

PRIORITIES, PRP, CMP -- CONTROLS

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PRIORITIES, PRP, CMP -- CONTROLS

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CAPTAIN WORTHINGTON:

It is a pleasure this morning to welcome another of last year's speakers, Colonel Maurice R. Scharff.

Colonel Scharff is one of the outstanding consulting engineers in America. He specializes in public utility engineering and construction, public utility valuation and rates; and is a recognized authority in these fields in America. After being graduated from Massachusetts Institute of Technology, Colonel Scharff embarked upon an engineering career, and his business experience from that time on is a record of one success after another.

During World War II he spent several years on active duty with the Army Service Forces and its predecessor organizations. During virtually all of his tour of duty he was engaged with phases of priority work and particularly concerned himself with PRP and CMP.

After his duties with Headquarters, Army Service Forces, were finished, he was sent to Germany, where he spent several months helping General Clay and others in determining the war potential of Germany, in order that German industries might be reduced in importance to the point where they were no longer a threat to peace. On the termination of these duties he was retired to inactive status with the grade of colonel.

He resumed his record as a consulting engineer, and has just recently been appointed conciliator for the Pittsburgh power strike.

COLONEL SCHARFF:

Thank you, Captain. When I was asked to come down and talk this morning about priorities, PRP, and CMP, I started to search my recollection after all the years that have intervened since I had been engaged in these activities, and naturally had great difficulty in re-establishing a sufficient knowledge of the subject to bring you anything of value.

In fact, my first effort to recall something about these systems of material control resulted only in my recollection of a story that someone told me in England about a British sergeant major that was explaining to a bunch of rookies the fine points of the Enfield rifle. According to the story, he pointed out the fine workmanship of the barrel and explained the operation of the firing mechanism. Then he finally called their attention to the stock, and he mentioned to them that early in the war the stock of this rifle was made, as he said it, "out of good old Hinglish hoak." At

that point a voice in the rear of the room spoke up and said, "Sir, you mean 'oak,' don't you?" He said, "That's what I said. Shut up."

He went on and said that later on, when oak was unobtainable, the stocks were made "out of helm and hash." The same voice said, "You mean elm and ash, don't you?" "That's what I said. Shut up."

Then he said, "Later on, when we couldn't get helm and hash, we used a very hard wood called lignum vitae. This is a very dark wood. It has many uses, as you may know. The Royal Navy has used it for piles for piers. And when I say 'piles for piers,' I might explain to the hedgeducated idiot in the rear, I don't mean 'emmerrhoids for blocmin' noblemen."

I suppose the difficulties with oak and elm and ash were similar to many difficulties we had to cope with during this war.

In trying to tell you about these controls that were adopted it would seem to me not worth while to go into many of the details of the forms or the complicated procedures that were involved. For one thing, there wouldn't be time. I hope to cover the subject rapidly enough so that some time may be available in this short period for questions, which I will be glad to answer if I can.

For another thing, I couldn't remember the details. So many things have happened since I terminated my connection with PRP and CMP that I would have the greatest difficulty on any matters of detail. For a third thing, it wouldn't be very useful, because both military arts and industry are dynamic and are constantly changing. Whatever of value we may get out of our experience with these control systems, we would all have to recognize that in any future emergency the details of the system that will be applied could not possibly be the same. So I would like to discuss, instead of the details, the background of these control systems, their objectives, the general plans that were adopted, the results that were accomplished, the deficiencies that were demonstrated by experience, and the suggestions that we can obtain from that experience for our guidance in any future emergency. But first I would like to trace very briefly and rapidly the historical development of these control plans.

It will be recalled that in 1939, the year in which the war in Europe began, our country was at peace. Our gross national product was estimated at ninety billion dollars. We were constructing about six and a quarter billion dollars of new facilities, and were exporting about three billion dollars of goods. Our competitive price and profit system was operating under more or less normal peacetime conditions and with no specialized government controls.

