

RELATIONSHIP OF 1939 STORAGE FACILITIES TO ESTIMATED NEED

25 October 1946

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THE INDUSTRIAL COLLEGE OF THE ARMED FORCES

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## Relationship of 1939 Storage Facilities to Estimated Need.

25 October 1946. . . .

GENERAL MCKINLEY:

Gentlemen, this morning we are particularly fortunate in having with us Brigadier General Herman Feldman. I feel that we are particularly fortunate because he has been quite a life-long friend of mine. General Feldman was at heart an artilleryman. He was an artilleryman on detail with the Quartermaster when I first knew him at Scofield Barracks, when we served over there. He later transferred to Quartermaster and was promoted to his present rank on 16 January 1944.

General Feldman is a graduate of The Army Industrial College, Class of 1940. He was the Deputy G-4, Services of Supply in the European Theater of Operations. During the African Invasion he was G-4 of the Mediterranean Base Section, later becoming Commanding Officer of the Central District Mediterranean Base Section. At that time he was very closely associated with General Leavey, whom we had here yesterday.

He then returned to the United States in the Summer of 1943 and was Deputy Quartermaster General until the Spring of 1944, at which time he went out to the Pacific as J-4 to Admiral Nimitz. I happen to know that it was General Leavey who put the pressure on to get him out there. So, they were associated in those two places. He returned to the United States in October of 1945 and is now Deputy to the Quartermaster General.

While I was in the Quartermaster General's Office I worked very closely with General Feldman on the subject he is going to talk about this morning. Therefore, I know his complete capacity on this subject. His subject is "Planning Depot Systems to Meet Major Emergencies, 1940 and 1946". I take great pleasure in introducing Brigadier General Herman Feldman.

GENERAL FELDMAN:

General McKinley, members of the Staff and Faculty, student body and distinguished guests: Despite the build-up I just received from General McKinley, I would like to say that I feel very much at home here on two counts: First, I was member of the student body here during the 1939-1940 Class; also, I see a number of Navy members with whom I had some association out in the Pacific. I have not forgotten that Navy experience because coming back to Washington has not exactly separated me from that experience because we are pretty much at sea in this town.

First, let me say I regret that the charts are not as large as I would like to have them in order to make them visible to the audience in the rear; but we did the best we could with our limited facilities and the time in which we had to prepare them.

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When a war is declared by the Congress of the United States, about ten per cent of the population of the nation very quickly become dependent upon the Quartermaster Corps for part or all of their food, clothing, petroleum products, and general supplies. This involves 38,000 items, not to mention spare parts, and the monthly tonnage to be handled by the distribution system suddenly reaches mountainous proportions. The items vary widely with regard to storage characteristics and methods of handling and distribution: horses, cigarettes, tents, fresh tomatoes, sleeping bags, gasoline, and combat boots, to mention a few of many thousand items, each representing specific storage problems.

The mountain of Quartermaster material produced each month by American agriculture and industry must be procured and packed in accordance with strict specifications, and size requirements, and initially directed to the depot best situated and equipped to distribute such supplies to centers of military population within the continental United States, or to ship abroad through selected ports.

Planning Quartermaster and General Depot facilities and operations involves three major functions and responsibilities of the depot system:

1. Receiving Supplies. Adequate and properly located storage facilities must be made available quickly in time of emergency; they must be adequately equipped, and staffed with trained supervisory personnel and labor, to efficiently receive and classify vast quantities of materiel.

2. Storing Supplies. Proper arrangements for protection of supplies in storage, including the installation and supervision of efficient storage methods and procedures with a view to economical and rapid assembly for shipment as required, is another important function.

3. Issuing (or shipping) Supplies. The quick and accurate shipment of supplies to meet all normal and emergency demands, and the development and execution of efficient and economical shipping procedures, is the third of the major, closely inter-related storage functions of the depot system.

Ever since the Quartermaster Corps established its first depot in the city of Boston over one and one-half centuries ago, we have had some kind of a depot system to meet normal supply requirements of the United States Army, which can be used as a framework into which other depot facilities can be rapidly integrated in case of sudden need for expanded capacities.

At the conclusion of each war the Quartermaster Corps contracts its depot system to meet the reduced requirements of a peace time army. It recommends what few depots will be actively used to receive, store, and ship Quartermaster supplies being currently consumed, and which depots will become inactive, storing military reserves or temporarily housing war surpluses pending disposal.

Supplies in commercial storage are removed to government owned warehouses as soon as practicable following the end of the war, to save expense, and to assure fullest possible utilization of government owned facilities. This will automatically provide for better maintenance, and will economically justify the retention for long periods of such warehouses for use in case of a later emergency.

