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INTRODUCTION TO MATERIAL REQUIREMENTS

17 November 1952

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INTRODUCTION TO MATERIAL REQUIREMENTS

17 November 1952

Admiral Hague, General Greeley and gentlemen:

You are now embarking on the 5th Unit of our Economic Mobilization Course--Requirements. Though it is apparent to you that the sequence of presentation of subjects throughout the course is one of logical progression, I want to emphasize the importance of Requirements coming on the scene at this point. You have had presented to you the asset side of our national ledger--the three factors that have made this country the power it is: its Manpower, its Natural Resources, and its Technological Ability.

Now to effectively and fully utilize these assets to provide security for the Nation, we must determine the demands which are to be placed on them. These demands vary in composition and volume depending on whether we are at peace, at war, or in a state of partial mobilization such as today. Only by measuring demands in light of National assets can we determine whether plans for security are within the realm of feasibility.

Requirements, about which you will study for the next couple of months, constitute these demands. These Requirements are basic essentials of Economic Mobilization. Without knowing what will be needed, procurement cannot be accomplished, production could not be initiated or planned for--in short, there could be no effective Economic Mobilization.

Let me give you a broad, comprehensive definition of Requirements. Requirements are a forecast of needs or demands for personnel, equipment, supplies, resources, facilities or services by specific quantities under a given set of conditions for a specified period of time. This, as you recognize, would constitute a terrific scope for consideration in a period of time as short as we have. Accordingly, we limit our course to material requirements, covering end items, components, and production materials. This we feel is ample because in the Unit just finished you became acquainted with Manpower requirements--in our concurrent course, Procurement, dollar requirements will be treated, and in the Production and Public Service Units to follow you will learn of facilities and services requirements. For all kinds, however, the means of determination are similar.

You may have heard, probably to your dismay, of difficulties encountered in the Requirements field. Some of these can be eliminated through better understanding. Some are the result of our form of government and as such we must learn to live with them.

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It is my desire to assure you that Requirements are not nebulous or mystically gotten figures, but rather are the result of sound mathematics or are logical estimates generated by specific plans.

(Chart I.)

It is my belief that most Requirements problems, in general, stem from three things: lack of understanding of what the term Requirements encompasses, inadequate guidance on which to base Requirements computations, and lastly the magnitude of computations due to the vast number of items involved.

(Chart II.)

Let us look at these and see if some of them can't be dissipated. Taken in order mentioned, we differentiate between the qualitative and quantitative aspects of Requirements. The qualitative are the operational characteristics to which the performance of the item must measure up. They bear on quantities particularly when a new item is to supersede one presently in use. For instance, strategic and operational planners must be apprised of new developments in order to incorporate appropriate units into the forces. Logistic planners must ascertain availability data on new items, and their bases of issue, to properly phase out the old and phase in the new without generating excesses.

Quantitative Requirements, the predominate type with which we are concerned are, as the name implies, a statement of needs over a period of time to support a military operation, a plan, or to sustain a population at a specified living standard. They encompass user or end items, certain component parts which go to make up these end items and various materials which are used in manufacture, maintenance, or construction.

Under each of these physical types of material requirements, we have demands stemming from both civil and military needs, as well as from aid to foreign countries.

Military Requirements, those with which we in the Services are directly charged, are merely the reduction of a particular plan with its pertaining forces and contemplated operations, to phased quantities of the various items needed.

Civilian Requirements, as already stated, are the needs of the total population to sustain itself under a given standard of living. In normal times, when the military takes only a small portion of the Nation's output, civilian needs are no problem and the laws of supply and demand pertain. In a period of partial mobilization such as now, civilian needs do become a subject of consideration. When the combined, civilian and military demand total more than the Nation's ability to produce, it becomes necessary to reduce one or the other to stay within capability

limits. The expanded military requirements, which have to be met, then curtail civilian goods and services to varying extents. Theoretically the standard of living is being reduced, though probably it is not being felt to any extent by the individual at this time.

