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Report to Secretary, Department of Defense; by Robert G. Rothwell (for Fred J. Shafer, Director, Logistics and Communications Div.).

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Congressional Relevance: House Committee on Armed Services; Senate Committee on Armed Services.

Unlike the Air Force, the Army and Navy have been slow in accepting two innovative packaging methods, foam-in-place and fast packs, and therefore have lost potential savings. Findings/Conclusions: Foam packaging affords savings in labor, materials, reusability, transportation, and reduced shipping damage when compared with conventional packaging. Experience at the San Antonio Air Force Logistics Center indicated that items packaged with foam resulted in overall savings in labor and material of about 40%. The San Antonio Center also reported that the introduction of fast packs in packaging resulted in increased production, about a 62% savings in material, and a 65% savings in labor, and a 65% reduction in paperwork. The lack of Department of Defense guidelines for effectively introducing the new technology has resulted in the wide variation of its acceptance by the military services. Recommendations: The Department of Defense should develop a program to insure that the military services adopt and use these methods of packaging and any future improved technology to the greatest extent possible. The plan should include identification of candidate items for packaging, training for foam equipment operators, information exchange among the services, and an educational program to promote acceptance at command levels. (DJM)

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UNITED STATES
GENERAL ACCOUNTING OFFICE

Military Services Should Uniformly Adopt Improved Packaging Techniques

Department of Defense

The Air Force has realized significant savings by using two innovative packaging methods: foam-in-place and fast packs. However, the Army and Navy have been slow in accepting and applying these new techniques, and therefore have lost potential savings. The Department of Defense should develop a program whereby the military services uniformly adopt and use these and future packaging innovations.

LCD-77-216

JUNE 8, 1977

UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

LOGISTICS AND COMMUNICATIONS
DIVISION

B-157476

The Honorable
The Secretary of Defense

Dear Mr. Secretary:

In our May 18, 1976, report (B-157476), we recommended that the military services share the benefits realized and the pitfalls encountered in using new packaging technology. Your response on August 5, 1976, indicated that actions were being taken on our recommendations, including the establishment of a Department of Defense (DOD) Storage and Warehousing Policy Committee which would, among other things, monitor the adequacy and effectiveness of DOD packaging policies.

We have continued to study the military services' management and control of reusable packaging containers, and we have observed problems with the use of two new techniques--foam-in-place and fast packs--which warrant your attention and special consideration by the Storage and Warehousing Policy Committee.

The lack of DOD guidance for effectively introducing new packaging technology has resulted in wide variations within the services. For example, the Air Force has realized considerable savings by emphasizing the use of foam-in-place and fast packs to assure maximum standardization and minimum overall packaging costs for selected supply items. On the other hand, the Army and Navy have been slow in accepting and applying the new technology to their packaging programs. As a result, they have experienced only moderate success with these new packaging methods, and potential savings have not been realized.

Our observations are based on information obtained at DOD; Air Force; Army and Navy headquarters; selected Army commodity and Navy systems commands; the Air Force's San Antonio Air Logistics Center (ALC); several Army depots; and

several Navy field activities, including two Naval Air Rework facilities, several Naval Supply Centers, and Naval Air Stations. We concentrated on Naval air activities because of the success the Air Force has had in applying foam-in-place and fast packs to aviation components. We also reviewed pertinent DOD and military service policies, procedures, regulations, and instructions.

Management responsibility for packaging is described in appendix I.

BACKGROUND

Foam-in-place and fast pack techniques may be described as follows:

--Foam-in-place is a packaging process where mixed chemicals are dispensed into an exterior carton or plywood container. The chemicals expand and solidify to provide cushioning, blocking, and bracing for the item being packaged.

--Fast packs are a series of reusable, standardized, cushioned containers. Basically, they consist of various sizes of cartons, prefitted with polyurethane foam inserts leaving hollow centers where items may be inserted for protection.