In 1940 the gross national product increased to 100 billion dollars. Our construction increased to 6-3/4 billion, and our exports to 4 1/2 billion. These increases were stimulated by the beginning of our defense production and by our effort to commence to serve as the arsenal of democracy.

It has always seemed to me a very striking demonstration of the delicacy with which our competitive system balances our facility capacity and our distribution of materials and labor to meet the requirements of production that even this small increase in national product resulted in a sufficient degree of unbalance so that in the fall of 1940 it became necessary to establish our first priority system. This was a very simple system, that assigned, as I recall it, only two groups of priorities, A and B, to military prime contracts and to some extent to their subcontracts.

In 1941 the gross national product increased to 130 billion, our construction increased to 10-3/4 billion, and our exports to five billion. At the end of the year came Pearl Harbor and our entry into the war.

Under the influence of these increased requirements of essential production the priority system was expanded to apply to certain essential civilian production as well as military contracts. The simple A and B priority system was expanded early in the year to a more elaborate system involving priorities running from A-1 to A-10. Later in the year there was an inflation of the A-1 band which began immediately to make itself apparent and led to a breaking up of the A-1 priority band to a series of priorities running from A-1a to A-1j.

During this period also it was found necessary to supplement the priority system by the first of the series of L and M orders relating to allocation of certain critical materials, conservation, standardization, limitation, and prohibition of some types of production, the most important of which perhaps was the order that became effective early in 1942 eliminating the production of civilian motor vehicles.

In 1942 our gross national product expanded to 150 billion, construction reached the peak at thirteen and a half billion, and exports increased to eight billion. The A-1a priority band in turn became so inflated that at the middle of the year it became necessary to establish a new series of AAL to AA5 priorities.

During the early part of the year an experiment was tried in material allocation as a means of program control known as the Defense Supplies Rating Plan. Then in the third quarter of the year PRP, the Production Requirements Plan, of which I will speak further in a moment or two, was established. Almost immediately the inadequacies of this plan became apparent, and in November the Controlled Materials Plan was first announced, to be put into effect in the second quarter of 1943.

In 1943 the gross national product expanded again to 180 billion, construction dropped off to seven and three quarter billion, and exports increased further to twelve and a half billion. The AAL band of priorities went through the customary cycle of inflation, and it became necessary to develop the AAA and directive systems for breaking bottlenecks.

CMP got into operation and was continuously studied and improved. Toward the end of 1943, it became apparent that it would be necessary to supplement these previous systems by the scheduling of critical components. So that scheduling was established, to be put into effect at the beginning of 1944; and at the same time the development of manpower controls was undertaken.

In 1944 the gross national product reached its peak at 200 billion dollars, construction fell off to four billion, and exports expanded still further to fourteen billion. At the termination of hostilities in 1945 all of the controls to which I have referred except the Production Requirements Plan, which had fallen by the wayside, were in effect and constituted a comprehensive system of material and program controls that was the result of some five years of experience and development.

Now, out of this experience it seems to me that some general principles can be derived.

When the supply exceeds the demand, our competitive system operates satisfactorily to adjust the facilities capacity and the distribution of materials and labor to the requirements, without any special controls of the type I have referred to. That is true when the supply either equals or exceeds the demand.

When demand commences to exceed supply but capacity is still in excess of demand, production expansion to meet all the requirements can eventually be brought about. But when time has become of the essence with respect to essential deliveries, a priority system is essential in order to accomplish that result.

When demand exceeds capacity, however, further controls are required. Our experience demonstrates, I think, that these controls must be aimed at the control of programs, that is, at the control of procurement by procuring agencies, and provision made to meet such controlled demand.

Our experience also demonstrates, I think, that the control of selected materials, which was adopted as the basis of the Controlled Materials Plan, provides a satisfactory gross adjustment of program to capacity. It cannot accomplish satisfactory program control by itself, but must be supplemented by the fine adjustments of component, product, and other material allocations and scheduling, with manpower controlled to effect distribution of the available manpower.

