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CONSTRUCTION OF NEW FACILITIES
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CONSTRUCTION OF NEW FACILITIES

February 25, 1946.

LIEUT. COLONEL GALLAGHER:

Colonel Moriarty, who is scheduled to address you at this hour, was unfortunately called out of town. He has asked a gentleman who was with him through most of the program to come down and pinch hit for him. This gentleman has very graciously consented to come before you and give you a brief talk on the construction of new facilities for the Air Corps. He is familiar with that, and while he has not had much time to prepare his talk, he has volunteered his willingness to answer any questions that you may have, after his brief remarks. Colonel Hay, as I have said, has been associated with the program through most of its formative stages and its completion stages. It might not sound entirely unfamiliar to some of you. This gentleman, is Colonel Hay, who is going to talk to you on the construction of new facilities.

COLONEL HAY:

It is too bad Colonel Moriarty could not be here, but he had to go to Cleveland. He is in charge of setting up a large central Cleveland bomber plant. Colonel Moriarty would have been a very good one to have talked to you, because he was actually the man who had most to do with the construction of facilities for the Army Air Forces in his capacity as Chief of Resources Control Section at the Air Technical Service Command, Wright Field, Dayton, Ohio. I was associated with General Hopkins or on the staff as A-4 for five years. I was more or less Colonel Moriarty's boss. In that staff position I had supervision over his activities. However, he is now my boss. So that is why I am here rather reluctantly today.

The construction of facilities really started at the time of the British and French procurement. The British government through rather general supply contracts enabled many manufacturers to construct the required additional facilities. In a few instances, such as Packard and Wright, they provided buildings for the use of those concerns.

We, in 1941, realized that we would need a tremendous amount of new facilities. At that time industry was not too interested in converting to war production. They had all the civilian production that they could handle. As a result we emphasized our program at that time upon the construction of facilities for the then aircraft industry. The larger companies were the ones selected and given facilities for combat equipment and so on. The smaller companies were given trainer contracts -- some of the engine companies.

Before Pearl Harbor we had, as I recall it, a very good start. Our total expansion program was a little over three and a quarter billion dollars. Prior to the 7th of December, 1941, a billion dollars had been authorized, and approximately one hundred plants were then under construction.

Some of these plants, such as the bomber plants at Omaha, Kansas City, Fort Worth, and Oklahoma City, were built a lot larger than later events proved necessary according to the then existing production schedules. We all realized that they were built larger than what they were supposed to be at that time. But, of course, we were planning on one-shift operation at that time, which gave us some leeway.

In the Air Forces we didn't supervise our construction as they commonly did in the Corps of Engineers, except under one type of financing. We had the old Emergency Plant Facilities contract, which we used first in the summer and fall of 1940. It was a contract which I don't care to go into now, because it will probably be covered further in the discussion of some other lecturer. But it made it necessary that we have men at the construction site to inspect and supervise the construction activity there.

In June 1941 we began using the Defense Plant Corporation as our method of financing projects. The Defense Plant Corporation method was decided upon rather early because we realized that, if we were going to continue the EPF and utilize the Corps of Engineers, we would have to have a very large staff of officers in the Army to supervise this activity, which was essentially a civilian agency activity.

The Defense Plant Corporation's method of supervision of the construction of the plant had another very decided advantage. That was that the lessee, if the Defense Plant Corporation, was also the agent of the RFC. So the representative of the Defense Plant Corporation had virtual responsibility for the completion of his project. He was also the man who was being needed by all the people in the district. He had to get the plant finished. He had no one to blame but himself if he didn't get the job done.

The manufacturers submitted plans of all projects to our districts. They were very complete in most cases as regards the detailed construction plans. The district manufacturers' people and the district personnel were well up on what the company should do, what the company's possibilities were, and the know-how, financial responsibility, and so forth. They furnished nearly all that information.