Let us carry this concept on to a war period when military requirements constitute a sizable proportion of our nations production. Then a decision must be made as to what amount of our resources can be devoted to war production and what must by necessity be retained in its civilian pattern. Essential civilian needs must be provided and war supporting industry must be given a slice of the pie for without these the munitions of war could not be produced or transported.

There are a number of approaches as to how to arrive at this apportionment or balance. For my purpose this morning, it is sufficient to establish that there must be a balance and that military plans and their generated requirements must stay within capabilities, present or potential.

In addition to the afore-mentioned U.S. military and civilian requirements, Foreign Aid constitutes still another demand for both military and civilian items which must be added to our own requirements and taken into consideration when establishing a balance.

But we have gotten a bit ahead of our chart while discussing types of requirements according to using sources. To establish clearly what we mean by physical types of requirements, we refer to an arbitrary classification based on the degree of completion of fabrication and assembly of an article.

An end item is one in which manufacture has been completed and it is ready to fulfill its final intended use. Such items range in intricacy from a complete aircraft to a mess can.

A component is an assembly or part which will ultimately be incorporated into an end item. A vehicle engine, the generator, and the starter are typical examples. They may be peculiar to the military or they may be common to both military and civilian needs.

Materials requirements, the last physical type which we will consider, cover some seventy principal raw or semiprocessed items, such as steel, copper, aluminum products and various alloys, which are essential to production. These, among the myriad of materials regularly used, are both strategic and critical and are thus accorded special handling. Generally speaking the military in establishing materials requirements must include those needed for all end items, in components other than those common for replacement parts and spares and for use in maintenance and construction.

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Returning to our first Chart, (Chart I) the second probable difficulty in the determination of requirements stems from the inadequacy of guidance on which to base computations. Have you ever tried doing the marketing for your wife on the basis of getting "the usual things" and when you came home, found her quite put out because you didn't have all of the things she wanted. It is not that you are incompetent but without knowing that she was planning to entertain the ladies' club on Tuesday and that the Jones's were coming to dinner on Thursday. It is improbable that you would cover all of the items she might desire. Thus, it is with all material requirements. Those responsible for requirements determination must be provided with timely information as to what is to be done, and the how, when, and where of it. Without this guidance the logistician must work from assumptions, from self-made assumptions, which may be erroneous and thus leave the resultant quantitative requirements of doubtful validity.

Another contributory factor to the requirements problems is frequency of revision of program guidance. Much of this changing of guidance can be attributed to the Services themselves but the greater part of it results from changes in the international situation and the resultant reaction on the part of the public and Congress. This fact must be recognized and accepted because this type of difficulty will ever be with us. It is inherent in our form of government where the "will of the people" and their "willingness to support" are the basis of action.

The last probable difficulty connected with requirements is one of sheer magnitude combined with repeated computation. Within the Air Force there are nearly a million items for which quantitative requirements must be determined so that current procurement may be accomplished. In addition usually one or more war plans are in the process of development at the same time, all with their resultant statements of requirements. These several different computations covering many of the same items can lead to much confusion unless caution is exercised.

(Back to Chart II)

Now to pursue a bit further the types of requirements we are confronted with, we should consider the various kinds of plans which generate military requirements. Each plan mentioned will be the basis for determining end items, components, and materials requirements and will normally include foreign aid consideration. Looking again at this Chart, we have indicated these various plans. Each must, to a more or less extent, be within our national capability from a dollar, resources, and production capacity standpoint. Basically they break down into 2 categories, current operations and war plans. Current considerations culminate in procurement during the pertaining fiscal year. War plans from an economic standpoint, establish an order of magnitude of effort

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and provide a means of determining logistic feasibility of these plans. The relationship between current operations and war planning may be illustrated in the present partial mobilization effort. The objective, as you know, is improvement of the mobilization base, both from the standpoint of forces in being and productive capacity to be available in time of emergency.

At the risk of oversimplification, war plans fall into 3 types: "short-range", "mid-range", or "long-range". We shall not go into the detail of these various plans and their generation of requirements now because tomorrow's lecturer and your instructors in the committee conference that afternoon will cover them.

