



Global Solutions in Materials Handling



PUSH/PULL & SLIPSHEET HANDLING MANUAL

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PUSH/PULL & SLIPSHEET HANDLING MANUAL

Introduction Background & Review

The palletless handling of unitized goods through the use of slipsheets and push/pulls can save money and reduce damage. This manual will provide you with the information you need to assist you in deciding whether the Cascade Push/Pull Handling System would be an advantageous and cost-effective alternative to the use of traditional pallets.

There are two main components at the heart of the Cascade Push/Pull Handling System:

1. A load push/pull attachment mounted on the front of an lift truck.
2. The slipsheet used in the push/pull handling system is a thin, corrugated, solid fiber or plastic sheet used in place of the traditional pallet.

In the following sections, potential users of the push/pull handling system will find helpful information including magazine articles collected over many years, case histories, brochures, and slipsheet specifications.

Specific application or supportive data can be obtained by contacting Cascade Corporation @ 800-CASCADE (227-2233)

WHAT YOU MAY NOT KNOW ABOUT SLIPSHEETS

Applications for slipsheets are growing at a steady rate. Has information about their savings reached you yet?

By C. W Ebeling

To the vast majority of shippers, wooden pallets are synonymous with unitized shipping and handling. In recent years, outside of an occasional article in a trade magazine, little information has been disseminated about the continued use of slipsheets. It is no wonder that a new generation of shippers and logistics managers has grown up not fully aware of what a slipsheet is, let alone why and where slipsheets are used as an alternative unitized shipping method.

Meanwhile, new applications for slipsheets continue to appear worldwide. The manufacturers of paperboard slipsheets report steadily increasing annual sales of 10% or more. Currently over 150 million paper slipsheets are produced annually. Further indication of the extensive use of the slipsheet method comes from the manufacturers of the handling attachments. Approximately 18,000 push/pull attachments are in operation in the U.S. Of the top 100 industrial corporations listed in the 1991 Fortune 500 list, 33 were using slipsheets somewhere in their logistics operations.

Slipsheets, like pallets, have their advantages and their disadvantages. Applications in either case are found where the advantages outweigh the disadvantages. The main advantages for slipsheets are:

Most slipsheets are made of lightweight paperboard, which averages a dollar or less each unit-load. They

are cheap enough to be discarded after each trip. The costs of tracking, recovering, and repair or disposal, which are characteristic of the reusable wooden pallets, are not required for slipsheets. In keeping with present-day environmental concerns, the used sheets are easily assimilated into the wastepaper market for recycling into new products.

The tare weight of a slipsheet is typically two to three pounds each or 20 to 30 times less than the tare weight of wooden pallets in a carload or truckload shipment. The space it occupies under a unit-load is insignificant compared to the 10% or more taken up by a typical pallet. Most net payloads of unitized product can be increased 10% or more with slipsheets. Putting it another way, the same amount of freight that requires 100 semi-trailers for shipments on pallets can be shipped in 90 semi-trailers when unitized on slipsheets (see T&D, Feb. '92 *Slipsheets Save Weight and Cost in the Air*, p.53).

Slipsheets can be used economically to provide a unitized loading and unloading method for lightweight products that cannot economically be shipped on pallets due to lightweight transportation penalties.

The disadvantages of slipsheets are usually related to the cost and performance concerns of shippers in comparison to the pallet method. These are:

The cost of a lift truck push/pull attachment to handle slipsheets is \$6,000 to \$8,000 compared to about \$400 for standard fork truck tines.

The lift truck operators require special training to effectively operate the push/pull attachments. The time required to become proficient in the operation of the equipment is several

times that required for the fork/pallet method.

There is no low-cost lift vehicle for the horizontal transport of slipsheet unit-loads that is the equivalent of the inexpensive low lift manual pallet truck or jack. Slipsheet loads can be placed onto pallets for in-house handling, but the transfer process is another cost to be justified.

APPLICATIONS

What then are the applications for slipsheets in which the advantages outweigh the drawbacks?

The earliest applications of the slipsheet method took place in the mid 1940's, several years before the beginning of unitized shipping in the U.S. The sheets were used to reduce the costs of long term storage of unit-loads on pallets for products such as canned fruits. The inexpensive sheets avoided huge investments in pallets for the buildup of inventory during the short harvest seasons.

