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THE SHIPBUILDING COMPONENT INDUSTRY IN EAST GERMANY



CIA/RR 1

15 February 1952

CENTRAL INTELLIGENCE AGENCY

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CENTRAL INTELLIGENCE AGENCY
Office of Research and Reports

THE SHIPBUILDING COMPONENT INDUSTRY
IN EAST GERMANY

CIA/RR 1

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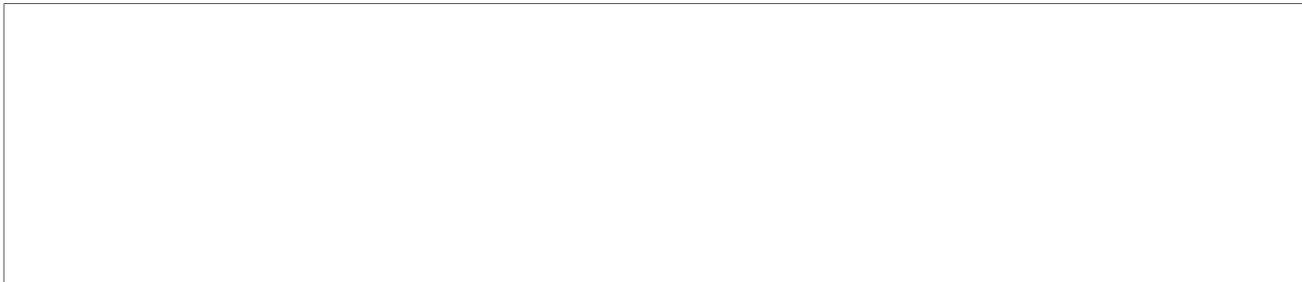
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THE SHIPBUILDING COMPONENT INDUSTRY IN EAST GERMANY*

Summary and Conclusions

By mid-1951, East German production facilities were adequate for the production of components for fishing craft construction, but there was a severe shortage of materials. Although shipbuilding component production in East Germany is largely a secondary endeavor of plants primarily engaged in other activities, the shipbuilding component industry has an important place in the economy of East Germany. Capacity for production of shipbuilding components is sufficient to support a shipbuilding effort of 700 light craft annually, or about twice the present production. Preliminary plans for steel consumption by the industry, including ship plate, for the years 1951-55 will require 5 percent of planned annual steel output.

The advanced stage of centralized control and planning already existing in the industry lends itself to immediate conversion to a war economy. The design of the ships on which the various components are used has been in accordance with the principle of ready adaptability to naval usage.

The submarine construction program of the USSR is aided by East German production of needlebearings, periscopes, and valves. East German naval designers are contributing to Soviet gas-turbine and torpedo experimentation. The Soviet economic potential is increased by East German contributions of communication equipment, nautical instruments, and other components for merchant ship construction in Polish and Soviet yards. East Germany plays a vital role in the procurement for the Soviet Bloc of diesel engines, ground tackle, electronic equipment, and other critical items from the West.

Western export restrictions contributed to the severe shortage of materials which forced drastic curtailment of production of shipbuilding components in East Germany in 1951. Stricter enforcement of export controls by the West German government is more feasible now because of the expanded market in its own shipyards. More effective measures against the flow of production equipment and raw materials would necessitate either large-scale importing of shipbuilding components from the Soviet Bloc or further curtailment of the shipbuilding program.

* Including ship plate, structural steel, and naval ordnance.

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S-E-C-R-E-TI. Introduction.1. General Description of the Industry.

Shipbuilding as currently conducted in East Germany is largely an assembly-type operation by shipyards which require a large number of finished components from outside plants. These yards have undertaken a program which includes series production of fishing vessels. They also salvage and repair merchant ships up to 22,000 gross registered tons (GRT). Construction of cargo vessels up to 8,000 GRT will begin in 1952.

To meet the expanding requirements of the industry, a central purchasing commission was established in 1948. With access to former sources of supply in West Germany no longer assured, attention has turned to the development of a self-sufficient shipbuilding component industry in East Germany. Emphasis has been on the establishment of a workable system of subcontracting with firms in related industries rather than on the construction and development of new plants. Shipbuilding components have become important products of firms in the East German engineering industry.

2. Importance of the Industry.

Goals of the East German shipbuilding and shipbuilding component production programs are to provide East Germany with a merchant marine and fishing fleet of its own and to augment the merchant and fishing fleet of the USSR through reparations and other agreements.

In addition to the increase in the economic potential of both countries which such a program offers, their war potential is increased because of the convertibility of these ships for use as naval vessels and auxiliaries. As the supporting element to the East German shipbuilding effort, the shipbuilding component industry assumes a vital role in the over-all planning of the Soviet Bloc. Of additional significance is the use of East German factories to supply critical components to shipyards in the Soviet Orbit.

Some idea of the importance which shipbuilding component production has assumed within East Germany can be gained by a comparison with the US. Normal peacetime* consumption of steel for shipbuilding averaged 1.3 percent of total finished steel production in the US. In 1951, steel consumed in East Germany for production of ships' machinery alone amounted to 1 percent of production, and total yearly consumption by the shipbuilding industry, including plate and structural steel, is expected to average 5 percent of the steel produced during the current Five Year Plan (1951-55).

* 1939 is considered the last normal prewar year.

