STEEL

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COLONEL CRANE: Gentlemen, I don't think it is necessary to convince this audience that steel production is a vital factor in evaluating the economic potential for war of any country. Nevertheless, I do think that we in the United States tend to get a little complacent about our outstanding position in steel production in comparison with that of other nations. I think we have to go back only a few months and look at the effect on industry of the shortage of steel in shutting down automobile plants to realize our great dependence upon the steel industry both in our wartime and our peacetime economy.

I am no expert in the matter of strategic bombing, but it would appear logical to me that if we wanted to close a large part of the plants engaged in wartime production, the simplest way to do it would be to shut off the source of supply of steel, which means that our steel plants may be considered a very profitable target by our enemies. I think it behooves us, therefore, to give consideration continually to our situation with regard to steel production in this country in view of our dependence upon it in the case of industrial mobilization.

Today we will have a talk on steel and the steel industry. The American Iron and Steel Institute for the past several years has been extremely cooperative, contributing time and personnel, with the Munitions Board and the Armed Forces in formulating plans for the utilization of steel production in time of emergency. Today we are very fortunate in having the Secretary of the American Iron and Steel Institute here to speak to us. It is a great privilege to present to you Mr. George S. Rose. Mr Rose.

MR ROSE: It is a real pleasure to be here with you today. We should like to think of this occasion as a renewal of the friendly association which the steel industry has enjoyed with the Industrial College for many years. In a more personal way I feel privileged to follow in the steps of other speakers from American Iron and Steel Institute who have addressed you in the past.

It is gratifying to know that you, who are being trained for assignments of great potential importance, are eager to learn more about the steel industry. That is a tribute to steel. In our constant endeavors to deserve your interest we want to keep you fully informed of our work and to assist you in every way we can.

Recently, the pace of the industry has been even swifter. More steel was made in January than in any other January in peacetime. If that rate could be maintained throughout the year, the total output of 1948 would be in the vicinity of 89 million tons of ingots, more than four million tons larger than the output of last year.

The most urgent needs of the many and complex industries of the United States are being filled. Few domestic users of steel are suffering undue privation or hardship. It is chiefly the more marginal wants, as distinguished from genuine needs, that are not being satisfied. Demand for some types of steel still exceeds the supply. The unbalances arise from such factors, as these:

1. The loss of 18 million tons of steel because of strikes and work stoppages since VJ-day.

2. The loss of six years' supply of purchased scrap because of heavy exports of steel during the war.

3. The poor quality of coal and coke, caused principally by the increase in machine methods of mining.

4. A 65 percent increase in the number of plants using steel since 1939.

5. The vast number of unfilled orders which piled up during the war.

While none of the major industries had as much steel as it should have liked in 1947, most of them nevertheless received far more than in any previous peacetime year. This is borne out by their own statistics, revealing new production peaks, or near-record output, in trucks and autos, freight cars, household appliances and many other items.

The steel companies themselves during the past year cooperated in establishing voluntary domestic allocations. These worked very satisfactorily for several important industries, notably freight cars and farm equipment. Now a program to cover the needs of additional vital users of steel is being set up under supervision of the Department of Commerce.

There are still other very significant developments, coupled with that of high production, which demonstrate well the steel industry's sense of responsibility toward the future welfare of the country.

In the 1938-1939 period, claims were made that the steel industry had overexpanded its capacity and thereby caused unemployment. These statements, then so freely uttered by government representatives and other public figures, now stand thoroughly discredited. Ironically, the same general groups which misguidedly accused the steel industry of having too much capacity in the late thirties, are currently claiming that the industry has too little capacity and should expand by 10 or 15 million tons.

The capacity of the industry has generally been an expanding one over any long period of time. It has continued even when steel operations have fluctuated widely with business activity. Probably there always will be difficulty in smoothing out the peaks and valleys of operations. When business is unsettled and steel operations fall off, there is a wide gap between capacity and actual production. To mention just one unpleasant example, production averaged only 19.5 percent of capacity for the depression year of 1932.

On the other hand, in times of heavy demand such as the present, operations approach the limit of capacity.