With palletized shipping expanding rapidly throughout the food industry in the 70's, a number of large manufacturers began converting to slipsheets for their long haul shipping operations to get out of the costly and difficult-to-control pallet exchange program. The problems of pallet repair and the sanitation of reused pallets gave further impetus to the manufacturers' changeover to slipsheets. During the conversion process it was found that the thin lightweight slipsheets made higher density payloads in many shipments possible, which resulted in reduced transportation costs.

In 1988 Apple Computer introduced slipsheets to the electronics industry with the first ocean container shipments of cased computer parts from

Slipsheets



Home Depot developed this battery powered, push/pull-equipped dock vehicle in cooperation with the Raymond and Cascade Corporations to improve the unloading of slip-sheeted unit loads at its store docks. Home Depot has implemented a program encouraging all its suppliers to convert to slipsheets.

overseas suppliers in the Far East and Europe. Pallets were unaffordable for ocean container shipments due to their cost along with the cube loss that would reduce payloads. Consequently, the goods had to be hand stacked case by case in the ocean containers. The replacement of the hand-stack operations with lift truck slipsheet loading and unloading saved the company millions of dollars annually and speeded the turnaround of ocean containers at the shipping docks for improved utilization. (See T&D Presidential Issue, 88/89.)

In 1991, Micropolis, a computer company with manufacturing facilities in Singapore and Bangkok, eliminated pallets under loads of cased computer peripherals that were shipped by air freight from the Far East to the U.S. and Europe. Their program demonstrated the practicality of the use of slipsheets for air freight and the economic benefits of increasing load densities in air freight shipments through the use of slipsheets in place of pallets (see T&D, Feb. '92, p.53).

The semi-bulk container method of shipping raw and in-process materials and goods is still another growing application for the slipsheet method.

A semi-bulk container carries the equivalent of an entire pallet load of smaller containers. In 1982 General Foods introduced the use of semi-bulk containers with built-in slipsheet bases for the transport of coffee powders from supply locations in South America to coffee packaging plants in the U.S. The slipsheet method increased handling productivity more than ten times that of the traditional methods of packaging and shipping coffee powder. Today the slipsheeted semi-bulk boxes are used for a wide variety of raw and in-process materials for long haul and international shipments (see T&D, April '93, Bronze Age Method Aids International Shipments, p. 53.)

The growth of home product and do-it-yourself consumer stores such as Home Depot, Walmart, and K Mart has in the 90's generated new interest in the slipsheet method. These huge retail stores have their own receiving docks and may receive truckload shipments from suppliers of a variety of merchandise ranging from plumbing, heating, and electrical supplies to step ladders and paint. Trailers arriving at store docks with hand-stacked loads take hours to unload and tie up the limited dock

space. Pallet loads speed unloading but require the eventual disposal of thousands of used wooden pallets. According to Matthew Pitts of Home Depot, each pallet received at their Northeast stores results in a disposal cost that averages \$2.50 each.

To facilitate the unloading of slipsheet unit-loads at the store docks, Home Depot developed a special battery powered, push/pull equipped dock vehicle in cooperation with Raymond and Cascade corporations. Home Depot is currently carrying out a program to encourage all of their suppliers to convert to the slipsheet method.

With growing interest in the costs, productivity, and environmental concerns associated with shipping methods today, logistics professionals should take a serious look at the slipsheet method and the advantages it may offer.

As seen in . . .
**Transportation &
Distribution**

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PALLETLESS LOAD HANDLING – IS IT YOUR FUTURE?

Handling costs are a major factor in any distribution system. However, they can be reduced with the use of slipsheets instead of pallets. For example, in the US, a typical quality fiber slipsheet once costing 50 cents is now US\$1.50; a good quality wood pallet has risen from US\$5 to about US\$15.00. Although the cost of both have tripled, the differential cost has gone from US\$4.50 to US\$13.50 per unit. This cost differential will

continue to increase in the same ratio as the cost of wood goes up.

The most noticeable benefits with palletless handling of unitized loads is the reduction of cubic space required and a reduction in weight. It is possible to increase product storage capacity in the warehouse by 10 per cent, often eliminating the need for new warehouse construction as product distribution requirements increase. Space is saved due to higher stacking capability, the elimination of pallet storage space, and reduced needs for racking. More space means more products in the warehouse, trans-

lating directly into a more productive operation.