(Chart III)

Having set forth the various types of requirements, groups using them and the plans from which requirements evolve, let us consider a moment the steps and sequence in requirements development; in other words, the Requirements Cycle. This cycle consists of three phases: guidance, computations, and review and adjustment.

To preclude misunderstanding and confusion regarding this cycle and another about which you will hear, the Mobilization Planning Cycle, let me say they are identical except that the latter has a fourth phase, "production planning" with industry. Consideration of this fourth phase is the responsibility of the Production Branch in a subsequent unit.

Back to the Requirements Cycle, the first phase--guidance--involves a number of steps. The National Security Council assesses and appraises national objectives and sets forth policy in national security matters. These are in the form of recommendations to the President and when approved become the bases for plans which the various executive agencies of the government are charged with developing. Within the Department of Defense, the Joint Chiefs of Staff translate NSC policies into strategic guidance for both current and war planning. When disseminated, JCS guidance is very broad and requires development and amplification of detail by the three Services. The Services expand these plans, filling in further data or assumptions as is necessary. By this time the planning has become rather specific as to what is to be done, when, and where. The logistic planners working concurrently with the operational planners, insofar as availability of guidance permits, develop support plans. Next these plans are reduced to programming which sets forth the "how" for implementing the plans. In other words programming spells out action which must be taken within special fields of interest, with due consideration being given in all instances to lead time. Examples of these programs are the "troop program" or "troop basis", the "installation program" and the various "training programs". These programs are normally the basis on which quantitative requirements are computed.

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The next step in our cycle is "computation". This phase, except for the number of items involved, is relatively simple providing good and timely guidance is available.

But before going into the categories of requirements to be computed, let me talk a few moments on what I consider to be a desirable approach to computations. I suggest for your consideration that perhaps too much time is consumed in the development of requirements, particularly in the war planning area. If too long a time is taken in determination, the results can lose their value through obsolescence before they are completed. With the various war plans now being revised annually, and nearly two years presently required for completion of the full requirements cycle, the new plans are in the making before results of the old are available. Yet each successive plan should reflect prior experience gleaned so that the gap of infeasibility can be narrowed or closed. The purpose of the requirements data, the time available for the job and the adequacy of the guidance on which to base computations should dictate the method of computation to be applied.

Thus there are obviously two approaches: the detailed approach where maximum accuracy is essential, and the short-cut approach with its varying degrees of accuracy. This raises the question as to when each should be used. If requirements computations are to result in procurement, they must be as accurate and dependable as is possible to determine for it is here that public funds and the Nation's resources are to be applied. If requirements are generated from war plans, such detail and accuracy are not warranted because by their very nature these plans are based on a series of assumptions. Also, these computations usually constitute an additional work load superimposed on computing personnel.

What is needed in this area are requirements sufficiently accurate to establish a reasonable order of magnitude for use in feasibility testing, industrial planning and stock piling operations.

Requirements in support of annual budgets would seem to require accuracy to a point someplace between these two extremes. Here, reasonable exactness is required particularly in major item areas. However, since a lead time of two or more years is involved there obviously will be changes in circumstances, configuration of items and the like. Hence, less time consuming methods should be in order. The objective here should be appropriate dollar balance between the various budget programs rather than statements of the exact number of lesser items which may or may not be needed.

(Chart IV)

Now let us look for a moment at how requirements are computed. To aid us, we will consider requirements classified as to military usage.

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The usual practice is to divide needs into initial issue, replenishment, distribution, special projects, and reserves. Be it shoes or trucks, the methodology is much the same.

Initial issue, that furnished to individuals or organizational units for the first time is determined by multiplying the number of troops or appropriate units by the basis of issue of the particular item. To get bases of issue, Tables of Organization and Equipment, allowance lists or other special authorizing documents must be available to the computer.

Replenishment quantities depend on the number of the particular item in use during the specified period. This total is multiplied by the established replacement factors. These factors are determined statistically from experience data or are engineering estimates made by the Service.