In January 1940, the Quartermaster Depot System consisted of nine (9) active depots, one of which was a sub-depot, and four (4) large inactive depots which became re-activated in June 1940. These depots contained a total of nearly 24 million square feet of warehouse space and 2 million additional square feet of shed space. All this space was not previously used, nor intended exclusively for, Quartermaster supplies, but over half of it had been previously used and would again be used for handling supplies of all other Technical Services which operate in coordination with the Quartermaster Corps during times of war in a system of general depots.

The increasingly critical nature of a national emergency in 1940, as emphasized by the passage of the Selective Service Act, resulted in a Quartermaster depot expansion program based upon several considerations:

1. The need for storage space required for essential items of an army of 1,820,000, and for critical items for an army of 3,200,000.
2. The need for permanent construction to permit use of facilities after the emergency to supply the post war army of 230,000 regulars and 250,000 National Guard, as planned at that time. Warehouse space required was determined by an analysis of the essentiality of each item, those requiring protection of covered storage, and the use of known dimensions of each item when packaged in bulk.

Based on the above, it was planned to increase government owned warehouse space from 24 to 43 million square feet; shed space from 2 to 23 million square feet; and to utilize additional commercial warehouse space of approximately 4½ million square feet.

After 15 December 1941, the Corps of Engineers assumed responsibility for construction of depots, and the combined space requirements for the various Technical Services in general depots became a matter for coordinated action between the Corps of Engineers and Headquarters, ASF.

At our entry into war on 7 December 1941, the following storage space was available or under construction:

Warehouse space (government owned)	-	34,870,000 sq feet
Shed space	-	1,265,000 sq feet
In spite of construction of new shed space, the release by the Quartermaster Corps to the Transportation Corps of most of its original shed space, especially ports, reduced the area available to 1,265,000 square feet		
Leased warehouse space	-	4,102,000 sq feet

When the extent of the two-front war which must be fought became definite in December 1941, the depot expansion program was accelerated, but the goals of various types of storage were somewhat reduced as compared with a large increase in projected troop strength because of a shortage of personnel and construction materials, which made it essential to restrict construction to the absolute minimum required.

The peak of the period of wartime expansion was reached in April 1945, and because of building limitations was not exactly in accordance with original plans for covered storage facilities:

Warehouse space, government owned	-	56,000,000 sq feet
Shed space, government owned	-	7,000,000 sq feet
Commercial storage	-	6,000,000 sq feet
Leased warehouse space	-	<u>5,583,000 sq feet</u>
Total covered storage	-	<u>74,583,000 sq feet</u>
Open storage	-	<u>40,000,000 sq feet</u>
		<u>114,583,000 sq feet</u>

The original estimate of covered storage requirements for an army of 3,200,000 men was 66 million square feet. This figure included not only storage for Quartermaster items, but items of other Technical Services stored in general depots administered by the Quartermaster Corps. Although planned army strength increased almost three times the figure used in the original estimate of warehouse space as mentioned, the total space including commercial storage did not exceed at the war peak 75 million square feet of covered space, which was only 9 million square feet more than the first estimate based upon a much smaller army.

The problem of warehouse space limitations was solved by several methods:

1. The greater use of open storage for selected supply items which are not subject to rapid deterioration through exposure.
2. The use of overseas facilities to store material shipped direct from contractors to ports, beginning in the middle of 1942.
3. The use of 9 Holding and Reconsignment points operated by the Transportation Corps to assemble supplies for overseas shipment, which relieved to a considerable extent congestion in Quartermaster depots.
4. Greater use of leased and commercial storage than originally anticipated.
5. Increased use of mechanical materials handling equipment, and improved depot layout, to increase supply turnover and utilization of space.

The storage space at the peak of expansion was distributed among eleven (11) Quartermaster depots and eleven (11) additional Army Service Forces general depots, which were placed under the administration of the Quartermaster Corps in August 1945. In addition, there were seven (7) sub-depots operating under parent depots where geographical location and space needs required utilization of sub-depots to secure adequate capacity. All of the new depots were established on the basis of location in relation to concentrations of military population, transportation facilities, or ports. All new construction was of the latest single story type which will be described in more detail later, and all leased storage was selected on the basis of similar location factors, plus suitability for efficient utilization of the space, in receiving, storage, and shipping of a large volume of Quartermaster supplies.

In the construction of new depot facilities, not only was the past experience of the Quartermaster Corps in depot operations drawn upon, but the best current practices of civilian industry were utilized, with some additional improvements. The single story type of building on which the QMC standardized, offers great advantages in the following respects:

1. Complete and efficient utilization of modern mechanical materials handling equipment.
2. Adequate trackage for large scale emergency operations.
3. Rapid unloading, storage, and loading of supplies
4. Almost unlimited floor load capacity

The general warehouse construction plan provided for:

1. Single story buildings, 180 feet wide, and divided into sections by firewalls at intervals of 120 feet, each building containing from seven to eleven sections.
2. Freight sidings with loading platforms level with car floors on one side of the warehouse and truck docks for truck loading and unloading on the opposite side, to permit full usage of both types of transportation concurrently.
3. Monitor type of sun-light roof to provide adequate light without windows in side walls.
4. Maximum size of depot determined to be 4 million square feet, to restrict hazards of loss by fire or by enemy action, and to permit establishment of installations at enough different strategic distribution points to furnish supplies to troop concentrations in contiguous transportation areas, with minimum delay.