S-E-C-R-E-T3. Organization and Operational Procedures.

The East German Ministry of Machine Building, through its Main Administration for Shipbuilding (HVS), supervises shipbuilding operations in East Germany. This administration is subdivided into the Federation of Nationalized Yards (VWV) and the High Sea Shipbuilding Bureau (HSSB) which exercise administrative control over the shipyards and over a few component plants.

The vast majority of plants producing components used in shipbuilding, however, belong to subdivisions of other Main Administrations of the Ministry of Machine Building. For example, sonic depth finders are produced at a factory in Koelleda which belongs to the Radio and Telecommunication (RFT) section of the Main Administration for Electro-technical Construction. Plants belonging to subdivisions of the Ministry of Heavy Industry and to the Ministry of Light Industry also manufacture components.

Procurement orders for components are channeled upwards and distributed on higher levels where representatives of various administrative offices place orders with appropriate factories. Despite inevitable delays necessitated by this procedure, detailed operational liaison at all stages of production and planning has been effective in working out a satisfactory flow of components. The tentative relationship of the High Sea Shipbuilding Bureau to its own shipyards and component plants and to the administrative organization which directs production in the complex web of East German industrial installations is indicated in the chart which follows. (See Fig. 1.)

4. Technology.

No significant improvements in technology are known to be used in East German plants producing shipbuilding components. Series assembly of the larger components has standardized production types and permitted fulfillment of orders in shorter working periods. Substitution of available materials for those in short supply has caused the quality of production to vary considerably. For example, when special steels needed for moving parts in diesel engines are not on hand, steel with improper alloying elements sometimes is used. While such substitutions inevitably lead to higher rejection rates, poor operating efficiency, and increased repair costs, the ability to make such substitutions has been largely responsible for the quantitative achievements of the component industry.

S-E-C-R-E-TII. Production of Components and Parts.1. Location and Capacity of Facilities.

Over 100 factories have been identified in East Germany as producers of components and parts used in the shipbuilding industry. (For the location of the majority of these factories, see Fig. 2, and for a detailed list, see Appendix A.) The wide dispersion of plants throughout East Germany is illustrative of the effectiveness of the operational liaison between the shipbuilding administration and other branches of industry.

The more important plants, those producing the major proportion of propulsion machinery, are the Wolff plants at Magdeburg (Buckau) and Magdeburg (Salbke), the Diesel Motor Works at Rostock, the Geraetbau at Schoenebeck, and the Kjellborg plant at Finsterwalde.

Capacity for greater output exists in nearly all plants because production of marine components represents only a small percentage of total plant utilization. Reasonable limits on over-all capacity can be estimated, however, by the ability of the major plants to produce main and auxiliary engines without serious dislocation of other activities. An estimate based on peak monthly production in 1950 and 1951 of 300-horsepower diesels and supporting propulsion equipment indicates that the industry is capable of supplying the components needed for 700 fishing vessels, which would be about twice the present actual production in East Germany.

2. Output.

Production in the East German shipbuilding component plants in 1951 was geared to the short-term requirements of the domestic building program and to the fulfillment of a few export orders. Material allocations are made in strict accordance with the minimum requirements necessary to complete the shipbuilding production schedules set forth in the state Plan. There is almost no output above actual targets. (For the products produced by each plant, see Appendix A.)

a. Diesel Engines.

Noteworthy in the production of marine diesels in 1951 was the assembly by hand of the first 1,000-horsepower diesels at Rostock and the production of the 500-horsepower diesels required for the new seagoing trawlers. These engines were turned out at Rostock, at Goerlitz, and at the Wolff plants, the latter of which also series-produced for the first time 200-horsepower diesels needed for the cutter-building program. Additional cutter engines were imported from West Germany.