In general the over-all plans were approved for procurement here in the headquarters, Army Air Forces. The plans were then relayed to the Air Technical Command. It was up to them and their districts to determine whether adequate capacity existed. If adequate capacity did not exist, they were to expand the capacity immediately, either by conversion of the existing plants or by recommending new construction.

Prior to Pearl Harbor there was very little reconversion, as I said before; but after Pearl Harbor our office here in Washington, the Air Technical Service Command, Wright Field, and all its districts were swamped with requests by manufacturers to get into the military production program. Nearly all of them needed construction items. Through the Defense Plant Corporation and other methods of financing we usually worked out ways whereby these companies were provided with these construction items.

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One very important part of the construction program was the private method of financing, where manufacturers received certificates of necessity. In the aircraft industry seven hundred million dollars worth of certificates were granted, which was a very large part of the construction program.

We converted all kinds of industries to the manufacture of aircraft and components. There were companies making washing machines, refrigerators, gliders, and on and on. One company, as I recall very vividly, was given facilities for the production of aircraft forgings. They had had no experience in forging aircraft parts. They were all set up and had no business. We suggested they go to the Studebaker Corporation for business. Their representative called on Studebaker and said "We are ready to go to work. We can produce forgings now." The Studebaker representative said, "What experience have you had in the manufacture of aircraft forgings?" Studebaker said, "What experience have you had in the manufacture of aircraft engines?" They turned out to be a very good subcontractor to Studebaker.

Before the first big cut back in ordnance we were doing our best to find additional facilities. We had plans out for the construction of many facilities. The War Production Board became very active in the coordination of all of our facilities planning in 1943. We were able to pick up many plants from the Ordnance Department in that cut back. They involved converting to aircraft work in many cases, although we used around fifty without any conversion at all.

The War Production Board's coordination with the Armed Forces was not too good in the beginning of the program, because, after we had screened and made our plans on how the construction was to be performed, as much as a month or maybe two months had elapsed. It was a little bit too late for the War Production Board to start guessing at that time. The production organizations were involved. They realized they couldn't spend too much time with us. As a result they passed them without too much perusal.

However, the Facilities Utilization Division was formed in the War Production Board, and they started working with us at the inception of the facilities projects. They rendered some real assistance. We found that we could convert many facilities such as fair grounds. In some cases it would have been cheaper to construct rather than convert. In general it was very good.

Construction sites for plants were selected more or less by the manufacturer. We had the prerogative of arguing with him about it, trying to get him to go to another city. The real factor, of course, in the location was labor. In 1943 and 1944 and 1945 the country was in a bad position as far as available labor for large expansions was concerned. I remember we had considerable difficulty in trying to find locations for plants that would employ twenty or thirty thousand workers.

I might answer some questions now if anybody has any.

COLONEL GALLAGHER:

Thank you, Colonel.

Are there any questions on the problems of expansion? Here is your opportunity to get an answer.

A STUDENT:

You mentioned that it was very difficult to locate areas where you could obtain twenty to thirty thousand employees. Did you try out areas where you could obtain five or six thousand in your architectural survey to determine contractors?

COLONEL HAY:

We used the War Manpower Commission, where the Manpower Commission had their data, as to the availability of labor. Our problem was to find such plants in areas where there was the labor. If not, we had to shift the operation, just as in the case of A.O. Smith on propellers. We ran into a labor bottleneck at Milwaukee. We had to set up subcontracting operations at the Minneapolis and St. Paul fair grounds. That was a labor-free area. In that way we were able to use six thousand workers in the Kansas City area and ease the pressure at Milwaukee.

A STUDENT:

Do you think that in the plant construction days, if you had had better architectural surveys and a listing of them and placing plants in somewhat free labor areas other than Fort Worth, Omaha, Kansas City, and Oklahoma City, you would have been able to obtain more labor and freeze labor in that area? In other words, do you think these architectural surveys were sufficiently sound and based on knowledge of the conditions in the areas to enable you to make sound decisions?