Both techniques offer advantages over more conventional packaging methods when used to package repairable items. For example, foam-in-place packages open easily and may be reused to pack similar items for return shipment and/or storage. The process involves a lightweight polyurethane foam which is easily and quickly applied and easily removed. Tests and experience have demonstrated that foam-in-place is a safe and reliable packaging method. Moreover, savings result in labor, materials, transportation, and reduced shipping damage when compared with the use of conventional wooden boxes and metal drums.

Fast packs also offer definite advantages over conventional packaging techniques. By using fast packs, packaging departments can ship thousands of different items--within allowable size, weight, and fragility limits--in just a few types and sizes of fast packs. Their reusability, together with the minimal labor required to insert and remove items, makes fast packs the cheapest type of packaging for many items--especially those having repair and return cycles.

THE ARMY AND NAVY MUST IMPROVE THEIR POLICIES AND PROCEDURES FOR FOAM-IN-PLACE PACKAGING TECHNIQUE

The Air Force has recognized the advantages of foam-in-place packaging and is widely using the technique. Although both the Army and Navy are using foam-in-place in some areas, their programs suffer from inadequate training, lack of centralized guidance, and reluctance on the part of some commands to accept foam-in-place packaging.

The Air Force started experimenting with foam-in-place as a packaging method in 1969. By July 1976, over 4,000 different supply items were packaged by that process which is now used at each of the five Air Force logistics centers--Ogden, Oklahoma City, Sacramento, San Antonio, and Warner Robins. It is also being introduced for use at base level activities.

The Air Force Packaging Evaluation Agency reports that foam packaging has excellent reusability and affords significant savings in labor, materials, and improved item protection. Experience at the San Antonio ALC confirms this position. San Antonio found that items packaged with foam resulted in overall savings in labor and material of about 40 percent. For fiscal year 1975, San Antonio reported savings of about $200,000. Another ALC performed a cost analysis for five randomly selected high-volume items and found that the average cost per package was reduced from $4.72 to $2.35 when conventional packaging was replaced by foam-in-place packaging. The annual savings reported on just these five items was $147,000.

Several factors have contributed to the Air Force's success with foam packaging, including

--attention at the command level,

--acceptance of the new technology by packaging officials, and

--extensive employee training in the operation and maintenance of the foam-dispensing machines.

A foam-dispensing equipment operator/preservation packer must have a minimum of 6 months training including 20 hours of classroom instruction. As a result of the training, operators can make on-the-spot repairs and thus avoid prolonged periods of time when equipment is inoperable.

Problems in Navy
foam packaging program

The Navy did not authorize foam-in-place packaging aboard ships until July 1976. At the time of our study, foam-dispensing equipment was installed at only a few Naval shore activities and was on order for several others.

We visited a few of these shore activities and found that the number of items packaged with the foam technique varied widely. Likewise, there was wide variance in the use of the foam at other Naval activities packaging similar items. For example, the Norfolk Naval Air Station in Virginia was using foam to package about 500 items a month, while the Oceana Naval Air Station in Virginia used the process to package some 2,200 items each month. This variation, at installations with comparable type and volume of activities, indicates a lack of visibility and centralized direction over foam packaging operations. The Navy had not identified items which were candidates for foam packaging. Installations using the process apparently were not communicating and exchanging data on their foam packaging programs.

We also found evidence indicating that the Navy Supply Systems Command had not been effective in introducing foam packaging systemwide. Officials at the Naval Air Rework Facility in Norfolk said they had no plans to use foam-in-place packaging because their engineers considered the process unacceptable. This policy is inconsistent with that of other comparable Naval activities and indicates a need for more centralized education and training.

Adequately trained personnel are essential in the packaging process. This need becomes even more critical when new packaging equipment (such as foam-in-place) is introduced. The nature of the process makes it easy to damage or destroy items being foamed if specific procedures are not properly followed. To illustrate, the Army shipped 365 gas cylinders, foamed in a seavan container, to Japan. Crowbars and picks were required to remove the cylinders from the van. Also, at the Red River Army Depot, 30 generators packaged for overseas shipment had extensive corrosive damage caused by improper use of foam-in-place.