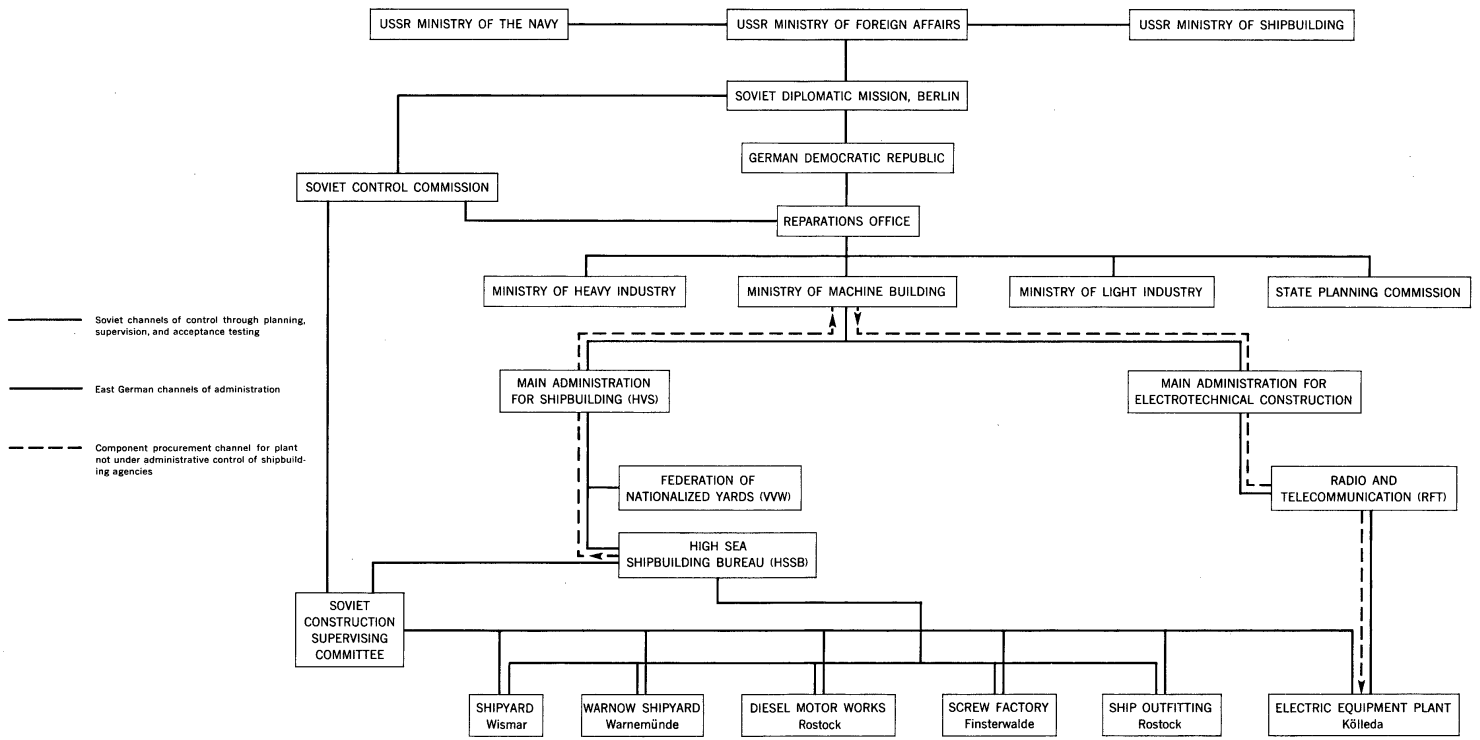
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FIGURE 1
TENTATIVE CHART OF CONTROL CHANNELS FOR
SHIPBUILDING AND RELATED INDUSTRIES IN EAST GERMANY

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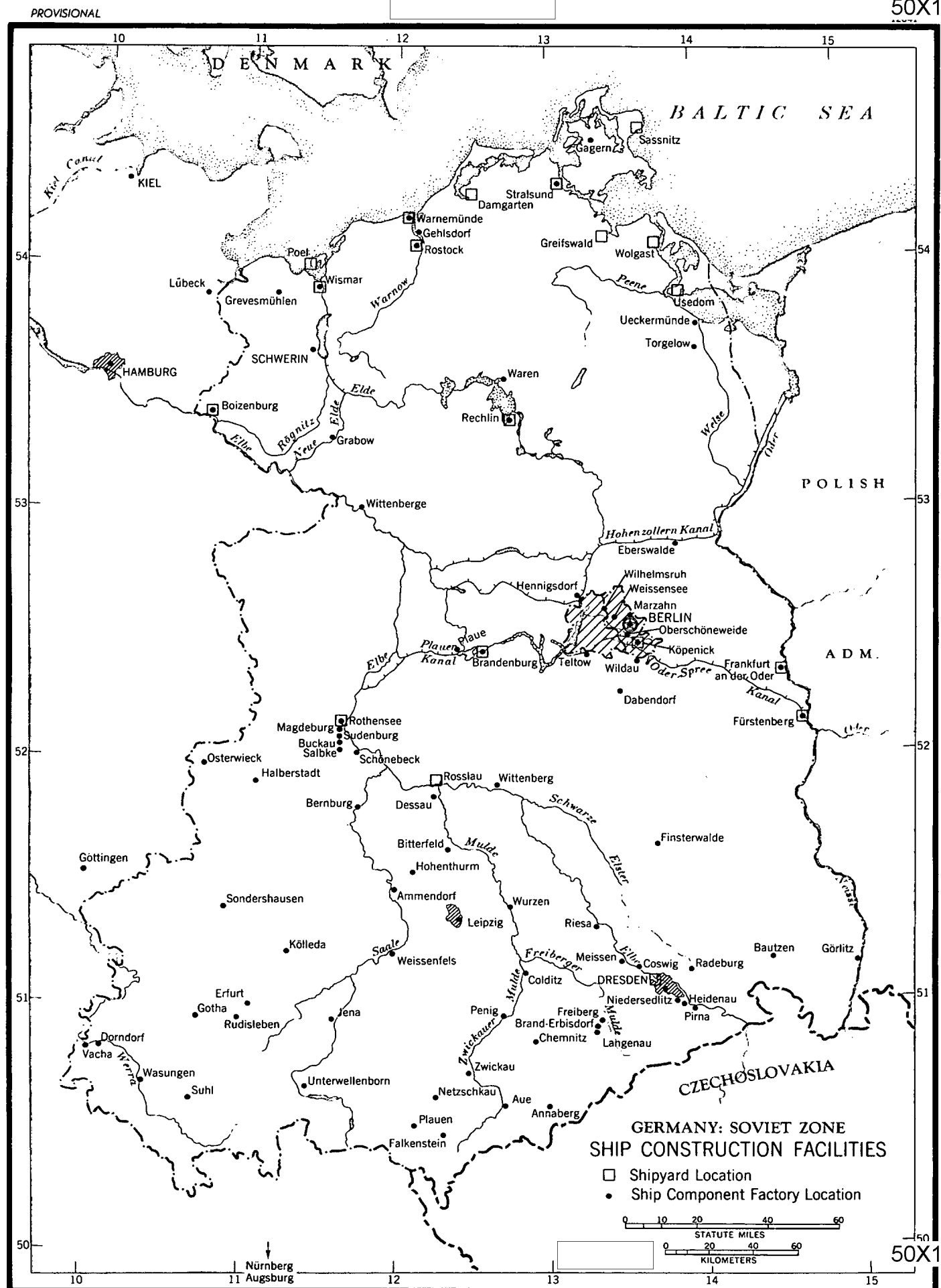