In order to make the product that sells for only a few cents a pound, on the base price average, the steel industry operates a far-flung and complicated assembly line of many materials such as coal, ore, limestone, dolomite, manganese, tin and scrap. Some of them come from far-distant points. The movement of all of them involves intricate arrangements for transportation facilities, storage space, labor supplies, and many other factors.

This high degree of integration of complicated processes creates problems for the industry when sizable expansion of capacity is necessitated.

In producing more than two billion tons of steel in the past 80 years, enormous quantities of essential raw materials have been used. It is generally recognized that the cream of some of these raw materials has been skimmed. We now face some readjustments in our technology.

Some idea of the enormous requirements of the industry can be gained by looking at production and consumption figures in 1947, when ingot output of 84.7 million tons far exceeded that of any previous peacetime year. Last year's tonnage required more than 95 million tons of direct steelmaking materials exclusive of the additional large tonnages of ore, fuel, and flux involved in blast furnace operations to produce 55 million tons of steelmaking iron. Full use of the enlarged steel capacity to which I have referred as now available will require even more raw materials. For that reason, more than five

How long such scrap conditions will continue is still an open question. Efforts are under way to bring in scrap from European war zones and from the Pacific islands. Scrapping operations in the United States are being encouraged in every way possible. At best, neither of these activities holds out hope for more than temporary relief. Now here's the rub: Full utilization of 1948 steelmaking capacity will call for substantially more scrap than has been available in recent years. It looks as if the problem of getting enough scrap of satisfactory quality will continue to tax the ingenuity of steelmakers as long as the rate of operations remains at its current high level.

As you know, the open-hearth process is by far the predominant method of making steel. Open-hearth furnaces require scrap and pig iron, the latter being provided by blast furnaces. With poor quality scrap costing more than iron, the demand for iron has been greatly strengthened. But iron requires coke and more costly and poor quality coal has resulted in a most important increase in coke costs.

Much of the coal being received today is unsatisfactory in quality. The main defects, as reflected in blast furnace coke, are higher ash content, more sulphur and poorer mechanical properties. The chief effect of inferior quality in coking coal is lessened output from blast furnaces, and resulting loss of tonnage of hot metal for steelmaking. The average loss of pig iron production by reporting producers has been 8 percent or 80 tons of iron per day for a 1,000-ton blast furnace. Projected throughout the industry, this imposes a substantial handicap on iron and steel production, and it has forced an increase in consumption of coke and fluxing stone. Some important producers state that coke consumption has risen 3 to 9 percent and the use of limestone 4 to 7 percent above 1944.

To help solve the problems created by these conditions, steel companies are spending large sums for coal-washing plants. They will have the benefit of some of these new facilities late this year. You can be sure that the basic problem of preparation of raw materials will continue to get more attention.

And how about iron ore, since iron today is all-important? It is generally agreed that there are ample reserves to supply all requirements for iron over a long period. However, opinions differ as to the probable life of the high-grade ores from the Lake Superior district. Known resources of Lake Superior ore exceed one billion tons. With the steel industry now getting about 85 percent of its iron ore from that source, even the possibility of any shrinkage in supply of high grade or direct shipping Lake ores presents a problem of the first magnitude. There are already some doubts whether enough ore from that district can be provided in the coming season to meet the needs of full operation of existing steelmaking capacity.

Our need for foreign supplies of manganese and tungsten placed us in a rather critical position early in World War II. Imports of manganese from Russia were interrupted early and shipments from India were harassed by submarine attacks. Fortunately, the development of Cuba as a major source of supply and increased shipments from Brazil and the African Gold Coast greatly improved our supply of manganese. Our normally limited domestic production was also increased.

The loss of British Malaya as a source of tungsten and the interruption of shipments from China also caused a serious situation. Again, it was fortunate that Bolivia, Argentina, and Brazil could offset those losses by shipping to us what we needed.

Early war developments also interfered with imports of tin from the Far East, of cobalt from Australia, of chromium from New Caledonia and Oceania, and of nickel from Norway and New Caledonia.

Tin was secured from Bolivia and the Belgian Congo and chromium from Cuba, while Canada did a masterful job in maintaining supplies of nickel and cobalt.

Now, the richer mines of the Orient are swinging back into production of their more desirable products and Bolivia is fearful of the consequences. In order to strengthen her position, she has signed an economic agreement with Argentina in which Argentina will receive yearly 8,000 tons of Bolivian tin. That amount will be subtracted from the United States quota--previously set by Bolivia.