The priority and CMP controls, therefore, are only part of the system of controls that are necessary under emergency conditions. I think I should add that in my view the entire system of program and materials controls itself is only part of the larger program of social and economic control that is inevitable in warfare, a problem which I think our experience of the past year and our experiences at the present time indicate we did not solve satisfactorily in the last war. For to me it becomes apparent that if we are to avoid the unbalances and the feelings of discrimination that are responsible for the present situation in our country in another emergency, it will be essential that we find a way to assure more affectively the universal service

of our entire population and the avoidance of the extreme unbalances or the feeling of unbalance in the distribution of income and profits that has contributed to our present situation.

Turning now to the Production Requirements Plan, which was our first attempt at program control, those plans were applied to all users of more than five thousand dollars worth per quarter with respect to some thirty odd critical materials; and users in this group had to apply for authorization of use of these materials and of a large number of other critical materials and alloys.

The PRP system has been described as a horizontal system. A single application, which was known as the PD 25-A form, was submitted for an entire plant covering the requirements of all the products made in that plant. It comprised fifteen or twenty pages. I am sorry that I haven't one of those to show you, but my files have disappeared since my experience with this matter.

That form required a statement of shipments in the prior quarter, the estimated future quarterly shipments, firm orders on hand, the preference ratings applicable to those orders, the end uses of materiel to be produced, inventories on hand at the beginning of the period, the estimated use of each of the materials during the period, the estimated inventories at the end of the period, distinguishing between usable and non-usable shapes and sizes, and a listing of the requirements for certain critical components.

These forms were submitted to the industry divisions of War Production Board, in which we had Army and Navy officers stationed to participate in the processing and to do what we could to protect the interests of our military contractors and subcontractors. There they were analyzed. They were tabulated. The total of stated requirements of each of the critical materials was computed. These tabulations were submitted to the material divisions of the War Production Board for advice as to the extent to which the requirements could be met. Percentage scale-down factors were established in each division of the War Production Board, and in some cases for all divisions of the War Production Board, to be applied to the quantities requested, in order to bring the authorization within the estimated supply.

Two quarters of experience with this horizontal system demonstrated effectively that it could not operate as a satisfactory system of program control. There was no way of telling under this system, when a manufacturer's application was reduced by thirty percent, for example, what effect that cut was going to have on the production of another manufacturer to whom the first manufacturer was a supplier and who might in turn be reduced by only twenty percent or by forty percent.

I remember very well the impression that I had during the months I put in there, that we were literally going at it blind, and processing of papers without knowing what we were doing. The confusion that spread throughout industry as a result led to an urgent demand for a new and improved system.

After several months of study, in November of 1942 it was announced that PRP would be abandoned and that the Controlled Materials Plan would be put in effect in the second quarter of 1943, with provision in the regulation for an overlap, so that producers who had operated under PRP in the first quarter of 1943 might continue to procure materials under their first quarter application, for the second quarter of 1943, in case they did not receive their CMP authorization, in time to prevent interruption of production.

CMP was based primarily on the control of programs through limiting the authorized use of four selected materials -- steel, copper, copperbase alloys, and aluminum. As to about 70 or 80 percent of the use of steel, for example, it was a vertical system, as contrasted with PRP, which was a horizontal system. For as to this proportion of the use of steel in what were designated as A products, the authorizations were passed down vertically through the production system. Only the so-called B products continued to have authorized use of material on what was in effect a horizontal or PRP system.

For the purpose of CMP and B products were defined by listing some five hundred types of products, most of them products that were widely used in civilian industry and many of them common components of a very large number of end products. Nuts and bolts were, of course, a particularly good example of B products. A products were defined as all products not on the B product list.