Although the Navy requires that equipment suppliers provide some on-the-job training on delivering foam-in-place equipment, no minimum training requirements have been established for equipment operators. Unless Navy operators have training similar to that of Air Force operators, the Navy

increases the risk of damage to both the foam-in-place equipment and the items being packaged.

Army should improve and expand its use of foam packaging

We visited two Army commodity commands and found that the use of foam as a packaging method varied widely. The Tank-Automotive Readiness Material Command (TARCOM) had encouraged its depots to use foam but favored a procedure which may not be cost effective. In contrast, the Aviation Systems Command (AVSCOM) had not determined that foam-in-place packaging should be used for any of the items it manages.

TARCOM application of foam packaging questionable

TARCOM has specified the use of foam-in-place in several of its packaging data sheets and is revising others to read the same. Generally, TARCOM favors encapsulation, a foam-in-place technique whereby the items or component is completely shrouded or encased in foam. Methods for opening these foam packs include (1) pulling a tear wire in the foam or (2) sawing part way through the carton and foam and prying the two halves apart. Such methods severely limit the reusability of the foam pack. We believe that limited reusability and problems resulting from the process more than offset any claimed advantages of the encapsulation technique.

At the Red River Army Depot, which packages many TARCOM items, encapsulation was the only foaming technique being used. Depot officials were very critical of the process and said that the depot does not use foam-in-place to any great extent. Corrosion resulting from the use of foam packaging was the most common complaint. We were told that items corroded in the pack because the foam was soaking up moisture after the item was packaged, or condensation formed when the hot foam shrouded cold metal. Other problems pointed out by depot officials were difficulty in opening the packs and limited reusability.

A military handbook on foam, dated January 1973, states that full encapsulation is best for hardware that will be stored indefinitely without periodic inspection or that is subject to severe environmental conditions. However, a

recent Air Force report 1/ shows that items packaged with a split-pack technique resist corrosion and receive excellent physical protection. In the split-pack, the top and bottom halves of foam are separated by plastic film. (See app. II.) It is easy to open and the container can be reused. The report discusses an outdoor environmental test of aircraft external fuel tanks packaged in polyurethane foam. The tanks were placed on a test site near the Gulf of Mexico--a severe environment of salt air, intense sun, heavy rain, and high winds. After 30 months the foam packs were opened and the tanks were found to be in excellent condition.

We believe that a foam-pack which has reusability and does not induce corrosion would be more acceptable to depot packaging specialists.

AVSCOM passive on foam use

Unlike TARCOM, AVSCOM has not specified foam-in-place packaging for any of the items it manages. An AVSCOM packaging official stated that it is not resisting the use of foam, but considers foam packs to be one-trip containers.

We met with AVSCOM packaging officials and showed them a film outlining various foam packaging techniques successfully used by the Air Force. The film emphasized the multi-trip life of foam-packs.

In discussions following the film presentation, reactions of AVSCOM officials varied on the use of foam as a packaging method. However, it was clear that most individuals present were not familiar with foam packaging and the advantages offered by the new technique.

TARCOM and AVSCOM manage thousands of items which are candidates for the foam-in-place process. As discussed earlier, the Air Force has found that substituting foam-in-place for conventional packaging can result in savings. We believe that the U.S. Army Materiel Development and Readiness Command (DARCOM) should direct all of its subordinate commands to review their packaging programs and use foam-in-place to the maximum extent possible.

1/"Environmental Study of External Aircraft Fuel Tanks Stored in Rigid Polyurethane Foam," Air Force Packaging Evaluation Agency Project No. 72-7A-12-1, Dec. 1975.