Since the original plan for construction of shed space was curtailed by 14½ million square feet, it was necessary to secure additional emergency storage to meet contingencies and relieve depots of a portion of the burden of inefficient crowding.

Two flexible commercial storage plans were developed, Kansas City and Cleveland plans:

Under the "Kansas City Plan", commercial warehouses through an association of operators entered into contracts to store items for the War and Navy Departments at tariffs prescribed for the general public.

Under the "Cleveland Plan", commercial warehouses individually contracted with the government to store supplies and materials.

These commercial storage plans insured that necessary commercial storage would be available to meet storage emergencies and that the government would incur cost only for storage space actually used. Under these plans, The Quartermaster General controlled the commercial storage operations for both the War Department and the Navy Department, and a total of 68,000,000 square feet of usable commercial warehouse space was available, located in all principal cities.

The emergency depot expansion program was based on making all possible use of government owned storage space, and restricted use of leased or commercial space. The proper location of re-activated depots and of newly constructed warehouses was an important factor in holding down the Quartermaster Corps' use of leased and commercial storage space to a reasonable figure of 11,583,000 square feet at the peak of war operations.

In the computation of space requirements for not only the Quartermaster Corps but other Technical Services participating in the general depot system, different factors are used by each Technical Service. For instance, the Quartermaster Corps requires for Quartermaster items 11.6 square feet per man, 78% of which must be inside storage and 22% may be outside storage. In contrast, for Engineer items, it is estimated in time of war that 8% of storage must be inside while 92% of the space required can be open storage. At present the Engineers, however, are storing 70% of their equipment and supplies under cover to give it long term protection, and to utilize adequate facilities which are now available to them.

The Quartermaster Corps utilized approximately 54% of all storage space in general depots during the war, and approximately 37% of all army supplies shipped overseas during World War II were Quartermaster items, including Fuels and Lubricants, Subsistence, Clothing and Equipage, and General Supplies. This was more than that furnished by any other Technical Service, and does not include items of other Technical Services which were shipped from General Depots.

Solving personnel problems in expansion. The personnel problem became a most serious and important one in connection with expansion of depot activities. Because of large troop requirements of the army, and the great demands for workers in war industries, the Quartermaster and General Depots experienced an increasing shortage of storage personnel. Prior to 1941, storage operations had been largely manual, using two wheel and four wheel hand trucks and manually propelled conveyors. With the great increase in tonnage handling, beginning in 1940, it was necessary to introduce mechanized materials handling methods into Quartermaster depots.

What became the greatest supply handling operation in history, was made possible by the fullest utilization of mechanized materials handling equipment and the development of improved unloading, storing, and shipping methods, plus the fullest utilization of available storage personnel.

The success of the operation was clearly demonstrated in the rising figures of depot tonnage handled concurrent with reductions in personnel. For example, during the month of September 1942, 20,900 depot storage personnel handled a total depot tonnage of 839,000 tons, whereas in September 1945, nearly two thousand less people handled approximately twice as much tonnage. The average activity per man was increased from 3.3 tons per day to 11.5 tons per day. Some of the principal types of mechanized materials handling equipment installed in depot storage operations were fork lift trucks with pallets, tractor trailers, powered conveyors, and powered stackers.

It takes good supervision and training to secure maximum utilization from the best mechanized equipment. Plans were developed by depot commanders and their staff, and of the Office of The Quartermaster General to assure:

1. Simple and efficient warehouse receiving and shipping methods.
2. Practical on-the-job storage training programs in depots.
3. Improved packing and crating methods to simplify handling of supplies overseas and to increase their protection: such as amphibious pack, drop pack, parachute pack, baling of clothing items, V-Board overseas containers.
4. Special marking systems to insure proper arrival of supplies to specified overseas locations, in right quantities of each type.

To provide well trained depot personnel in adequate numbers to be used both within the Zone of Interior and in theaters of operations, Advanced Officers Storage Schools were conducted to train selected officers for storage assignments, including a special training course for QM storage officers at the University of Pennsylvania which was instituted in the fall of 1941. These officers were detailed to assist depots in installing mechanized materials handling equipment and methods.

In addition to the depot system handling non-perishable supplies, the Quartermaster Corps established early in the war, and still maintains, a system of market centers, designed to most effectively procure, store, and distribute perishable subsistence such as meat and vegetables.