The general basis of that Controlled Materials Plan was a prohibition of the mill shipment or the acceptance by any plant of delivery of any of these controlled materials excepting on the delivery of a valid allotment. The A product allotments were made by the War Production Board operating through the Requirements Committee to the claimant agencies, consisting of the military services and, at different times, some ten or twelve agencies representing the balance of the economic system, on application from the claimant agencies. They were then passed on in turn by these agencies through their procurement services to their prime contractor, their subcontractors, on down to the sub-subcontractors as far as the chain ran through successive A products.

The B product manufacturers made their applications direct to the industry divisions of the War Production Board; and the allotments for the manufacture of B products were made by the Requirements Committee through the Operating Vice-Chairman of the War Production Board, who acted as claimant agent for the industry division. He in turn broke up those allotments to the industry divisions, which in turn passed them on to the B product manufacturers on their applications. They in turn either used the materials themselves, or if they had to procure products which were A products, passed on portions of their allotments to their A product component manufacturers.

For the operation of this system a series of CMP forms, of which the principal ones were CMP 4-A and CMP 4-B, for A and B products respectively, were devised. They were much shorter and simpler than the elaborate PRP application had been. As I recall it, each consisted of only two or four

pages. They required the submission of production schedules for each product to be manufactured for four to six quarters in the future, the controlled material requirements of these schedules by quarters, inventories at the beginning of the period, the use in each quarterly period, and estimated inventories at the end of the period.

The regulations prescribed the procedure to be followed, and in addition defined the procedure for the establishment of bills of material, the establishment of lead times for relating controlled material deliveries to end product schedules, and other details.

These applications, submitted as they were by manufacturers, and reaching the claimant agencies, in the case of A product manufacturers, and the industry divisions of WPB, in the case of B product manufacturers, were tabulated and summarized and submitted to the Requirements Committee and its working subcommittee, the Program Adjustment Committee of the War Production Board, along with the reports from the material divisions of WPB as to the amount of controlled materials expected to be available.

After full consideration and discussion, the Requirements Committee made its allocation to the claimant agencies and to the Operations Vice-Chairman of the War Production Board. The Operations Vice-Chairman, as I have indicated, broke his allotment down by industry divisions, and the industry divisions in turn passed them on to the B product manufacturers.

To illustrate the procedure for the claimant agencies: The War Department received its allocation from the Requirements Committee of the War Production Board, turned it over to the Controlled Materials Officer of the Production Division of Army Service Forces, who broke it down between the supply services on the basis of their estimates of their requirements, holding out a small kitty to meet emergencies as they would arise, and passed the allocations on to the supply services, which in turn passed them on to their prime contractors, who in turn passed them on to their subcontractors and down through the chain to the sub-subcontractors as far as the A products chain ran.

The CMP regulations also provided for a complete accounting and reporting system, so that the War Production Board had at least the machinery for enforcing compliance with the regulations and assurance that no manufacturer violated them either by receiving controlled materials without the delivery of an approved or valid allotment certificate, or by building up inventories in excess of the limits prescribed by the regulations.

One of the things that interested me about our experience with the Controlled Materials Plan was the similarity which that experience bore to that of the Germans with their metals control plan, as I saw the effect of it during my later experience with the Control Council in Germany. I have been told, and I assume it is probably correct, that our Controlled Materials Plan was based in part upon study of the German metals control plan. We learned in Germany that its operation was very definitely similar, the principal difference being due to a characteristic difference between

the German and our own industrial and social organization, in that in the operation of the German plan the German private industrial groups, the Rings, or cartels or trade associations, played a large part in handling directly the allocation and distribution of materials allotted to them, taking the place in that respect of our governmental claimant agencies and the governmental industry divisions of our War Production Board.

The operation of the Controlled Materials Plan, in my opinion, made a great contribution to our war effort. I think everyone who had anything to do with it would have to admit the fact that it was not a complete success and that opportunities exist for its improvement.

We never succeeded in overcoming completely the tendency toward inflation of requirements by claimant agencies and by manufacturers in the expectation that they would be reduced. That, by the way, was an experience that was exactly paralleled in Germany.