Services' comments and our evaluation

We discussed our findings and observations with the Navy Supply Systems Command and DARCOM. Naval officials said they heartily endorse foam-in-place and encourage its use on ships and shore stations. They stated that $100,000 would be spent in fiscal year 1977 and another $100,000 in fiscal year 1978 to purchase 80 foam units for use aboard ships. The officials believe that foam-in-place aboard ships--especially aircraft carriers--will alleviate the serious problem of damage to components while being transported. Currently, they said, in-transit damage is more severe than the failures which cause items to be removed for repairs.

Naval officials attributed delays in foam use to (1) problems in funding equipment purchases after foam-in-place was authorized for shore stations in 1974 and (2) long and stringent testing of the process which was required by several Navy commands before it could be certified for use aboard ship.

Concerning shore station use, we observed that at least one Naval Air Rework Facility is still resisting the use of foam, and other stations are making only limited use of it. We believe that the testing and certification process could have been shortened if DOD had introduced and fostered foam use throughout the services.

Although DARCOM officials acknowledged that the Army needs to increase its use of foam, they felt that our evaluation of the Army was too severe. They objected because the Army depots had been authorized to use foam-in-place and the required equipment had been made available to them.

During our visits to depots, however, we discovered that foam equipment often sat unused. Also, the commodity commands which provide packaging instructions had generally not specified that items could or should be packaged in foam.

DARCOM officials could not explain why TARCOM favored, and depots practiced, total encapsulation in foam rather than the preferred split-pack method. They said that Army's Packaging and Containerization Center knew how to use foam and sent teams out to assist the depots.

We noted, however, that visits from the Center staff were generally made upon request. Based on our observations, depot personnel may not be interested enough in foam packaging to request assistance. In April 1977 one of our staff members attended a packaging seminar at Tooele Army Depot, where the

use of foam-in-place was demonstrated. The method used? Total encapsulation!

GREATER USE OF FAST PACKS WILL REDUCE PACKAGING COSTS AND IMPROVE PACKAGING EFFICIENCY

As was the case with foam packaging, the Air Force is the services' primary user of fast packs. The Air Force has demonstrated the reusability and economy of the fast pack and has introduced thousands of the containers into its supply system. The Army and Navy have been slow in accepting fast packs and are not taking advantage of the savings offered by the new technique.

Air Force proves fast packs to be cost effective

In 1965, the San Antonio ALC developed and implemented a packaging standardization program which replaced conventional methods with fast packs. Conventional methods involve hand-scribing instructions from military specifications, setting up a fiberboard container, cutting cushioning and wrapping materials from bulk stocks, wrapping and inserting an item in the carton, and filling the carton with additional cushioning material. These methods are rather slow, require repetitive paperwork, and provide little or no standardization of packaging techniques and materials. Under these procedures, various items (even though similar in size and weight) could require different packaging--i.e., different sizes/types of wraps and barrier materials, cushioning pads, and exterior containers.

After introducing fast packs in its packaging operations, the San Antonio ALC reported increased production, substantial savings in labor and materials, and a 65-percent reduction in paperwork. In addition, the Air Force expected to get five trips from each reusable fast pack instead of a single trip which is the expected life of a fiberboard box. Initially, the fast pack program at San Antonio was applicable to small electronic and electrical items, i.e., items weighing 15 pounds or less and having a volume under 1.5 cubic feet. Now, according to ALC officials, items weighing as much as 50 pounds may be considered for fast packs. By July 1976 the Air Force had identified over 40,000 items suitable for fast pack shipment.

The Air Force made many individual cost analyses to determine the financial advantages of reusable fast packs over nonstandard and nonreusable packaging. In one such analysis the Air Force found that for 10 items, the average material and

labor packaging costs before switching to fast packs were $2.01 and $1.89 respectively. After converting to fast packs the average costs were $0.77 and $0.66, or a 62-percent savings in material and a 65-percent savings in labor. What makes the analysis even more significant is that the Air Force now estimates that fast packs may be used for seven trips instead of the expected five, making them even more cost effective.

One measure of the various uses of fast packs is shown in the following statistics. During fiscal year 1976, the General Services Administration (GSA) issued some 341,128 fast pack units to the three service branches. Air Force requisitions accounted for 94.7 percent of the total.