FIGURE 2

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The drive for domestic self-sufficiency in engine production is continuing to make progress. The standard 300- and 100-horsepower diesels are already produced in quantities sufficient to satisfy domestic needs. Given sufficient materials, production of 200-, 500-, and 1,000-horsepower marine diesels also should meet planned requirements in 1952. The general shortage of diesels in the other Soviet Bloc countries, however, probably will mean continued importing of some marine engines from West Germany for reexport. (For production data of marine propulsion units at various factories in East Germany, see the table on p. 6.)

b. Marine Electrical Equipment.

Marine electrical equipment is produced in East Germany chiefly at three plants, the RFT Central Laboratory at Berlin (Koepenick), RFT Koelleda, and RFT Dabendorf. At Koelleda, 60 sonic depth finders were produced in 1950; at Dabendorf, 250 patrol boat transmitter sets (100-watt) were manufactured in the same year. Other production, for which totals are not available, includes 20-watt ship-to-ship radio-telephone equipment for fishing vessels and a wide range of ships' electrical equipment and sea-rescue signal apparatus.

East Germany is expected to become increasingly important in 1952 as a producer of marine transmitting and receiving sets. Included in production plans are 100-watt medium-wave transmitters, 100-watt short-wave transmitters, 1-kilowatt short-wave transmitters, and very-low-frequency receivers. Some of these sets reportedly are destined for use in Bloc naval vessels, but as yet neither shipment to the USSR nor installation of these sets on visiting Soviet ships has been reported.

c. Plate and Structural Steels.

The principal producers of plate and sheet steels for shipbuilding in East Germany are the Halbzeugwerke at Aue, the Maximilianhuetten at Unterwellenborn, and the Kirchmoeser Rolling Mill at Brandenburg (Havel). Structural pieces also are produced at the steel mills at Riesa and Hennigsdorf. These plants have the ability to meet current requirements but will require new equipment in order to turn out the larger plate sections needed for the ocean-going vessels to be built in the 1952-55 period.

Expansion of production facilities at these installations and the construction of new mills, despite the lack of sufficient materials to maintain present plants at full capacity, are indicative of the East German government's determination to push through its shipbuilding program regardless of the major supply problems involved.

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Production of Marine Propulsion Units and Auxiliary Equipment in East Germany ^{a/}

Factory	Town	Type of Unit	Maximum Known Production Rate	Period	Estimated 1951 Production	Comment
Wolff	Magdeburg (Buckau-Salbkke)	Diesel, 100 Horsepower	40 per Month	Nov 1950	400	Auxiliary for loggers, seiners
		Diesel, 200 Horsepower	68 per Year	Year 1951	68	Main cutter engine
		Diesel, 300 Horsepower	65 per Month	Nov 1950	450	Main logger, seiner engine
		Diesel, 500 Horsepower	1 per Month	4th Quarter 1951	3	Main engine for trawlers
Diesel Motor Works	Rostock	Diesel, 100 Horsepower	48 per Year	Year 1950	200	Auxiliary for loggers, seiners
		Diesel, 500 Horsepower	1 per Month	4th Quarter 1951	3	First of 55 engines planned by 1955
		Diesel, 1,000 Horsepower	2 per Year	Year 1951	2	First of 63 engines planned by 1955
		Diesel, 2,000 Horsepower	In Design	Year 1951	0	55 engines planned by 1955
Wumag	Goerlitz	Diesel, 500 Horsepower	1 per Month	4th Quarter 1951	3	For 600 GRT trawlers
		Diesel, 200 Horsepower	N.A.	Oct 1951	N.A.	Main cutter engines
Horch	Chemnitz	Diesel, 30 Horsepower	5 per Quarter	Year 1951	20 ^{b/}	Automotive and tractor diesels adapted for small craft made in the Berlin Yacht Yard
		Diesel, 45 Horsepower	3 per Quarter	1st Quarter 1951	9 ^{b/}	
		Diesel, 120 Horsepower	3 per Quarter	1st Quarter 1951	9 ^{b/}	
Geraetbau	Schoenebeck	Diesel Generators	64 per Quarter ^{g/}	4th Quarter 1950	256	For main engines, loggers, seiners
		Electric Motors, 50 Horsepower	20 per Month ^{g/}	Year 1951	240	Auxiliary engine for light, heat
Kjellborg	Finsterwalde	DC Motors and Generators, 3 to 70 Kilowatts	1,600 per Year ^{g/}	1950	1,600	Standard electric auxiliaries shipped as needed by shipyards and other industries
		Current Regulators	250 per Year ^{g/}	1950	250	
Elbtalwerk	Heidenau	AC Motors				
		0.25 to 1 Kilowatt	1,000 per Year ^{g/}	1950	1,000	Standard electric motors for cranes & winches allocated in part to shipbuilding
		1 to 10 Kilowatts	5,000 per Year ^{g/}	1950	5,000	
10 to 50 Kilowatts	1,800 per Year ^{g/}	1950	1,800			

a. The electric engine repair plants in Dorndorf and Osterwieck are used by the shipyards for rebuilding small electric motors. The Schwermaschinenbau in Halberstadt is reported to have commenced production of 200-horsepower marine diesels. The Sachsenwerk (SAG) at Niedersiedlitz is an important, additional source for electric motors, generators up to 250 kilowatts, and transformers.