Whether transporting by container, truck or rail, less weight equals more payload, for example:

- A 40" x 48" grocery pallet weighs between 65 and 75lbs.compared with the negligible amount for an equivalent slipsheet
- For a truckload of 40 palletloads, the payload is reduced by about 3,000lbs.
- For a rail car shipment of 56 palletloads, 4,200lbs. can be saved.

It doesn't take long to see the potential savings palletless handling can provide in transport costs. Add to this the other savings mentioned in this article and it is easy to see how those non-value-added costs can be translated into additional company profits, or lower prices to customers.

PROBLEMS WITH PALLETS

While palletized cargo handling is entrenched in the shipping and distribution industry and has worked well for several decades, many problems remain and some are becoming more critical. A key concern today is the destruction of a natural resource to produce pallets. There is an enormous demand for lumber from the pallet industry; according to one estimate, 50 percent of all hardwood lumber is used for pallets; 6 percent of total lumber

Traditional wooden pallets are an expensive, environmentally-unfriendly, space-consuming and relatively awkward way of supporting goods for transportation and storage. US company, Cascade Corporation, presents the Push/Pull slipsheet system – a low cost, smoother way to deliver, store and receive unit loads



Figure 1: Slipsheet palletless handling system

Palletless Load Handling

production in the US is consumed by pallet manufacturing. Roger Rij, of the Agricultural Research Service, US Department of Agriculture in Fresno, California, has been researching another disadvantage of pallets – disposal of the one-way softwood pallets. No matter whether these shipments are heading to terminal markets or chain store operations, those on the receiving end are still faced with the problem of disposing of the pallets. Rij notes that one-way pallets still have to be broken down, thus adding to the cost. Slipsheets, on the other hand, are easily recycled and offer the distinct advantage of being a re-sellable item.



Figure 2: One problem—pallet storage

Converting to slipsheets offers many more cost savings, the largest being the capital investment required for pallets – US\$150,000 for a 10,000-pallet system versus US\$15,000 for an equivalent slipsheet operation. Other savings include the expense associated with pallet repair, return shipping, lost pallets, sorting of pallets, bookkeeping of pallet exchange, pallets returned that are inferior to those shipped, and dam-

age to product caused by broken pallets.

Slipsheets also offer the distinct advantage of reduced worker injuries when compared to wooden pallets. Manual handling of wood pallets weighing anywhere from 25 to 65lbs. can cause hand, arm, back and foot injuries. Splinters and nails can also be troublesome. Most of these problems are eliminated when using slipsheets and, since they take up only 1-2 percent of the space required by pallets, slipsheets can often be stored indoors, where they stay cleaner and are protected from the elements.

The greatest source of warehouse contamination usually arrives on pallets – rodent droppings and insect infestation as well as chemicals and residues from previously carried products. Since slipsheets are flat and made of inert materials, they do not provide a medium for infestation or contamination. Slipsheets also eliminate the fire hazard associated with inside or outside storage of a large amount of wood pallets.

PALLETLESS HANDLING— THE US EXPERIENCE

Food products

General Foods, now part of Kraft Foods, has experimented with pallets and slipsheets since 1962. During the following decade, the problems with pallets were becoming obvious. The cost of new pallets had doubled as had the costs of repair. Few pallets lasted even a year and cost per pallet trip was in the



Figure 3: The system in use

area of \$1.00 each. Industry efforts to control the quality of pallets in the exchange system were not proving to be successful. Problems of sanitation increased with general deterioration of the pallets in the pool and damage to products caused by broken boards and protruding nails became common. With the onset of the energy crisis and the demand for high utilization of transportation equipment, carriers realized that pallets were taking considerable space and displacing room for revenue producing payload.

General Foods had early concerns about slipsheet use, but soon found that the obstacles were minor and solutions existed for most problems. An example was its concern for high stacking on slipsheets on warehouse floors. At the time, the company could not conceive gripping a sheet under a top load and pulling it onto an attachment without pulling the entire stack over. As it turned out, it was not a problem once workers had been properly trained and slipsheet loads were stabilized. In time, the shrink or stretch film wrapping commonly used today proved to be the most efficient form of load stabilization. Special non-slip adhesives have also been developed to allow cases to be easily lifted from the slipsheet while at the same time preventing sliding.