Military service	Fast packs issued during fiscal year 1976
Air Force	323,035
Navy	9,708
Army	8,385
Total	341,128

The various types of reusable fast packs are listed in appendix G of Military Standard 794. This appendix gives information necessary to select a fast pack for a given item, and it can apply to DOD packaging activities, contractors, subcontractors, or vendors. However, as of July 1976 the appendix was binding only on the Air Force.

Navy use of fast packs was limited and irregular

The Navy's use of fast packs was limited and varied considerably even among similar activities. It delegated primary responsibility for packaging to its systems commands. However, more command interest in fast packs is needed; use of fast packs varied greatly within individual commands; and some activities used more expensive substitutes.

We visited two Naval Air Rework Facilities (NARF), six Naval Air Stations, and five Naval Supply activities, all with extensive packaging operations. We found only limited use of fast packs.

Navy procedures inhibit use of fast packs

Each Navy aviation component has a 13-digit code developed by the Aviation Supply Office (ASO) that specifies how an

item is to be packaged. In part, this code specifies the type and volume of cushioning to be used in packaging the item. The San Diego NARF officials said that they follow the codes closely in their packaging operations. They also noted that the codes do not specify use of fast packs.

Despite the limits imposed by the ASO codes, local packaging personnel still have some flexibility. This is particularly true for fast packs. For example, if the ASO code for a particular item allows materials similar to those in a fast pack, then the NARFs can use the fast pack.

Potential exists for greater use of fast packs at Navy NARFs

Officials at the San Diego NARF estimated that about half, or 25,000, of the items they package go into one-trip fiberboard boxes. These cartons, which they construct, are made under the same specifications and out of the same fiberboard as the fast packs; however, the officials did not know how many components could be packaged in fast packs. A comparison of costs of some fiberboard boxes constructed by the San Diego NARF with fast packs available from GSA follows:

Container size	NARF's cost to manufacture one-trip cartons (note a)	Cost to purchase multitrip fast pack (from GSA)
6" x 6" x 10"	$0.93	$0.87
12" x 12" x 16"	3.05	3.30

a/Provides only a fiberboard shell; excludes costs of labor and any foam or other materials necessary to protect the item.

We examined the packaging procedures for 35 line items selected on the basis of their value and high turnover. An ASO official said that 13 of these items could be packaged in fast packs. The ASO packaging codes for 7 of these 13 did not specify a particular container. For example, the code for one of the items stated that any suitable container could be used. We talked with a responsible official of the San Diego NARF about this problem; he concluded that fast packs could be used to package some of the remaining 22 items.

The NARF had an onhand inventory of over 600 of these items in storage, ready for issue. We observed that most were contained in metal drums, which are more expensive and add appreciably to shipping weight. The remainder were in fiberboard boxes. NARF officials noted that drums may have

been used because the packager did not interpret the ASO code as calling for use of a fast pack.

We toured the NARF packaging operations and, although officials said that fast packs were used for some items, we did not see any being used, nor did we see any items being received in fast packs. However, there were numerous repairable items being packaged which appeared suitable for fast packs. Many of the items being received were either without packaging or poorly packaged.

Naval instructions should recognize fast packs as shipping containers

At Miramar Naval Air Station, fast packs were used only when the component was to be shipped together with several other packages in a larger and heavier fiberboard container. According to supply officials at the air station, instructions initially authorizing the use of fast packs stated that fast packs could not be used without enclosing them in a more substantial container. However, officials could not give further details.

If such a directive is still in force, we question its validity since the Air Force routinely uses fast packs as exterior containers. In fact, many Air Force packaging orders specify fast packs as the only shipping container.

The Navy needs to identify items which are and could be packaged in fast packs

Regarding the Navy's ability to expand its utilization of fast packs, neither ASO, which is under the Naval Air Systems Command, nor the Naval Electronics Command were able to provide the potential universe of items suitable for shipment in fast packs without extensive and lengthy computer and manual research. Also, they could not provide a list of line items which were being shipped or were authorized to be shipped in fast packs.