The quantity needed for distribution is complicated by the several considerations involved. Among others, they include length of supply line, availability of shipping, and stock levels at various points in the line. Even so there is no mathematical difficulty. These segments are stated, for the most part, in periods of time. The total number of days is established and translated into item requirements by relating replenishment quantities to this number of days of supply.

Special projects are probably the most indefinite and thus the hardest to determine. Here the specialist, such as the engineer, communicators and the like must envision from the type of operation or action expected, essential facilities, systems and other special needs. These needs are reduced to items by the bill of material method and totaled.

Last we have Reserves. Levels of reserves for particular categories, which are over and above normal stockage objectives are usually specified in the guidance or are laid down in directives from higher headquarters. They are set forth as a period of time for which the reserve is to provide. For this additional period, initial issue for any force build up and all replenishment needs must be included.

The sum of these subtotals indicates gross requirements. From this must be subtracted quantities of the item which you have on hand, in the pipeline and under procurement. Before this becomes a procurement quantity, however, reparable items on hand must be assessed to determine the extent to which they can fill these needs. Also suitable substitute items on hand must be considered. Gross requirements, less availability from these sources, is the net quantity of a given item which must be obtained.

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Each service is responsible for its own determination of requirements. Transmission to agencies for consolidation follows procurement assignment. For example, if the item is Navy procured, then Army and Air Force needs would be forwarded to that Service for consolidation with their own requirements. Service requirements do not lose their identity however, and one Service does not sit in judgment on another's statement of needs.

The foregoing procedure applies specifically to items of equipment. As you well know, these account for only a portion of the total number of items with which the logistician is concerned. Consumption items, such as subsistence, POL, parts and spares, and ammunition, are computed in much the same way as are items of equipment. There may or may not be an initial issue. For replenishment quantities, a consumption factor is used in lieu of the replacement rate. These factors are again the result of experience or judgment and are applied to either the number of troops or to the appropriate equipment population. To this may be injected operational rate factors such as sortie rates. Needs for distribution, special projects, and reserves of consumption supplies are arrived at in the same manner as are items of equipment.

(Returned to Chart III)

This brings us to the last phase of the requirements cycle--review and adjustment. About review, let me say, this is a sometimes neglected aspect of the cycle, due possibly to over confidence in computing agencies but more probably to a lack of appreciation of the importance of appropriately balanced requirements. Review is a process which actually runs throughout the cycle. Within the military it is a command responsibility, which has been given its most recent emphasis in Secretary Lovett's Department of Defense Directive, Military Supply System Regulation, issued 5 September of this year.

Above the Military Departments, review for various purposes are accomplished by the Munitions Board, OSD-Comptroller, Bureau of the Budget, the Congress, the agencies of the Office of Defense Mobilization and also by the JCS. Based on the findings from these reviews, adjustments of various types take place depending on the level at which made. At computations level, adjustments are usually the correction of errors in calculations or adjustment in accordance with new programming received. At Headquarters level, adjustments are normally to reflect a change in program or to bring about proper relationship and balance between programs.

At the levels of the Munitions Board and ODM, adjustment may be made so long as they don't alter the basic plan. These adjustments are normally made in conjunction with the Services concerned. The Munitions Board must consider the balance of requirements between the Services insofar as productive capacity and availability of materials are

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concerned. ODM considers balance from the standpoint of total national capacity and the impact on the Nation's economy. Should infeasibility be indicated its extent is established and action passes to the Joint Chiefs of Staff.

Concerning budgetary requirements, from Headquarters level upward, adjustments are usually in the form of cuts in requested funds. This is especially true of the actions of the OSD-Comptroller, Bureau of the Budget, and Congress. These cuts, often arbitrary, are applied to areas where they think possible excesses may have been asked for or where they think it will hurt the least. There is fallacy in this line of action, however, because a cut in any one budget area impinges on others, so usually a full realignment of programming and recomputation of requirements becomes necessary.