Our need for tin has not diminished; in fact, it has increased in spite of technological savings made in the tinning of steel. To maintain the flow into the country we must turn to other sources, Malaya and the Netherlands East Indies.

Both those countries are being eyed as prominent contributors to the stock pile of critical metals which Washington deems necessary for the Marshall Plan. According to a report sent to the President, based on today's rates of consumption and excluding imports, domestic supplies of manganese will last only two years; asbestos and mercury, three years; platinum, antimony, and tungsten, four years, vanadium, seven years; lead, twelve years; zinc, 19 years and copper, 34 years. Supplies of nickel and chromium are virtually exhausted.

According to this same report, Marshall Plan countries and their colonies have been supplying United States stock piles with only 17 million dollars' worth of material a year. It is proposed to raise that amount to 172 million dollars.

widely recognized that weak priority ratings were hampering steel expansion programs. That was certainly true in 1943.

Great emphasis was put on the need for electric furnaces. The steel industry built them. They were operating at capacity in March 1943 but by September 1943 they began to slacken operations because of lack of orders.

In the early days of our defense program, the steel industry was faced with the absurd requirement, laid down by government officials, that a non-steel man be named as director of all steel activities. Other industries were hampered by similar requirements.

In enumerating these, I should like to have it clearly understood that I am speaking simply as an individual. It should be added, however, just to keep the record straight, that these sentiments are not based on hindsight. During the course of the war they were quite generally felt and publicly commented upon.

During the war, as you can well appreciate, the industry's responsibilities were heavier than ever before. The economy of the United States was more deeply engaged than in any previous war and for a longer time. The steel industry met and exceeded goals which would have been considered unbelievable a few years earlier.

In the three years and eight months from the time of the attack upon Pearl Harbor until victory over Japan, the steel industry turned out 327 million tons of raw steel, more than in the nine years 1930-1938 combined. In addition, a very large proportion of the steel made in 1940 and 1941 was utilized for war purposes. The total steel output for war, therefore, ran well over 400 million tons.

In order to produce that huge tonnage, the furnaces of the industry were operated at an average of 95.1 percent of capacity. That is a remarkable achievement over such a long period of time.

The steel industry financed the building of more than 8,300,000 tons of ingot capacity during the war as contrasted to 6,939,000 tons financed by the Government. For improvements and expansions during the war the steel industry spent one and a third billion dollars. This exceeded slightly the amount spent by the Government for its share of the steel expansion program.

The steel industry's promise to the Armed Services was; "Just tell us what you need and we will produce it." The promise was fulfilled at all times.

The tonnages of steel produced and shipped at every stage of the war kept well abreast and even ahead of actual current consumption. That was true even during the brief period when orders piled into the steel mills faster than deliveries could be made.

In view of this sensitivity of the steel industry to the needs of its customers, it is difficult to see how steel could have stood still and survived even if its sponsors had so desired. The progress of steel's customers has been swift. They have never been content to remain static or to relax their efforts to improve their products. The steels of twenty or forty years ago would be inadequate today in view of the improvements in welding, cold stamping, forming and drawing, vitreous enameling, new high-speed machine tools and other improvements.

In recent years one striking trend, already well-developed, has been the increased demand for flat rolled steel products which include sheets, tinplate, strip steel, and plates. New products have been coming into the picture to provide additional markets for those forms of steel. Producers have modernized their processes and expanded their capacities to meet the rising demand, but the pressure from the consuming side is still strongly felt.

During the war about one-third of the personnel of the United States Navy and a sizable part of the Army was housed in buildings constructed with light gage structural steel members. The trend toward the increased use of structural members formed of light gage sheet steel was well under way before the war began, in the construction of automobiles, ships, airplane fuselages, furniture, and office equipment. The most recent trend, and it is rapidly expanding, consists of using cold formed light steel members and panels in building construction. Light steel sheets or strip may be easily formed in a variety of shapes and panels to meet a wide range of service demands and an equally wide range of architectural applications. These sections make for easy fabrication, low transportation costs, and quick and simple erection on the site.