The Navy can reduce packaging costs by having its activities purchase fast packs from GSA

The San Diego Naval Station Supply Center Annex was using locally procured containers similar to fast packs that were available through GSA at considerably lower prices. For example, a locally procured 12" x 12" x 12" container costs $7.50 but GSA's 12" x 12" x 14" fast pack costs only $3.30. Officials

at the activity said they were not familiar enough with the fast packs to compare other important characteristics and that any such evaluation would have to be made by a higher authority.

If the Navy is to introduce new packaging technology in its logistics systems, it must have a method for easily identifying candidates for the technology. When new packaging technology is successful, the Navy should identify those items being packaged so this information can be shared with other services. Since all the military services are spending funds to package items, reductions in the time necessary to introduce new packaging technology will reduce DOD packaging costs.

Although some activities are using fast packs, the Navy can expand fast pack use. Some present Navy practices limiting their use are

--restrictions against using fast packs as shipping containers,

--inability to identify fast pack candidates, and

--use of packaging codes which do not specify fast packs.

In addition, the Navy is spending funds to buy containers which are similar to fast packs but more expensive. The Navy should revise its regulations, instructions, and policies so that fast packs are used when they offer savings over present packaging methods.

The Army can reduce packaging costs by expanding fast pack use

The Army's Packaging, Storage, and Containerization Center studied the use of fast packs by the Air Force to determine potential use by the Army. The Center's study was limited to items weighing less than 15 pounds with dimensions no greater than 12 inches; i.e., items usually shipped via parcel post by the Army. In its July 1975 report, the Center concluded that the Army's present methods for shipping general supplies were less expensive than the Air Force's fast pack system. However, the report recommended the use of fast packs for repair and return programs; particularly for those where nonexpendable items are returned to a depot maintenance facility.

Despite this recommendation and the Air Force's reported successes with fast packs, neither the Army depots nor any of the overseas Army activities we visited were using fast packs. Further, packaging officials at the two commodity commands contacted had not performed studies to explore the advantages of fast packs.

One factor, which may be seriously affecting the Army's limited use of fast packs, is that the Army has not considered the expected "life" of a fast pack container when evaluating total packaging costs. Officials at the Army's Packaging Center told us that the Army considers the life of a fast pack to be one trip, even though Air Force and Navy experience indicates that three to seven trips are more likely.

Considering the savings afforded by fast packs through multitrip use and reduced labor costs, the Army should further explore the potential for using fast packs. In view of the thousands of repairable items in the Army's repair/return programs, opportunities may be available for savings comparable to those realized by the Air Force.

Services' comments

Navy Supply Systems Command officials agreed that fast packs afford potential savings in packaging repairable items, and that criteria need to be developed for identifying items for fast pack use.

DARCOM officials acknowledged that fast pack use had been impeded by the Army's concerted emphasis on commercial type packaging 1/ for expendable items. They said that the Packaging and Containerization Center is making a cost comparison study between fast packs and conventional packaging methods. The study will include a test using 10,000 fast packs (more than the entire Army used in 1976) to determine the reusability of fast packs. If a favorable "trip life" can be attained by the Army, much greater use will be made of the fast packs.

CONCLUSIONS

Use of both foam-in-place and fast packs varies widely among and even within the military services. The Air Force has concluded that the use of foam-in-place and fast packs offers considerable savings when compared with conventional packaging

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1/Recommended in our report, "Savings Attainable by Revising Packaging In The Department of Defense," B-157476, May 21, 1973.

practices. The Army and Navy, on the other hand, have not, to any large extent, promoted or used these new packaging techniques.

We believe, therefore, that each military service should maximize use of these new, innovative packaging methods. The problems discussed in this report stress the need for DOD to establish a more effective method of introducing new packaging technology.