General Foods was also concerned about the substantial capital investment required in order to convert automatic palletizers to slipsheet unitizing and to provide slipsheet attachments for the lift trucks. In some cases it was necessary to replace the lift-trucks that did not have sufficient counterweight capacity for installation of a slipsheet attachment that weighed 750 to 1,000 lbs. and still carry the required payloads. The expenditure proved to be justified, however, by the reduction in pallet costs and the benefits from higher density storage and shipping of more products.

“Slipsheets... are easily recycled and offer the distinct advantage of being a re-sellable item”

In addition to General Foods, many other food processing companies use slipsheets and push/pull handling attachments such as Campbell Soup, Kellogg, Carnation, Del Monte, Heinz and Ralston Purina. Beverage, paper product and building material companies also use this method.

Electronic products

In the electronic products arena. Apple Computer, Hewlett-Packard, and Micropolis Corporation have been very successful with palletless distribution systems, shipping computer products on slipsheets in ocean containers and by air freight. In 1987, Apple Computer, with Cascade Corporation's assistance, became a pioneer in the implementation of an international (US, Europe and Singapore) palletless handling system. Apple's idea was unique in that it required the entire supply chain from end-users to OEMs to shippers to use the same handling/shipping method, namely slipsheets. The plan, which had major

implications for many other electronics companies, included an 18-month program to change the supplier network to unitized loads on slipsheets. During the first full year of operation, Apple saved over U.S. \$2.5 million on a U.S. \$200,000 investment in equipment and start-up costs. Broken down, this represented cost savings everywhere in the distribution chain:

- 20% reduction in freight costs.
- 75% reduction in unloading labor.
- 78% reduction in pallet costs.

“Another requirement for successful pallet-less handling is commitment”

A key to Apple's successful palletless handling scheme was its partnership with Cascade Corporation, the push/pull attachments supplier. A computer-aided warehouse management system (SPOC) was also designed to reap the benefits from using slipsheets and Cascade push/pulls. According to Apple, another requirement for successful palletless handling is commitment – from top management, sales and marketing, and manufacturing. In addition, all the people directly impacted by the change – vendors, carriers, and customers – must be educated about how the system works and what the benefits are.

Hardware products

Home Depot converted to palletless handling to meet one overriding goal: the reduction of financial and environmental costs. In mid-1994, the company set a very ambitious goal, based on its knowledge of Apple's earlier successes – to convert itself and all its vendors (over 5,000 suppliers) to a palletless handling system by January 1, 1995 in a bid

to reduce shipping and handling costs. It also wanted to identify a way to reduce the impact that use of wood pallets was having on the environment, so slipsheets were its natural choice. In addition to the cost savings, one of the company's vendors reported a 30 percent decrease in damage due to the use of slipsheets.

EUROPEAN SKIDBOARDS

In the UK, where slipsheets are more commonly known as 'skidboards' or 'slip pallets', at least 28 large shippers use slipsheets where economic justification is often related to shipments of exported goods in containers. For this reason major exporters of liquors – Dewar, Haig, Chivas, Strathleven Bond and Johnny Walker – are all slipsheet users. Not all UK applications are related to exports, however. At English China Clays Sales Co., Ltd., Cornwall, fifty 55lb. sacks of powered ball clays are unitized on 52" x 47" expendable skidboard sheets. The loads are stacked five-high in the warehouse, and sideloaded for shipment onto lorries using Cascade push/pull attachments. The clay company's promotional literature informs customers that the skidboards are supplied free, offering many advantages over pallets such as lower cost, easier disposal, greater stack stability with a 20 percent saving in space, and the fact that they can be used with or without pallets on the receiving end. Other slipsheet users in England include the consumer electronics companies Sharp, Sony and Panasonic.

The use of slipsheets is also increasing in France, Germany, Belgium, Holland, Italy, and Spain. One industry observer noted recently

that; "The investment carried in pallets is usually greater than the investment carried in the lift-trucks themselves", and any way of reducing this massive investment must be given careful consideration. A new law in Germany affecting US businesses' use of pallets states that companies which originate a packaging product which eventually ends up in the solid waste stream in Germany will be held responsible for disposing of that packaging. This means that one-way wooden pallets are not acceptable.