We never secured satisfactory inventory controls within the limits prescribed by the regulations. That again was an experience that was paralleled to an even greater extent in Germany, for the inventories we found in German plants after the Germans surrendered demonstrated that the inventory regulations of the German system had been even more grossly violated notwithstanding the dictatorial central control, than had been our experience in industry here at home.

We never succeeded in adapting the production of B products adequately to their requirements in connection with our production program as a whole, for the B product system was a horizontal system, like the Production Requirements Plan. It suffered from the same defects as the Production Requirements Plan. Although our scheduling procedures that were developed helped a great deal with respect to the selected critical components that were scheduled, it still is apparent that the adjustment of B product production to our production program was never adequately solved.

These deficiencies suggest some of the line along which, it seems to me, improvement can be sought. I always felt myself that there was an opportunity for a very considerable extension of the A products procedure in connection with a simplification of the allotment extension procedure, which would have accomplished a much more effective program control and would have greatly narrowed the area in which the difficulties we experienced with B products were encountered.

There was some feeling in some quarters in the War Production Board that it might even be possible to abolish the B products procedure and to carry on all production through a vertical extension of allotments, utilizing, as it was suggested, some form of allotment banking or currency where the extension of allotments would be as simple as passing dollar bills or bank checks, and where central clearing would be accomplished through branch allotment banks and a central allotment bank analogous to our Federal Reserve banking system.

My own view is that the continued study of this experience is well worth while, continuing the expansion of these types of developments that have been suggested; and that out of that study it should be possible to establish at least the general contours of a plan that might be promptly adopted in case of another emergency and give us at the very beginning or very near the beginning the advantages that it took us four or five years to develop in the last war.

It seems to me too that the study that you are giving of these subjects in this institution and the opportunity that exists to extend those studies more widely to the ranks of Reservists throughout the country, and probably within the ranks of industrial executives not in the military services, suggests a way in which our intelligence can be centered on this problem, and knowledge of the result may be widely spread, so that an earlier start may be made on an adequate organization in case of the development of a similar emergency in the future.

In closing I would like to say that such consideration, I feel, must recognize that no one simple set of controls can possibly produce the result we desire; that what we must seek is first a system of program control supplemented by additional controls of the type we developed during the war, which operated as a combined system and which produced the maximum effective production from our various facilities and materials and manpower.

I would like to add, again, that even the combination of these programs of material and component and manpower distribution controls cannot be effective in producing the all-out effort that any future emergency will call for unless it is integrated into a more successful over-all system of social and economic controls than we had in the last war, which will make available our entire adult man and woman power for the purposes of the emergency and effect a distribution of income and profit and control of prices which will lead to less unbalance and less difficulty in the reconversion to normal competitive conditions that have to be encountered after any such future emergency.

CAPTAIN WORTHINGTON:

We are ready for questions.

A STUDENT:

Can program control be accomplished by fiscal means in war?

COLONEL SCHARFF:

In my opinion it cannot be. Incidentally, a suggestion was made in the latter part of the war, when some of the deficiencies of our Controlled Materials Plan or supplemental controls were becoming apparent -- this suggestion was made in the Army Service Forces. There was a group of officers that became convinced there was merit in the suggestion -- that we might effect program control directly through fiscal control, that is, by authorizing programs such as procurement programs and production programs, in dollars.

It was always my feeling that such a procedure would be a very great step backward; that just as control of the selected four CMP materials could accomplish only a gross adjustment and had to be supplemented by scheduling, by other material allocations, and so forth, a program authorization in dollars would be even less effective and would require even more complete supplementing, including, I would imagine, something like the Controlled Materials Plan with respect to the allocation of selected materials.

A STUDENT:

What do you think might be done about preparing ourselves for the next emergency? We have a fairly well-tried system in CMP. In case of a new emergency, which probably will occur a little faster than the last one, do you have any suggestion as to how we can have the machinery organized and ready to be set up quickly?