RECOMMENDATIONS

We recommend that the Secretary of Defense direct the Storage and Warehousing Policy Committee to develop a program to insure that the services adopt and use foam-in-place, fast packs, and any future improved technology to the greatest extent possible.

The Policy Committee should consider the following needs in developing a plan of action:

--Criteria for identifying items which are candidates for packaging by foam-in-place, fast packs, or any other innovative method.

--Minimum training requirements for foam equipment operators.

--An exchange of detailed information among and within the services--highlighting achievements and problems--when packaging technology advances have been applied by one or more of the services to common items.

--An educational program highlighting the advantages of the new packaging technology to promote its acceptance at the various command levels, noting that activities which receive packaged items have opportunities to reuse the containers.

Once a program is developed, the Joint Logistics Commanders could be given responsibility for implementing it; or the service which successfully develops a packaging method could act as lead service in fostering its use by the other services.

As you know, section 236 of the Legislative Reorganization Act of 1970 requires the head of a Federal agency to submit a written statement on actions taken on our recommendations to the Senate Committee on Governmental Affairs and the House Committee

on Government Operations not later than 60 days after the date of the report and to the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 60 days after the date of the report.

We are sending copies of this report to the Director, Office of Management and Budget; the Chairmen, Senate and House Committees on Appropriations and Armed Services; the Chairman, Senate Committee on Governmental Affairs; the Chairman, House Committee on Government Operations; and the Secretaries of the Air Force, the Army, and the Navy.

Sincerely yours,

R. G. Rothwell

for Fred J. Shafer
Director

APPENDIX I

MANAGEMENT RESPONSIBLE FOR PACKAGING WITHIN DOD

DOD has established a Joint Technical Coordinating Group under the Joint Logistics Commanders to manage military packaging needs. The Coordinating Group supports DOD's Storage and Warehousing Policy Committee under the Assistant Secretary of Defense (Installations and Logistics).

DARCOM has overall responsibility for managing Army material, including packaging. However, DARCOM has virtually no packaging headquarters staff. Instead, each of DARCOM's five subordinate commodity commands decides the type of container and packaging protection that will be used for the items it manages. DARCOM also directs the Packaging, Storage, and Containerization Center at Tobyhanna Army Depot, which performs the technical functions for general supplies packaging.

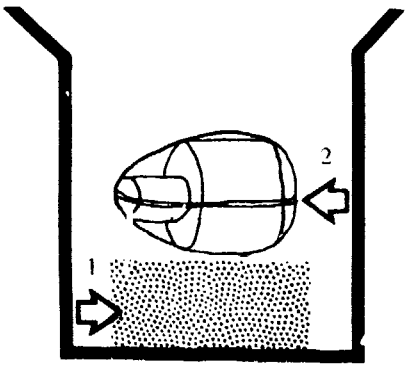
The Navy Supply Systems Command is the Navy's packaging coordinator/manager, and it develops packaging policy. Each Navy systems command is responsible for packaging its assigned items. The Naval Air Systems Command has delegated some of its packaging responsibilities to the Aviation Supply Office in Philadelphia, Pennsylvania.

The packaging policy for the Air Force is established by Air Force Headquarters. Responsibility for implementing policy is divided between two commands--the Air Force Logistics Command and the Air Force Systems Command.