COLONEL HAY:

Yes. I should say they were. We, of course, had to stay in the interior of the country at the beginning of the expansion program. I believe that we could have used a lot more labor that was never used in the New York area if we had started there. But we had that two hundred mile limit there on the coast.

A STUDENT:

In the early part of your talk you mentioned that prior to Pearl Harbor, plant construction went apparently far beyond the needs of that time; that there was a question raised by the WPB. I was wondering what methods were used to determine what the required productive capacity had to be.

COLONEL HAY:

We had the architects work out the floor space to produce so many B29's or so many C47's at that time.

A STUDENT:

From your actual requirements?

COLONEL HAY:

Yes. Those were actual requirements, prime requirements.

The plant, of course, was set up on a one-shift operation. Of course, that plant could probably produce 150 airplanes on a three-shift operation. We had in 1941 very little experience in the mass production of airplanes. Our engineers and the people here in the Army Air Forces and the Aircraft Division of the War Production Board worked out what they thought would be the facilities needed for the production of a certain number of aircraft over a certain time interval.

A STUDENT:

In other words, you used your end items entirely?

COLONEL HAY:

That is right.

A STUDENT:

Rather than the components or raw materials? You used your end item capacity?

COLONEL HAY:

That is right. We did not have any expansion in the Air Forces as it was not justified at that time upon the then approved over-all production schedules for engines and airframes. All we had were approved schedules to go by.

A STUDENT:

The reason I raised the question was what I read in connection with the expedition of production capacity. As I recall, about the middle of 1943 facilities of that type were away beyond even the augmented aircraft program of our own country as well as our allies. Is that a fact?

COLONEL HAY:

Yes. That is, in the latter part of 1943 that condition began to occur as certain facilities were in excess but there was a shortage of certain types.

A STUDENT:

I was wondering what methods were used to determine or to base estimated productive capacity on. You mentioned earlier that prior to the World War you had more than what was required. Then a year and a half after that you again had more than what was required. What methods were used in determining that? Was it made by guess or by God?

COLONEL HAY:

There was a lot of that.

A STUDENT:

That is what I thought from what I read of the history. That is, there were no firm methods? Is that right?

COLONEL HAY:

We actually had the theory of using plant facilities and so forth and space studies. But we had had no actual experience in mass production, in large-quantity production of aircraft. We had to guess a lot. Our guesses turned out to be fairly well fulfilled.

A STUDENT:

Did you apply that to machine tools too?

COLONEL HAY:

Yes. Machine tools. Some of those estimates were purely guesses. That is true of all the materials. Everybody came up with a figure almost out of thin air. We had many factors that we used in the computing of requirements. We also had so many intangibles that all we could do was to make a darn good guess or estimate.

A STUDENT:

Colonel Hay, when you were thinking of plant expansion on the basis of one shift operation, were you looking forward to the point that you would secure all of your production on one shift, or were you planning, if necessary, to go to two or three shifts? Were you cognizant of the fact that by going to two or three shifts you could get a hundred per cent more production without any increase of facilities?

COLONEL HAY:

This one-shift operation came up in the early part of the program. As I remember it, it applied to only four plants. Higher authority at the time for some reason or other told us that it should be one-shift operation. As to the other plants, I am sure all of them were plants with two-shift operation or more.

A STUDENT:

So you weren't generally going on the basis of a one-shift operation? It was only for those four plants?

COLONEL HAY:

That is right. Only for those four plants.

A STUDENT:

What proportion, roughly speaking, of the production did those four plants give you?

COLONEL HAY:

I would say, about 30 per cent.

A STUDENT:

In view of the construction needs do you have any idea why your higher authority went on one-shift operation for those plants?

COLONEL HAY:

No.

A STUDENT:

How much did you contemplate scheduling beyond the one-shift operation?

