50

ITEM No. 22
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DYNAMIT A.G., TROISDORF

COMBINED INTELLIGENCE OBJECTIVES
SUB-COMMITTEE

REPORT ON DYNAMIT A.G. TROISDORF, GERMANY

28 April, 1945

Reported by

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CIOS Black List Item - 22
Miscellaneous Chemicals

COMBINED INTELLIGENCE OBJECTIVES
SUB-COMMITTEE
G-2 DIVISION, SHAEF (Rear), APO 413

TABLE OF CONTENTS

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REPORT ON DYNAMIT A.G. TROISDORF, GERMANY

1. GENERAL CONDITION OF PLANT.

a. The plant was visited on 28 April, 1945. It is located in the town of Troisdorf about 15 miles south east of Cologne on the road to Siegburg, and covers an area of 2 kilometers square.

b. General Director Dr. Müller died on 4 April, 1945, and his place had been taken by Dr. Habbel. Dr. Mienes is in charge of the Plastics Section. The plant had escaped bombing until 29 December, 1944, and was so severely damaged that it has never operated since.

c. Like most explosive plants, the buildings are small and extend over a wide area with spaces between. The plastics section, which was investigated, had severe building damage and considerable apparatus destroyed; but it was estimated that if help, coal and raw materials were freely available, partial operation could commence in two months.

d. Dynamit A.G. has in all forty plants which were directed from Troisdorf. The Troisdorf plant had 9,000 - 10,000 workers of whom 2,000 were foreigners. In peace time 50 research men were employed, which complement had been reduced to ten by drafting for the army.

2. EXPLOSIVES SECTION - Director Habbel

a. In general, besides manufacturing, Troisdorf has served as a development center, manufacturing being then carried out in plants constructed for the purpose.

b. Among the plants outside Troisdorf are:-

*Malchow near Mecklingburg
*Wolfratshausen near Munich
Forde a/d Lenne near Olpe
Empelde near Hannover
Grünberg, Silesia
Nürnberg
Krümmel, Hamburg
Düneberg, Hamburg

* Operated by German Government.

c. Detonators, detonator cords and electric fuses were made at Malchow, Wolfratshausen, Forde, Empelde, and Grünberg. Infantry ammunition was produced at Nürnberg, TNT at Krümmel, gunpowder at Düneberg, nitro-cellulose at Troisdorf and nitrated Pentaerythrytol at Troisdorf, Malchow and Wolfratshausen.

d. It was stated that most items for explosives manufactured at Troisdorf were ordinarily used for coal mining in the Ruhr. Hence it would appear necessary to start such production at Troisdorf when mining in the Ruhr is resumed.

3. PLASTICS SECTION.

a. Dr. Mienes was relatively cooperative but continually denied knowledge of any details, stating that only his department heads knew them. According to him, no central file of processes and formulae exists which seems extraordinary and should be investigated further. Dr. Mienes is collecting this information from his department heads and will have it available in ten days to two weeks.

b. Types of plastics manufactured are as follows:-

(1) Cellulose

Vulcan fiber is cellulose hydrated by zinc chloride used for self-sealing gasoline tanks.

Collon is cellulose acetate from I.G. Dormagen and is used for gas masks.

(2) Phenol-Formaldehyde

All kinds of phenol-formaldehyde resins are manufactured.

(a) For large moldings a Novolak resin is beaten with soda pulp in a Hollander beater for two hours. 30 lbs. of Novolak are used per 100 lbs. of dry product together with 6-8% hexamine. The product is run into sheets on a paper machine or preformed before molding. Products are stronger than laminates.

(b) Laminates are made with both phenol and urea resins and of paper, cloth, and wood. Cloth laminates have been pushed during the war for practically all bearings. For paper laminates, instead of coating, the resin is made in the paper for plates, sheets or shapes, with as low as 20% resin content. Wood laminates from 1 mm beech wood and cresol resin, using 150 kg/sq. cm. pressure, is used for wooden airplane propellers.

(3) Melamine and Urea Resins

(a) Thiourea is used with urea because the powder can be stored longer without setting up.

Melamine is too expensive to be used alone, costing approximately 1.15 mks/kg. Due to its greater water resistance, it is used particularly for dishes at the ratio of 1 mol. melamine or urea to 2 mols formaldehyde.

(4) Polystyrene.

There are two types of polystyrene obtained from I.G. Ludwigshafen.

(a) Block polymerized.

Dr. Mienes stated that this is polymerized in a kettle and poured out in sheets with a softening point of 64°C.

(b) Emulsion polymerized.

This has a softening point of 72°C, is not clear, but is stronger and better for articles of varying thickness and complicated shape where breakage occurs in corners, etc.

No copolymers of styrene are used.

(5) Polyvinylcarbazole - Luvican

Luvican was generally unsatisfactory for injection molding since it had a melting point over 200°C, required much power and was hard on the molds.

(6) Polyvinyl chloride

(a) Vinidur

Vinidur is polyvinyl chloride without plasticizers used particularly for chemical apparatus.

(b) Mipolam

There are several types of mipolam:

i. Plasticized polyvinyl chloride.
ii. Copolymers of polyvinyl chloride and acrylic esters.
iii. Polyvinyl chloride and maleic esters. No more of these are available.

(c) After-chlorinated polyvinyl chloride

Chlorinated to 60% Cl content, a very stable product is obtained which is used for P.C. fiber in solution in methylene chloride in which the original polyvinyl chloride is not soluble.

Polyamides

(d) Polamides

The Nylon type polyamide melts at a very high temperature like polyvinyl carbazole but has a very short melting interval, becomes very liquid and can be easily injection molded.

Polyurethanes have better heat resistance than polystyrene but not as good electrical properties. They will become very important after the war, according to Dr. Mienes.

c. Plant Operations

(1) Most of the plant operations are standard.

(2) Continuous calendering of Vinidur Sheets.

Fresh plastic is mixed on one set of rolls and scrap on another, then the two together through two sets of rolls in series. The crude sheet is delivered continuously to a three roll calender maintained at temperatures according to type of plastic from 120° to 160°C. The sheet is somewhat opaque due to markings but is ready for press polishing. This is carried out for the most part by the old pack method but a continuous press polishing machine is being developed wherein the plastic runs between a 1/4" rubber belt and a thin polished metal belt forming a "sandwich". The combination passes first over an upper roll, then around a lower one with 2/3 surface contact, then again over an upper and to a cutting table. The rolls are heated to a suitable temperature.

4. RECOMMENDATIONS.

It is recommended that the Dynamit A.G. plant at Troisdorf be revisited to obtain:-

a. The detailed formulae books and detailed process instructions.

b. Blueprints of the continuous developmental press polishing machine.

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