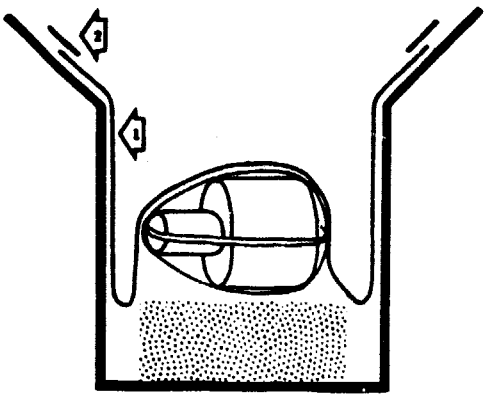
APPENDIX II

FOAM-IN-PLACE
INVERTED SPLIT PACK

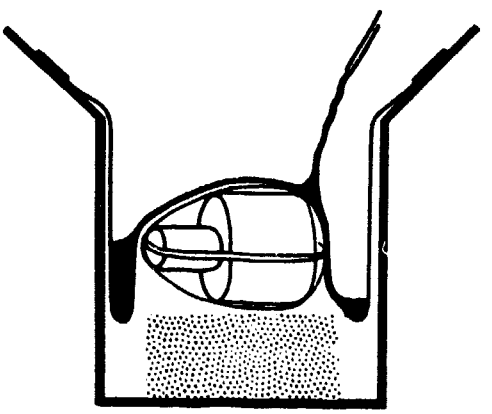
FOAMING PROCESS



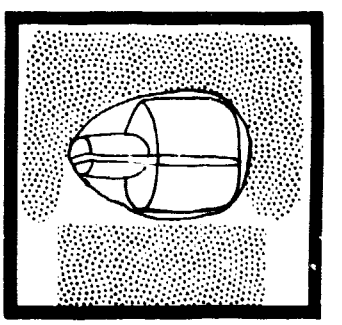
A block (or blocks) (1) of previously used rigid foam as needed is cut and placed in the center of the container[1] bottom or in the proper position to support the item. The wrapped item (2) is placed upon the block (or blocks).



A sheet of polyethylene film is draped over the item. The polyethylene film must be (1) shaped closely to the item and the container sides and (2) taped in place to support the foam.



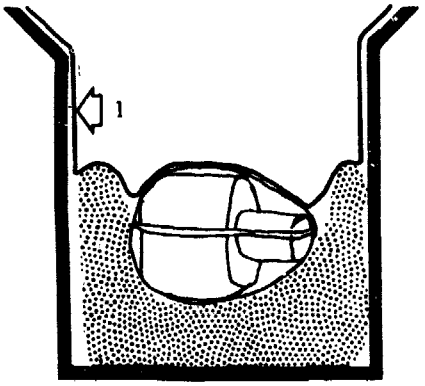
The foam mix is put into the cavity formed by the polyethylene sheet.



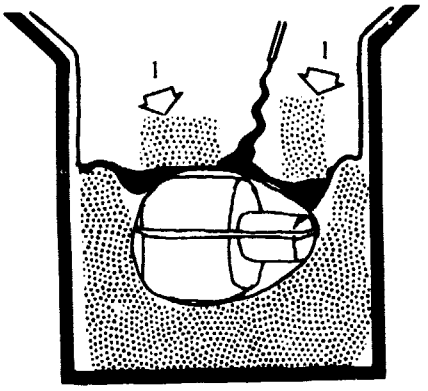
When the expanding foam reaches the container top, the polyethylene is folded inward, the box flaps closed and taped.

[1] Usually a fiberboard carton.

APPENDIX II

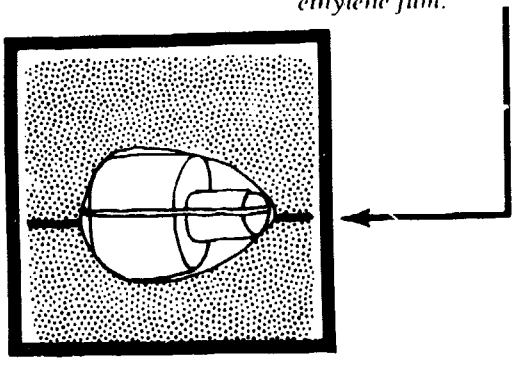


The container is inverted, the flaps opened and the foam supports removed. Another sheet of polyethylene film (1) is inserted to separate top and bottom foam.



The foam supports (1) can then be placed into the cavity and sufficient foam mix is added to fill the container.

Two halves of foam separated by polyethylene film.



Again, when the foam has reached the container top, the polyethylene film is folded inward and the box flaps closed. The container flaps are sealed with tape and the container is marked for shipment.