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NAVAL ORDNANCE PRODUCTION PROBLEMS

17 February 1948

L48-88

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Publication Number L48-88

THE INDUSTRIAL COLLEGE OF THE ARMED FORCES

WASHINGTON, D. C.

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NAVAL ORDNANCE PRODUCTION PROBLEMS

17 February 1948

CAPTAIN WORTHINGTON: Gentlemen, last week we heard from Major General Hughes on Army Ordnance production problems. This afternoon we will hear from Rear Admiral A. G. Noble on Navy Ordnance Production Problems. Admiral Noble has had the opportunity, first, to plan for ordnance production in the Bureau of Ordnance and then to command a cruiser and later an amphibious group in combat operations, using that same material. At the end of the war he returned to Washington to be Assistant Chief of Naval Operations (Material.) At the present time he is Chief of the Bureau of Ordnance. I take great pleasure in introducing Admiral Noble.

ADMIRAL NOBLE: Ordnance is designed and produced for mounting in specific types of ships and aircraft. In short, the providing of the ordnance must be done in close coordination with the shipbuilder or the aircraft manufacturer. The types of ordnance customarily furnished by types of ship are as follows:

Surface Ships

- Guns (major, medium (AA) & small (AA))
- Mounts and Turrets
- Power Drives
- Fire Control
- Radar
- Torpedoes
- Armor
- Projectiles
- Powder and Cases
- High Explosives
- Fuzes
- Mines and Fuzes

Submarines

- Torpedoes
- Mines
- Guns
- Torpedo Control
- Radar

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percent increase in the strength of the Navy and in July of the same year authorized an additional seventy percent increase. In September the Congress also furnished funds for a ship-improvement program which provided for a radical increase in antiaircraft armament and somewhat later the Lend-Lease Program was authorized.

While the Congress was authorizing the increase in the strength of the Navy, and was also aware of the vulnerability of the Naval Gun Factory, our single and principal ordnance manufacturing center, and authorized the construction of five ordnance plants to be located inland and widely dispersed and duplicating the production facilities of the Gun Factory. These plants were subsequently constructed at Center Line, Michigan; Canton, Ohio; Louisville, Kentucky; Indianapolis, Indiana; and Macon, Georgia. Somewhat later a supplementary plant to Macon was built at Millersville, Georgia, and a torpedo manufacturing plant was built at Forest Park, Illinois. These plants were intended to be, and are permanent additions to, the production capacity of the ordnance establishments.

Although the Congress appropriated funds for these new ordnance plants, it very soon became evident that they could not be built and put into operation in time to meet the requirements of the shipbuilding program, and that the bureau would have to look to industry to assist in meeting its programs either through utilization of its existing capacity or through plant expansion of the contractor. Analysis of the requirements of the bureau was made and where other bureaus of the department were interested, their requirements were included in order to arrive at an over-all estimate of total requirements. The bureau program was divided into two logical classes, namely, the requirements for armor, guns, and ship shafting, which affected immediately the steel industry, and the remaining ordnance such as gun mounts, fire control, ammunition, torpedoes, and torpedo mounts. Among the first facilities to be expanded were:

1. Armor.--The forged armor capacity of the country was about 20,000 long tons per year in 1939. By July of 1940, this capacity had been expanded to 40,000-50,000 long tons per year. By the end of 1941, expanded facilities for an ultimate planned capacity of 125,000 long tons per year were under way. Expenditures totaling 50 million dollars had been allocated to the Naval Ordnance Plant at South Charleston, West Virginia, for forging, heat-treating and armor-machining facilities. This plant was operated by the Carnegie-Illinois Steel Company as the contractor-operator, in conjunction with its Homestead (Penna) Works. This Naval Ordnance Plant at South Charleston was built during World War I for the manufacture of armor, gun barrels and armor piercing projectiles and was closed on 8 February 1922, following the cessation of the Naval Shipbuilding Program, which resulted from the Washington Naval Conference. The plant was retained as a part of the Ordnance

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the Pontiac Division of the General Motors Corporation in the production of the 20 mm gun mounts. These three plants, virtually single handed in their own specialty, carried the load for the gun-mount program.

In the manufacture of projectiles the bureau looked to the experienced manufacturers, Midvale, Bethlehem, and Crucible. These contractors had been manufacturing this item for over extended periods of time and possessed the basic facilities which had to be enlarged in order to meet the new program which was performed adequately and capably. In the medium caliber field 6", 5", and 3" --facilities had to be erected to meet the high volume of requirement. These facilities were furnished to contractors such as National Tube and Pipe Company, Harrisburg Pipe Company, Cannonberg Steel Company. In the small caliber field, the 40 mm and 20 mm Automatic screw machines and heat-treating equipment were furnished to a large number of contractors and no great difficulty was experienced in getting adequate numbers.

The bureau had a long history of manufacture of fire-control equipment and computers with the Ford Instrument Company, General Electric, and Arma Engineering Company. However, in each instance the contractor required major plant expansion which was carried through and the necessary equipment furnished.

In the case of torpedoes the high usage rate very early demonstrated in the war the urgent necessity for the construction of additional facilities. American Can Company was able to furnish its St. Louis plant and constructed a new plant at Forest Park. These two plants, together with Newport, were able to meet the requirements of the operations forces.