An intersting trend relates to electro-tinned plate, sometimes known as electrolytic tinplate. During the war a great saving of tin was effected by the increased use of methods of electrolytic deposition. Approximately one-half of the tinplate now produced is coated by electrolytic methods and the trend for the future is strongly in its favor.

Another trend which promises to become more pronounced concerns the specifying of steel in terms of its hardenability. Certain steels must be hardened by heat treatment before they can be placed in service as parts of machines or implements. Some parts must be hardened throughout but others require less or only surface hardening.

Formerly, a manufacturer desiring a steel to meet his requirements from the standpoint of hardenability, usually specified the chemical composition. More recently, due to advances in steel

In recent years a number of steel producers have been working to improve the Bessemer process and its product; the results have been gratifying. Controls have been improved. Studies are going forward to determine the best blowing procedures. One achievement has been the development of "killed" Bessemer steel for use in the production of seamless oil well casing. When we speak of "killed" steel, we mean steel that has been thoroughly deoxidized. In the Bessemer converter the steel is killed by the addition of molten iron.

Technical experts are working to shorten the melting time for open-hearth steel by desiliconization of the hot iron before charging it into the open hearth, and by treatment of the hot metal for the elimination of sulphur. Both of these are doubly important when demand for steel is high and every possible ton must be made available.

The technical men in the iron and steel industry are diligently pursuing many other investigations, as well, in an effort to improve products and processes.

Experiments have indicated that higher production of pig iron can be obtained by increasing the amount of pressure exerted by blast-furnace blowers and throttling exhaust gases.

The use of oxygen to speed steelmaking in open-hearth furnaces may still be considered in the developmental stage, but several companies are committed to its use in the expectation of obtaining production benefits. In general, two main processes can be used. One process uses oxygen to enrich the flame of the open hearth, and the other process consists of injecting oxygen into the bath in open-hearth and electric furnaces.

When the two different ways of using commercially pure oxygen are combined on one furnace, the saving of time becomes of prime importance. This is because the daily productive capacity of the furnace is so materially increased. In addition to fuel and limestone saved, there is an increase of furnace yield of one or two percent, which is significant in times of high demand for steel.

Using oxygen, some operators have reported reduction in melt-down time by as much as 30 percent of normal practice time. When oxygen is used directly in the bath, it is not necessary to use as much iron ore to promote chemical activity. This is significant in considering the growing scarcity of domestic ore of open-hearth grade.

I know that in the group now working with the Department of Commerce they have had innumerable small consumers come in, each one with a highly plausible story. But the minute you take care of one, you have a hundred or a thousand to take care of. That just makes it a little bit difficult.

QUESTION: What is the average iron content of the iron ore that is used for the fabrication of steel in the United States?

MR. ROSE: It is slightly over 50 percent. Taconite runs 25 to 30 percent. Those are the ores which we eventually will have to use.

QUESTION: Is Labrador being anticipated as a possible source of ore?

MR. ROSE: It is being very seriously considered. There are apparently large deposits of very fine ore in Labrador. It is said--I can hardly believe it myself--that that is wide open country even in winter. It will necessitate the building of a 300-mile railroad to bring the ore down to the St. Lawrence River. From there it is a simple matter to ship it through the St. Lawrence to the present Lake ports, where the Lake Superior ore is being brought. They figure that it will cost approximately the same as it now costs to bring down the Lake Superior ores.

QUESTION: Wouldn't it be more feasible to use the scrap iron in Europe in the European steel mills than to haul it over here, with the consequent cost of transportation, and then fabricate the steel here and ship it back to Europe under ERP?

MR. ROSE: If there were enough European steel industry to use it, yes. We are extremely short of scrap here and we could use it if we could get it here at a fair cost. A group which just returned from Germany tells us that the German steel mills have six to eight months inventory of scrap, and that all the scrap yards are simply bulging. There is so much of it lying around that it is impossible to arrive at any accurate estimate of what tonnage is available there. The German steel industry, I believe, is aiming at getting up to a production rate of something over ten million tons a year.

QUESTION: I was thinking about France rather than Germany.

MR. ROSE: France does not use a great deal of scrap, because of the nature of its industry. France uses what we call the basic Bessemer converter. They call it the Thomas converter. That does not utilize scrap to the extent that the open-hearth furnace does.