Market Centers were located in the heart of the district where important types of subsistence supplies were available in large quantities. For example, the headquarters for the procurement of meat was located in Chicago, and for various specialized types of fruits and vegetables, buying officers were placed in the areas where they were produced.

The Chicago headquarters of the market center system operates under the supervision of the Office of The Quartermaster General.

Provision is also made for remount depots organized for the procurement, breeding, training, and distribution of horses and the handling of mules for the use of the army. War dogs were also trained at certain of these locations.

Post War or Peace Depot Storage Plan. Space requirements have been computed as 30 million square feet of closed storage space as of June 1949, to house Quartermaster supplies, and supplies of other technical services stored in general depots. This computation is based upon a peace time army of 1 million men; 25 to 30 % of which will be overseas, making an allowance of 40% for flexibility in planning. In addition, it considers supply requirements of the National Guard, and Organized Reserves.

Quartermaster Corps' first move after V-J Day was to release commercial and leased facilities and it has gradually contracted its peace time depot system to seven (7) distribution depots, three (3) filler depots, two (2) manufacturing depots, and four (4) depot procurement facilities, which are not separate but are located in existing depots.

In a current plan which has not yet been finalized, nine (9) additional depots will be assigned a reserve mission and will be classified as storage depots pending a new emergency.

Certain depots are being assigned storage missions based upon maximum utilization of best equipment and best located government owned facilities as distribution depots, which can most efficiently serve present distribution of troops within the Zone of Interior, and support present deployment in occupational zones abroad.

In addition to giving up leased and commercial space, three large government owned depots are being leased to private interests, or released to other uses by the government, on the condition that they can again be used by the army in event of emergency.

Depot Plans for New Emergency. The proposed strength of a re-mobilized army has been given for planning purposes and, based upon experience of World War II with regard to individual allowances, and tonnage and space requirements per man of Quartermaster items, the depot space required can be readily determined. Assuming, moreover, that a system of general depots would be expanded under the supervision of the Quartermaster Corps, the requirements of the other technical services for space in such general depots have been computed.

In addition to 30 million square feet of warehouse and shed space contained in the current system of active Quartermaster and General Depots, plans are ready to reactivate nine depots now performing a reserve mission, with approximately 25 million square feet of covered storage, and to supplement additional space requirements through recapture of 6 million more square feet contained in 3 large deactivated depots. This will give a total of 61 million square feet of warehouse and shed space to the Quartermaster Corps, including facilities for general depots, upon relatively short notice, without considering possible future use of leased or commercial facilities. This figure does not include the approximately 11 million additional square feet of covered storage now being administered by the QMC which will be returned to the Transportation Corps, Corps of Engineers, and Ordnance Corps, who turned over certain Holding and Reconsignment Points, and depot facilities, at the end of the war to the Quartermaster Corps. Nor does it consider use of open storage - 40,000,000 sq. ft. of which can be again readily provided.

All materials handling equipment has been registered, classified, and necessary equipment is being retained and well maintained in good state of repair for such expanded use as may be required. Complete and adequate stocks of spare parts are also being retained.

Although the electrical accounting machine equipment at depots has been reduced in proportion to present work loads, plans have been made for expansion of such equipment and the assignment of necessary trained personnel to operate it. The gigantic stock reporting and control tasks of the depot system, as in World War II, will be mechanized to the extent practicable, with electrical accounting machines saving untold man hours of work, and producing depot records with a frequency and accuracy not possible under manual methods.

Although the assumptions made as a basis for War Department planning for a new major emergency cannot be so complete or dependable that absolute reliance can be placed upon them, at this stage, either as to disposition of troops abroad, or an estimate of results of any enemy action on our distribution system within the Zone of Interior, the depot system of the Quartermaster Corps is still largely intact and capable of rapid expansion when necessary. Full use can be made of labor saving materials handling, and accounting equipment; and of trained personnel; and further improvements in utilization of each, are consistently being sought and developed by the Quartermaster Corps.

It is perhaps an insoluble paradox that The Quartermaster General must keep one eye on peace and take advantage of all potential savings made possible by more stable conditions of distribution and supply of Quartermaster equipment, but at the same time he must keep the other eye on the possibility of approaching war and alertly maintain all necessary flexibility within Quartermaster facilities and plans to permit maximum expansion within a short time, and equipping of troops for the field in large numbers, under the urgent conditions of the increasing tempo of modern warfare.

Despite the present eye strain caused by the current profusion of possibilities in both directions, The Quartermaster General is resolutely making plans which are as complete and as realistic as present conditions permit, to establish the most economical depot system for operation during a period of peace, and at the same time the one most capable of rapid and efficient expansion to meet the tremendous challenge of another great war, spearheaded by new atomic weapons, but probably requiring large armies in the field to achieve decisive victory.

(6 November 1946--350) L.