b. Allocation for marine use from general production.

c. General production of types known to be used in East German shipbuilding.

S-E-C-R-E-Td. Nautical Instruments.

Production of nautical instruments in East Germany is centered at the Askaniawerke in Berlin (Teltow). Manufactured at this plant are ships' compasses, patent logs, automatic tide and current gauges, coastal water thermometers, and metering devices and gauges for shipboard machinery. Although a wide variety of instruments is produced here, there is considerable dependence on West Germany for small parts. The Askania plant supplies domestic shipyards and is an important supplier of nautical instruments to the USSR.

e. Submarine Components.

Of special interest is the role of East Germany as a potential source of parts used in submarine production. Immediately after World War II a series of orders for odd components was placed at various plants. These parts probably were used to outfit or to complete captured German vessels. In 1948 and in 1949 a few additional orders reportedly were received for submarine components, and more recently there have been numerous reports mentioning export orders for the USSR. The table below is based on the more reliable of these references:

Production of Component Parts for Submarines
in East Germany

<u>Factory</u>	<u>Location</u>	<u>Components</u>	<u>Quantity</u>	<u>Production Period</u>	<u>Remarks</u>
Maschinen-fabrik	Penig	Transmissions	2	1949 and 1950	For experimental submarine
Maschinen-fabrik	Goerlitz	Centrifugal Pumps	N.A.	1950	Capacity, 300 litres per minute
Chemical Factory	Rudisleben	Valves	300	1950	T-shaped; known production rate, 25 per month
DKF <u>a/</u>	Leipzig	Needle-bearings	3,500,000	1950 and 1951	Includes bearings for torpedo boats
Zeiss	Jena	Periscopes <u>b/</u>	N.A.	1951	Production begun in Aug 1951
Simson	Suhl	Periscope Parts	N.A.	1951	For Zeiss-Jena; production begun in 1951

a. Deutsche Kugellagerfabrik (German ball-bearing factory).

b. The recent order for periscopes at Zeiss-Jena is significant evidence of increased need for this component in the USSR.

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S-E-C-R-E-TIII. Input Requirements.1. Materials.

The principal material used in the production of ship components is steel. The requirements of steel in East Germany in 1951 for the manufacture of ships' machinery and deck equipment for about 360 fishing vessels totalling 100,000 GRT are computed to be 16,000 metric tons of ingot steel. Plate and structural steel production will not require more than 25,000 metric tons of ingot steel during the same year. The comparatively low amount of steel used for plate and structural pieces is a result of substitution of wood on the loggers and cutters. As production of such larger fishing vessels as trawlers and of merchant ships gets under way in 1952, the use of steel will increase because substitution of wood will be less feasible on these larger ships.

Preliminary East German plans for annual consumption of steel by the shipbuilding industry during the Five Year Plan (1951-55) are known to be 95,000 metric tons of finished steel. Because there is a loss of at least 25 percent in the processing from raw to finished steel, an annual requirement of 126,000 metric tons of ingot steel can be estimated. This is about 5 percent of planned average annual production of ingot steel in the same period.

In view of the severe material shortages and the recent downward revisions in the production schedule of merchant vessels, it seems unlikely that actual shipbuilding consumption will exceed 70,000 to 75,000 metric tons of ingot steel. Shipbuilding consumption should remain at approximately 5 percent of actual production, however, because over-all steel output in East Germany will itself probably fall below original plans.

East German mills, with the help of limited imports of alloy steels from Czechoslovakia, have adequate facilities to meet the steel requirements of the component plants and shipyards, but they are not able to maintain capacity output, because of shortages of iron ore and coke. The severe shortages of ores will make the East German mills directly dependent on fulfillment of large-scale imports planned from Krivoi Rog, USSR.

Nonferrous metals, chiefly copper alloys, also are used in the manufacture of shipbuilding components. The shortage of nonferrous metals in East Germany, however, is acute and has resulted in intensive scrap salvaging and substitution wherever possible. Tubing, for example, is sometimes made of galvanized steel instead of copper. Domestic suppliers such as Kupfer Messing in Hettstedt were able to provide only 44 metric tons of the 132 metric tons of brass required in 1950. Requirements of bronze for propellers, while small, are being met with great difficulty. Use of aluminum on fishing vessels has been negligible.

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Seasoned lumber is obtained in quantity from West Germany and from Yugoslavia through Swiss intermediaries. Marine paint, also in short supply, is produced at the paint factory in Berlin (Teltow). Additional paint is procured from the Netherlands.