So far we have dealt with the requirements cycle only in connection with military items. The cycle, to varying extents, applies to both civilian and foreign aid requirements. How foreign aid requirements are determined is the subject of one of our early lectures so we will not go into that now. I do want to emphasize, however, that they do constitute another demand against our national assets and thus these requirements must be included in the over-all review and adjustment of requirements if feasibility in fact is to be determined.

Now to civilian requirements. The civilian standard of living in this country is high as compared to other parts of the world and thus constitutes a sizeable cushion which in turn contributes to our potential to wage war. Notwithstanding the size and importance of civilian requirements, they have been the least effectively determined. In fact it was stated by Mr. Krug in one of his reports as Chairman of the War Production Board in World War II, they were never able to figure essential civilian requirements accurately.

To date complete civilian requirements under any set of conditions have not been determined. In some special cases, civilian needs in the form of estimated percentages of capacity of various commodity industries have been made, but even this has not been done across the board. This situation is probably due to a number of reasons. First, no adequate guidance has been developed for such things as applicable levels of living standards and probable war damage. Second, complete statistics are not available from which to develop replacement or consumption factors. Finally, we have never before been in a position where determination of comprehensive civilian requirements has been absolutely necessary.

Thus in wartime, if World War II practices are to be repeated, the Office of Defense Mobilization would proceed on the assumption that the military are to be given what they can establish need for and the

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civilian take cut-back as much as necessary to provide this amount. If the pinch on the public becomes too excessive and that the war effort is jeopardized, civilian production would be restored to the point of reducing or eliminating the detrimental physical or morale effects. Should World War III come, we cannot say now what means of establishing civilian needs will be used. I will venture to predict, however, that the civilian "take" will be, by necessity, curtailed to a lower level than has ever pertained in the history of this country's wars, and that a hit-and-miss approach as used last time will not suffice.

Before closing, gentlemen, I would like to tell you a bit about how we will conduct our Unit of this year's course. A monograph and curriculum book have been furnished you and should be quite helpful. I enjoin your careful study of them.

We will not attempt to make requirements specialists of you but we do intend to give you a good understanding of what material requirements are, why they must be determined, and the major problems encountered in this field.

To do this, we have scheduled ten lectures from outside speakers--all specialists in the subjects about which they will talk. The subjects and the chronological order are not directed at specific committee problems but rather are to give a good general appreciation of requirements.

There is a total of 232 pages of essential reading. This reading also is directed toward over-all understanding.

We have scheduled four committee conferences for the purpose of discussing various facets of requirements determination.

Then there will be six committee problems, each of which to the maximum extent possible embrace a cross-section of the problems confronted in the requirements field. Committees have been kept small and in all instances except one there will be two committees working on the same subject. This is to make possible cross discussion of problems and also to generate a bit of competition. This approach applies to the individual problems as well.

For the oral presentations, we have selected subjects outside of those about which you will normally hear and read. In other words, the student oral presentations are a continuation of our course of education in requirements.

I should like to present to you the members of our branch who have developed this year's course. I will introduce them with the problem area for which they are responsible.

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Colonel Holmes, with whom I had the pleasure of working our student year. COMPUTATION OF SERVICE MATERIEL REQUIREMENTS.

Captain Carlson, also a brother student. Two problems: MEDIUM TANK REQUIREMENTS and 90 MM AMMUNITION REQUIREMENTS.

Colonel Martz, a colleague for the past ten years: REQUIREMENTS FOR MUTUAL SECURITY PROGRAMS.

Colonel Goldsmith, one of the outstanding students from last year's class, whom we are most happy to have: REVIEW, ADJUSTMENT AND BALANCING OF TOTAL NATIONAL MATERIAL REQUIREMENTS.

Mr. Henkel, better known as "Pop", who has guided many a student through the intricacies of requirements: THE DETERMINATION OF CIVILIAN REQUIREMENTS.

And, Mr. Shipley, our able administrative assistant, who devotes himself to making all of our tasks easier.

Gentlemen, this morning we are going to depart from the traditional question period. Please hold any question or comments which you may have for this afternoon's committee conferences. Your instructors and I will be at your service then and through out the course. I wish all of you and the Requirements Branch success.

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