I have one other question. What is your personal opinion of the possibilities of the allotment-currency plan?

COLONEL SCHARFF:

As to the first question, I intended to suggest in general terms that I thought a great deal could be done in the way of preparation in order to save time at the beginning of another emergency. I think certainly there is no necessity that we again pass more than two years, as we did this time, before we establish any system of program control.

The things that seem to me to be possible to do are: First, continued study and analysis of the control plans developed in the last war, such as you are carrying out here, and the development possibly of a consensus of opinion within the services of the general features of the control programs to be established at the beginning of another emergency.

Second, the spread of the knowledge of that plan and its general features throughout the military establishment and through the reserve organization, and, if possible, through industry, so that we may maintain an asset which I think exists today, that is, a general knowledge of these types of control systems. We should keep it constantly available, so that when it becomes necessary to put into effect such a control plan, personnel will be available who understand it and acceptance will be available on the part of industry. It seems to me that a great deal can be done, some from this group here, to accomplish that type of preparation.

Now, relative to the allotment-currency system, I was always greatly intrigued by it myself. So far as I know, nobody ever worked out the details of such a plan sufficiently so as to justify any final opinion. I never felt myself that I could arrive at a final opinion with respect to that.

My own ideas were in the direction of simplifying the allotment extension procedure, and at the moment my ideas tended to coalesce with those that supported the allotment-currency system. I think that it is a matter

that is well worth much more consideration than it received during the war, and that it may be the solution of the problem of the extension of the A product system to cover all industrial products. I never succeeded, however, in arriving at any final opinion except that.

DR. YOSHEF:

Except for the three basic metals -- copper, steel and aluminum -- which came under CMP, and a number of other items, such as tires, textiles, and knit goods, which came under a budget allotment plan during the latter part of the war, the priorities system remained a fundamental material control mechanism throughout the war. During the course of its history it underwent substantial improvement, and by the middle of 1942 we came to adopt the idea of time and quantity limitation in the use of priorities and of balanced production programs within particular periods. Assuming, then, that we can gear our requirements to our production potential and think in terms of balanced production programs for particular periods, do you think that we can work out a priority system to meet the needs of a war economy without the elaborate and cumbersome machinery required in CMP?

COLONEL SCHARFF:

In my opinion, such a course is impossible. Priorities were in full use as the sole control during the early period, when there was assurance that everything ordered would be delivered and the only question was meeting the time limit on the more essential production. But it also performed a most useful service throughout the war and up to the very end as a method of solving conflicts in detail of determining, if two orders should meet in the shops, which one would go first and which would go second.

But from the very beginning it has been my view, and it was our experience, that priorities were totally ineffective as a basis of program control. In fact, so far as that having any influence, it seemed to me that it was in the opposite direction; that the tendency in the priority system was to encourage inflation. I have never been able to conceive of any development of the priority system that would make it an effective system of program control.

The allocation of a selected list of materials -- and our experience, I think, showed that the three selected were a reasonably satisfactory selection -- was the best idea, I feel, that developed during the war for bringing about that balance between the requirements or demand and the capacity or supply that is essential to get even the limited benefit that a priority system makes available.

MR. SWAREN:

In some recent studies of facility expansions some interesting factors pointing to the necessity of early controls were developed. The first computation on proper requirements, made in the late summer of 1941, indi-

cated requirements two and one half times greater than the available supplies. This tendency was experienced in all of the more critical materials as well as in requirements for end products. The result was a snowballing of demand for increased production facilities. So great was the demand for critical materials to be incorporated in facility expansion that by the last quarter of 1942 and the first quarter of 1943, 90 percent of many critical materials was scheduled for increased productive capacity. In order to cope with this situation, drastic changes in specifications and an extensive program of substitution were necessary.

CAPTAIN WORTHINGTON:

Thank you, Colonel Scharff, for a most valuable talk.

(28 Feb. 1947 -- 350)E.