Rope-making materials are virtually unobtainable in East Germany. The entire supply is shipped by firms in Hamburg. These firms evade restrictions against reexporting by false labeling. The Bastfaser plant in Annaberg converts manila, hemp, and sisal into halyards, cordage, rigging, and rope for the shipyards.

2. Manpower.

It is believed that the total number of workers exclusively engaged in ship component production in the major plants in East Germany does not exceed 6,000.* There is a shortage of skilled labor and technical personnel in all segments of the industry, and the lack of mechanical engineers and draftsmen with experience in both machinery design and shipbuilding is especially acute. As a result, preventable flaws in operation of such components as net winches are not discovered until they are installed and in use.

Training programs include apprentice shops in the component plants and courses in the Technical Institute at Rostock. The shipbuilding industry also recruits skilled personnel from West Germany. This policy, however, has had limited success. The controls over both unskilled and semi-skilled labor in East Germany are sufficient to give the labor force a high mobility and to allow management to shift workers from plant to plant. The shortage of skilled labor and professional personnel, however, is unlikely to be alleviated before the end of the current Five Year Plan (1951-55).

3. Equipment.

By mid-1951, production equipment needed for construction of components for fishing craft in East Germany was adequate to meet the demands of the shipbuilding program. Widespread deficiencies exist, however, in the availability of production equipment needed for the new merchant marine building program. In particular, large machine tools such as crankshaft turning lathes for the 1,000-horsepower diesels are not readily available from machine tool plants, which have only recently recommenced production of large special-purpose machine tools.

* For statistical purposes, this total would ordinarily be included with statistics for heavy industry, light industry, or shipbuilding.

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Ship plate production has been limited to plates which are 5.5 meters long and 2 meters broad. Considerable retooling and some new equipment will be needed to produce the larger plates required. Component plants are known to be expecting delivery of some of these machine tools from West Germany to set up production lines for the new building program.

4. Power.

It is estimated on the basis of comparable US experience that the percentage of electric power cost to total manufacturing costs would be the lowest of all input factors.

In the US, power inputs presently account for approximately one-half of 1 percent of the production cost of electrical equipment; seven-tenths of 1 percent of the manufacturing cost of engines, turbines, and similar machinery; about four-tenths of 1 percent of the cost of sheet metal production; and about one-half of 1 percent of structural steel production cost.

Power plants by mid-1951 had recovered very largely from the effects of postwar dismantlings in East Germany. No plants producing marine components are known to be limited by a lack of electric or other power.

5. Construction.

The expenditure of DM 3.2 million (East) for reconstruction of the Diesel Motor Works in Rostock was authorized in 1950. The plant is now in production. There has been little other plant construction or expansion outside of the shipyards proper.

Priorities for housing projects for workers, however, have been assigned to areas adjacent to ship component plants in Finsterwalde and Rostock. Because of the shortages of construction materials in East Germany, assignment of priorities for such supplies is believed to be indicative of the determination of the East German government to ensure the success of the ship-building program.

6. Parts.

East Germany in 1950 and 1951 was still dependent on West Germany for parts for certain nautical instruments, marine electronic equipment, ground tackle, pistons, crankshafts, and other diesel engine parts. The principal procurement agent for marine components and parts has been the Selbsthilfe Kieler Betrieb in Kiel. The trade of this firm with East Germany amounted to DM 3.5 million (West) in 1950.

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The shipyards in East Germany are heavily dependent on West German firms for replacement parts for prewar marine engines still in use on inland water and harbor craft. In addition, complete diesels are imported to augment production. The Maschinenfabrik Augsburg-Nuernburg was an important exporter of diesels in 1951. Other sources for diesels included Klockner, Humboldt and Deutz in Cologne, Maschinenbau in Kiel, and Bohn and Koehler in Kiel. Total value of marine engine exports from West Germany to East Germany may exceed DM 2 million (West) in 1951.

There undoubtedly will be continued importing by East Germany during the current Five Year Plan (1951-55). The drive for self-sufficiency in marine component production has made steady progress, and increasing orientation of the entire shipbuilding industry toward the economy of the Soviet Bloc is discernible. Shipments of ship plate and structural steel were received in Rostock from the USSR in mid-1951. Continued shipments may be expected until production of large plate sections in East Germany is satisfactory.

Parts for diesels and pumps occasionally have been shipped from Czechoslovakia, Bulgaria, and Hungary. In addition, the USSR has shipped critical parts needed for construction on 19 large Soviet merchant vessels (1,000 to 20,000 GRT) undergoing repairs in East German yards during 1951. The Soviets also supply parts to East German yards for repairs on Soviet naval vessels.

IV. Distribution of Output.

1. Domestic Requirements.

The requirements of each East German yard for components needed to fulfill its quota of ships determine production orders. In addition, there are a few orders filled specifically for shipment to other Soviet Bloc countries. With the exception of this latter category, domestic yards consume all production, and there is no exportable surplus.

2. Foreign Requirements.

Exports include 300-horsepower diesels produced by Wolff which are shipped in unknown quantities to Baltic ports in the USSR and in Poland for installation on fishing vessels built in those two countries. Production of 85 large marine boilers and 91 turbines, both for export to the USSR, also are included in production orders this year. The submarine components previously mentioned are shipped to the USSR.