The erection of two plants was required for torpedo mounts in order to meet the shipbuilding program, one at Nordberg Manufacturing Company in Milwaukee, Wisconsin, and the other at the Joshua Hendy plant at Sunnyvale, California. The latter part of the war, the latter plant was turned over to the merchant-ship program for the manufacture of engines.

The erection of facilities at contractor plants was largely necessitated by the urgent need to meet the shipbuilding program completion date of ships. Although we were technically at peace during the time that these expansions were undertaken, there was a thorough appreciation of the fact that peace would not be assured and that every effort was needed to get into early production because it was felt that a large scale war was approaching. For that reason, wherever practicable, additions were made to the contractor's plant rather than undertaking erection of a new facility. However, in several instances completely new plants had to be erected, two for General Electric, Northern Ordnance Plant,

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After the end of hostilities on VJ-day, the bureau has moved to maintain production capacity through:

1. The retention of government-owned plants.
2. The insertion of National Security Clause on plants sold or leased.
3. The machine tool and equipment program for the preservation of important tools and equipment.

CAPTAIN WORTHINGTON: Open for questions.

QUESTION: Sir, when you have to expand facilities to a very large extent, do you find that it is better to increase an existing factory or to build a separate plant altogether?

ADMIRAL NOBLE: That is determined largely by the type of article being manufactured, by the situation where the contractor's plant is located, and by the ability of the contractor to get the labor force in the market. I can give you some specific examples. In St. Louis, we went inside the Busch-Sulzer plant. We put in a plant which required a thousand men right in the middle of the compound. We did it rather reluctantly, but we had to do it because there was no one site where he could exercise managerial capacity. He had the know-how, he could get machine-tool people, but he needed a topside engineering staff.

In the case of Northern Ordnance Company, the Northern Pump Company had a plant downtown in Minneapolis. We went out on the plains north of Minneapolis and built this huge plant out there; we moved out the old plant immediately in front of it and connected it by a causeway.

In the case of General Electric, we put in a director plant at Pittsfield, immediately across the way from what we called then the ceramics plant--it is now the plastics plant--so we could have the same topside management for both plants. The power-drive plant was put at Schenectady. That was put there because he wanted the building when we got through with it.

At the American Can plant at St. Louis, we took over its valve capacity there.

The Bridgeport Brass and Copper Company at Bridgeport, Connecticut, had to put its addition right in front of its property. The company worked it in and increased the total capacity rather than a specific portion of it.

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QUESTION: Admiral, a group of us here are seeking to find certain basic factors or possible operations to which we can reduce military items, and then, in turn, compare those factors with existing capacity in industry. You mentioned heavy forgings as one of your problems. Are there other indices of that type readily usable in making quick determinations as to capacity?

ADMIRAL NOBLE: Well, that is quite a poser. You have to know the nature of your product and you must have the drawings to determine the machine-tool hours or an approximation of the machine-tool hours before you can tell. By and large, the planners at the gun factory, I think, could do it on a rough basis, on the basis of the weight of the materials for certain types of equipment.

As an example, years ago we used to pay 45 cents a pound for finished, machined, heavy forgings in the nature of gun liners and things like that. They could take intricate mechanisms, such as directors, guns, and gun mounts, and come up with it. But where you find difficulty on that is when you run into things like electronics, where unless the instruments are assembled through assembly of components, you are likely to be led astray.

For example, frequently the handwork in an equipment, such as completing the wiring, testing the wiring, and testing equipment, runs into more man-hours than the actual machine-tool hours in connection with it. But given any one specific type of equipment, I think it could be resolved or could be reduced by an experienced production engineer.

QUESTION: You touched upon the difficulties that would ensue in the production of newly developed items. Could you tell us what the Navy's policy is toward insuring close coordination with industry when newly developed items have been subjected to their analysis from the standpoint of mass production? I am speaking of production engineering.

ADMIRAL NOBLE: Yes. In our research and development processes the scientists and the engineers are required to submit their plans to our own production engineering group and receive comment as to the practicability or feasibility of doing the thing. But on existing machine tooling, as a concrete example of that, one day way back in November 1941, I went up into our drafting room and ran across a man who was working on a six-inch antiaircraft turret mount. I took a look at what he was doing and gave one loud shriek, because the outside diameter, which had to be controlled and which had very close tolerances, was over 48 feet long. So far as I knew, there were only two 45-foot boring mills in the whole United States. There was a 60-foot boring mill in Pottstown, Pennsylvania, but it was horse-drawn and went back to 1845.

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One of the crosses of Naval Ordnance is a system known as marks and mods. The first type of anything is mark 1. The first one or two are called marks. By the time you get a large number of marks, you go into the corresponding number of mods. It is out of the question to consider a standard series of articles with such a system. The marks pertain to the basic equipment. The improvements thereafter-- not all of them, but the improvements on the type, like a new model-- are the mods or changes which are required therein to improve its efficiency and render it applicable to a special type of gun. For instance, the gun mount 63 director can be used for 3-inch 50, 2-inch 70, 5-inch 38, 5-inch 25, and 5-inch 54. We have the mark 63, mods 1 to 11 already. We have only one of those directors in being at the present time.

CAPTAIN WORTHINGTON: Admiral, we appreciate very much your very fine talk, sir. Thank you.

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