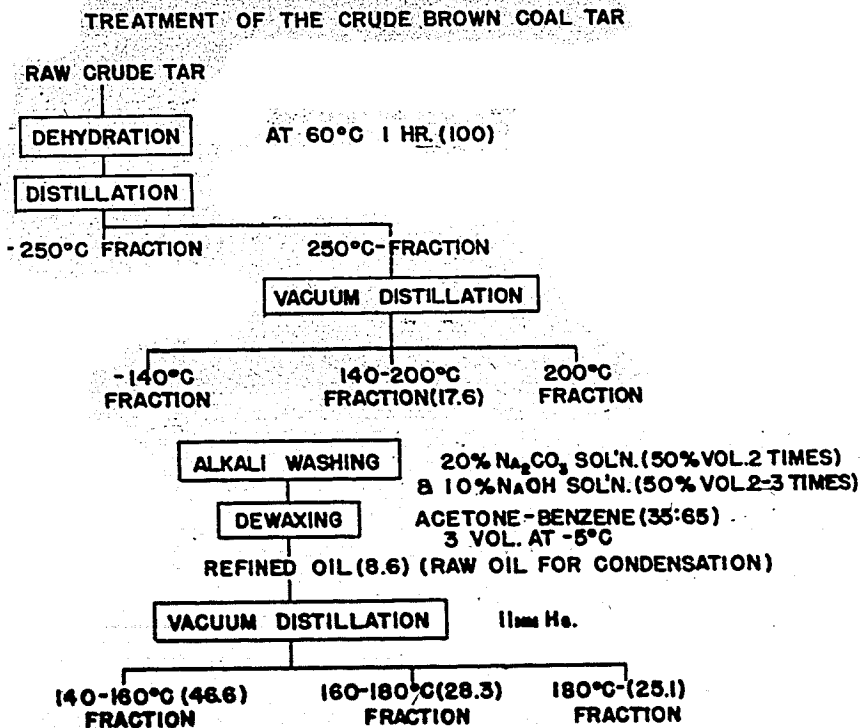


Figure 1(B) 16

TREATMENT OF THE CRUDE BROWN COAL TAR