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Sporadic reports indicate that East German industrial facilities are utilized for the processing of parts for naval guns, but there is no evidence of sustained production of naval ordnance of any kind. Of significance, however, is Soviet interest in East German experimental facilities. The Economic Technical Bureau (WTBG) in Berlin is known to have developed a new stabilizing device for torpedoes, and the Entwicklungsbuero (design office) in Dresden has conducted experiments in the development of new turbines adaptable for naval use.

3. Stockpiling.

No stockpile of marine components is known to exist in East Germany. The export of 3.5 million needlebearings, however, is evidence of possible stockpiling of this component in the USSR.

V. Limitations and Vulnerabilities.1. Limitations.

Limitations in the supplies of basic raw materials do not permit full utilization of shipbuilding component production facilities in East Germany without substantial importing. Production has been further curtailed by the shortage of skilled labor which necessitates the hiring of workers with a lower level of productivity. Another factor which decreases the value of East Germany as a supplier of needed components is the concentration upon a few standard models for series production. Replacement units for models not currently manufactured are not readily available, and this entails long delays in repair work.

2. Vulnerabilities.

Western export restrictions contributed to the severe material shortages which sharply curtailed activities in some East German shipbuilding component plants in 1951. Even stricter enforcement of controls by the West German government now is practicable because of alternative markets in the expanded West German shipbuilding industry. Curtailment of repair activities subcontracted by East Germany to yards in Belgium and the Netherlands would severely impair East German salvage and repair programs because of the inability of East German plants to produce many of the nonstandard components needed.

The flow of components to coastal shipyards is subject to disruption at two key points. Magdeburg, with several major plants, and Berlin, with a concentration of component plants, are both situated at intersections of principal railroads, waterways, and roadways used in the shipment of components.

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APPENDIX A*

LOCATIONS, INSTALLATIONS, AND PRODUCTS OR ACTIVITIES
OF THE SHIPBUILDING COMPONENT INDUSTRY
IN EAST GERMANY

<u>Location</u>	<u>Installation</u>	<u>Product or Activity</u>
Ammendorf	Wagenbau	Metal-processing
Aue (Hammer)	*Halbzeugwerke	Ship Plate
Bautzen	Drahtseilerwerk	Cable
Berlin	Andacht, Paul Co.	Winch Drums
	Akku Fabrik	Submarine Equipment
	*Askaniawerke Teltow	Precision Instruments
	Augustin Werke	Engines, 800-horsepower
	Berliner Stahlbau	Winch Frames
	Bergman Borsig	Turbines
	Heckert	Winches
	Klockner Eisenhandel	Metal Importer
	Kabelwerk Oberspree	Marine Cable
	Kabelwerk Koepenick	Marine Cable
	Lackfabrik Teltow	Marine Paint
	Osram Works	Incandescent Lamps
	Primus Trakteren Werke	Parts Made of Gun Metal
	RFT Central Laboratory	Communication Equipment
	Transformer Works	Transformers, Motors
	Wagner Laboratory	Voltage-control Devices
	Wilhelmsruhe Electric Equipment Plant	Voltage-control Devices
Bernburg	*Armaturenwerk (SAG) a/	Precision Parts for Sub- marines
Bitterfeld	Kombinat	Hydronalium Sheets
Brand Erbisdorf	George Weingoldt	Forgings, Stampings
Brandenburg (Havel)	Precision Instrument Plant	Naval Optics
	Kirchmoeser Rolling Mill	Plate
Chemnitz	Hauboldt Maschinenfabrik	Diesels
	Niles	Machine Tools
Colditz	Alfred Stortz Co.	Engines
Dabendorf	RFT Plant (VEB) b/	Radio-telephone Equipment
Dessau	Maschinenfabrik (ABUS) c/	Electromagnets
Dorndorf (Thuringia)	Repair Plant (VEM) d/	Repairs for Electric Motors

* Additions and corrections to the list of component plants are invited.

- a. Soviet-owned firm.
b. People-owned plant.
c. Mining and Heavy Industrial Equipment.
d. Federation of Electrical Machine-building Plants.

S-E-C-R-E-T

S-E-C-R-E-T

<u>Location</u>	<u>Installation</u>	<u>Product or Activity</u>
Dresden	Agregat	Small Engines
	Brueckner Kanis	Turbines
Eberswalde Erfurt	*Entwicklungsbuero (Design Office)	Turbine Experimentation
	Electric Motor Works	D.C. Motors
	Ludwig Karl	Winches
	Kruse Co.	Starting Gear
	Schulze and Schulze	Ship Airconditioning Units
	Ardeltwerke	Forgings, Turbines, Propellers
	Dietz	Boilers
	Hagans Co.	Engine Models
	*J. Jahn	U-boat Ballast Pumps
	RFT Erfurt	Batteries, Radar
Finsterwalde	*Henri Pels	Castings for Submarines, Naval Guns
	Kjellborg	Electric Motors, Generators, Welding Electrodes
Freiberg (Saxony)	*Schraubenfabrik	Nuts, Bolts, Rivets
	Hildebrandt Plant	Precision Instruments for Submarines, Sextants
Gagern Goerlitz	Repair Shop	Small Craft Parts
	*Maschinenfabrik (VEB)	Gas Turbine Generators, Diesels
Grevesmuehlen Halberstadt Halle Heidenau Hennigsdorf	Praezionsmaschinenfabrik	Precision Parts
	Schwermaschinenbau	Diesels
	*Hallesche Pumpenwerk	Pumps
	Elbtalwerk	Electric Motors
	*Electric Locomotive Plant	Turbine Parts, Plate
	*Stahl und Walzwerke	Parts for Submarines, Naval Ordnance
Hohenthurm Jena	Dampfkesselbau (VEB)	Boilers, Fittings
	*Zeiss	Precision Parts, Industrial Diamonds for Submarines, Periscopes
Koelleda Langenau Leipzig	RFT Plant (VEB)	Echo Sounding Equipment
	Plant Name Unknown	6-kilowatt Motors
	Eger Works	Compressor Parts, Trans- missions
	Energie und Kraft- maschinenbau	Diesels
	Elektrostahlgusswerk	Gas Turbine Parts
	*Deutscher Kugellager- fabrik	Needlebearings for Sub- marine and Torpedo Boats
	Meier and Weichelt	Cable Blocks, Propellers
	Schuman and Co.	Submarine Valves