COLONEL HAY:

As I remember it, the second shift was about 80 per cent efficient. The third shift was about 50 per cent efficient. Then it was found in most of our plants that it was much better to go on a two-shift operation of two ten-hour shifts. You get more that way than by three shifts of eight hours a day. So in the over-all production the two-shift operation increased. That was at some plants. I don't know whether all plants went on that or not. I know several did.

A STUDENT:

That was from your experience?

COLONEL HAY:

That was our actual experience.

A STUDENT:

Do you remember what you used in calculating your estimates in the beginning?

COLONEL HAY:

We had estimated a third-shift efficiency much higher than what it was actually. I know that. I don't remember what the factors were.

A STUDENT:

Considering correlation of placing the load on the production capacity, from your previous statement I assume that there always was ample productive capacity, that is, always in readiness for any future even unforeseen demand.

COLONEL HAY:

That is true. I don't think that any procurement program was ever held up for the lack of facilities.

A STUDENT:

There were always available facilities?

COLONEL HAY:

There was always a cushion there.

A STUDENT:

Was any of this facilities planning done with the idea of some of it having to go underground like the Germans did?

COLONEL HAY:

As to the Marietta Automobile plant in Georgia, General Wolfe suggested that that be put underground. Other people thought it wasn't such a good idea at the time. However, a large basement was dug there. There was a lot of floor space underground. That was the only time we had any ideas about putting any of these underground at all.

COLONEL BROWN:

Did you have any instances like this: It seems to me I recall a lot in the papers about one civilian agency would be requested by the Air Corps to build a plant. Some other agency would be requested to select a site. Then when the builder started building on the site, some inspector from the Air Corps would come around and say that no such location had been considered.

COLONEL HAY:

No. I am sure that nothing like that happened, because in the Army Air Forces we turned everything over to the Defense Plant Corporation. They were in charge of the construction and all. Of course, in a very limited way we sent men or officers to the site. But very little of that was done. Our district people would probably drop in and make some

comment or suggestion on how the thing was to be built or how the work was progressing. We had very good relations with the Defense Plant Corporation.

A STUDENT:

Can you give us a brief word on production scheduling? You mentioned production scheduling and that plant capacity was based on production scheduling. Were these real production schedules or program schedules, and did they schedule the production down to the manufacturers themselves?

COLONEL HAY:

We issued production schedules down to the manufacturers of airframes, engines, and propellers on GFE's -- all Government-furnished equipment. The manufacturer, working with our people at Wright Field, scheduled all CFE, contractor-furnished equipment, and other components. Then we had our WX's and XJ's and all these schedules. Every time a new program came from top side, a detailed production schedule was furnished the manufacturer that indicated how many airplanes per month he was to be expected to produce for us. I believe that was usually projected about eighteen months.

Facilities, of course, had the scheduling as far as the production of all the components from all these various manufacturers to determine if the capacity was available. I remember in the case of forgings we had to figure about eighteen months flow time there for providing the facilities. The bases for the presses and the hammers had to be made and they had to go through a long cooling period.

A STUDENT:

When the WPB entered into the production of aircraft was there much confusion?

COLONEL HAY:

That is a tough question. A lot of personalities are involved in that question. But I will just touch on it briefly.

The early scheduling of aircraft was done almost wholly by the old OPM through T. P. Wright, now head of CAA. He was in charge of the Aircraft Division of OPM at that time. Then we had the British members in there and the JAC. Then the Army and the Navy seemed to become more active in scheduling, seemed to take away all the functions of the old OPM crowd and then later the WPB crowd. So actually the industry divisions dealing with aircraft in the War Production Board toward the last of the war had virtually little to say at all about production.

I think if you get somebody else to talk to you, you may probably be able to get a little more complete answer.

COLONEL GALLAGHER:

Are there any other questions, gentlemen? If not, the class owes you a vote of thanks, Colonel, for filling in for Colonel Moriarty.

(8 July 1946 -- 200.) P.