S-E-C-R-E-T

<u>Location</u>	<u>Installation</u>	<u>Product or Activity</u>
Magdeburg (Buckau)	*Wolff	Winches, Gear
Magdeburg (Salbke)	*Wolff	Diesels, Boilers
Magdeburg	Krupp-Gruson	Turbine Rotors, Ground Tackle
	*Polte	Valves, Gauges, Submarine Parts
	*Schaeffer and Budenburg	Submarine Parts, Signal Whistles
Marzahn	Hasse and Wrode	Engine Parts
Meissen	Meissen Co.	Friction Discs
Netztschkau	Nema (SAG)	Propellers, Pontoons
Niedersedlitz	Sachsenwerk	Electric Motors, Transformers, Generators
Osterwieck	Repair Plant (VEB)	Electric Engine Repairs
Penig	Peniger Maschinenfabrik	Cable Winches, Transmissions for Submarines
Pirna	Control Apparatus Plant	Electric Switches
Plaue (Havel)	Shipyard Lathe Shop	Anchor Winches
Radeburg	Sachsenwerke	Radar
Riesa	Riesa Steel Mill	Plate, Angle Irons, Piping
Rosslau	Elbwerke	Net Winches, Capstans
Rostock	*Dieselmotorenwerke	Diesel Engines, Windlasses
	Maschinen und Kuhlschrank	Refrigeration Machinery
	Schiffsausstattungswerk	Outfitting, Ship Interiors
	Elektro (VEB)	Motor Generators, Electric Motors
	Industriewerke	Winches
Rudisleben	Chemische-Maschinenfabrik (SAG)	Valves for U-boats
Schoenebeck	Geraetbau	Diesel Generators, Electric Motors
Schwerin	Plant at 87 Goethestrasse	Electric Motors, Telegraphs
	Industriewerke	Net Winches
Suhl (Thuringia)	Simson (SAG)	Periscope Parts
Torgelow	Giesserei	Forgings, Castings, Diesel Parts, Winches, Propellers
	Maschinenfabrik	Signal Whistles
Ueckermuende	Laternwerk	Ship Lanterns, Patent Logs
	Stahlgiesserei	Propellers
Unterwellenborn	Maximilianhuette	Plate, Piston Rods
Vacha	Cable Plant	Rubber-covered Cable
Waren	Waren Mueritz Foundry	Propellers, Porthole Fittings, Steering Gear Sockets, Diesel Parts

S-E-C-R-E-T

<u>Location</u>	<u>Installation</u>	<u>Product or Activity</u>
Warnemuende	Plant at 3 Poststrasse	Installation of Radios
Weissenfels	Industrial Hardware Plant	Anchor Chain
Wismar	Wagenfabrik	Naval Instruments
Wurzen	Cable Works	Wire Cable
Zwickau	Horch	Diesels

Additional Locations, Installations, and Products

<u>Location</u>	<u>Installation</u>	<u>Product or Activity</u>
Annaberg (Erzgebirge)	Bastfaser	Rope, Cordage, Nettings
Berlin	Gaselan (VEB)	Buoys, Beacons
Berlin (Grunau)	Clarsten Co.	Tackle, Sail
Berlin (Johannisthal)	Kaltmaschinenbau	Refrigeration Units for Loggers
Berlin (Johannisthal)	Motorenwerke	Two and 4-horsepower Outboard Motors
Boizenburg	Plattenfabrik	Plate, Hull Sections
Falkenstein (Sachsen)	Webereien	Signal Flags
Gotha	Maschinenfabrik	Reverse Gears
Grabow	Geraetbau	Bronze Parts
Leipzig	Radio-signal Plant	Shutter Signal Apparatus
Plauen	Gluehlampenwerke	Clocks, Chronometers
Rechlin	Staatswerft	Transmission Gears
Sonderhausen (Thuringia)	Zweigwerk	Cylinderheads, Nozzleholders
Wildau	Heavy Machine Works	Ship Plate Press
Wismar	Stahlbau	Anchors

It is possible that the following installations also may be making or processing parts for submarines:

Raguhn	Heerbrandt	Interior Equipment
Wasungen	Jaeger Cigar Factory	U-boat Parts
Wittenberg	Former Textile Plant (name unknown)	U-boat Parts
Wittenberge	Railroad Repair Works	U-boat Engine Repairs

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