Figure 4: The slipsheet, what it is all about

Europeans seeking innovative alternatives to pallets have found some creative and unique ways to use slipsheets. One example is the use of captive sheets in place of captive pallets to facilitate loading. The Van Der Ploeg Zaden BFA Seed Company of Barendrecht, Holland, is one of several European companies using this approach. Seed bag unit loads are stacked, three and four high, in the warehouse. When they load into outbound trucks, a special sheet retaining device on the lift-truck push/pull attachment grips and holds the sheet as the load is pushed off. The sheet can be reused several times whereas a pallet would be impractical for this type of operation because of its height and sharp corners. Corrugated boxes with slip

tabs are being used to import auto parts by Nippon Denco in Holland for distribution throughout Europe.

PALLETLESS HANDLING IN JAPAN

The concept of palletless handling was introduced in Japan by Cascade in the mid-1960s. It experienced little growth until 1978, when changes in Japan's transportation codes strictly forbade overloading highway vehicles. The reduced payloads caused by the weight and cube of pallets used for truck shipment, along with the very high cost of wood pallets in Japan, accelerated interest in the palletless method. Companies that have recently converted to slipsheets for highway transport of goods include shippers of electrical appliances, electronics, milk, rice, confectionery products, liquors and canned goods. The Japanese Physical Distribution Rationalization Institute enthusiastically promotes slipsheet utilization via the distribution of literature, training seminars, and study team tours to observe application in the US and Europe.

QUALITY

The slipsheet, made of corrugated paper, solid fiber or plastic, must be matched to the job for optimum performance in a palletless handling system. A key part of the evaluation includes an accurate cost estimate of the slipsheet type. It may be possible, after a successful conversion to slipsheets, to experiment with lower cost sheets, but to justify the project based on a marginal quality sheet can often be a mistake. To determine what type of sheet is the best value requires the support of a knowledgeable slip-

sheet supplier, who will assist in considering such things as:

- Weight and dimensions of the unit load.
- Size of gripper tabs and number of score lines required.
- How many times the unit load will be handled in the most extreme situation.
- What conditions, such as humidity or contamination, might exist that could affect slipsheet strength.
- If a surface treatment is required to prevent slippage between the load and slipsheet.

Fortunately, today a large knowledge base exists in the use of slipsheets, as well as complete palletless handling systems, costs and attachments.

LIFT-TRUCK ATTACHMENTS

A successful palletless handling system is dependent on the functionality and quality of the slipsheet's partner: the attachments used on the lift truck.

Push/Pulls

Cascade makes two types of push/pulls currently in use worldwide: the Model 35E/45E dedicated units, and the Quick Fork Mount (QFM) push/pull units for dual usage lift-trucks.

The 35E push/pull is a rugged, lightweight unit designed for short-wheel-base counterbalanced trucks in the 3,000 to 4,500lbs. capacity range. Its high production slipsheet handling capabilities include platens that are adjusted just like conventional forks, full bottom taper platens, 4° tilting faceplate, high visibility pantograph, and faceplate and



Figure 5: Another option, the carton clamping system

gripper mechanism designed to handle all types of slipsheets. The unit is specifically designed to protect the products and slipsheets from damage. Features include T-1 steel platens, protected hydraulics and unitized construction with cast primary and secondary arms.

The 45E push/pull has all the same features as the 35E with the difference being that it is designed for all general slipsheet handling applications for lift trucks in the 4000-5500lbs. capacity range including those requiring double-load stacking. The Quick Fork Mount (QFM) push/pull mounts directly onto the

forks and can be installed or removed in approximately one minute. This type of push/pull is designed for operations that frequently require both pallet and slipsheet handling. Both the standard and QFM push/pulls use the same pantograph mechanism and faceplate.

Carton clamps

The other popular method of palletless handling is clamping unitized loads directly. Carton clamps have been adopted by many manufacturers and distributors for handling goods such as: appliances,

packaged foods, paper products, wine, consumer electronics and plastic products. Carton clamps can be used successfully with any products that have sufficient strength or packaging to withstand the clamping force. Additional benefits of clamps are that no slipsheet is required, and that it has the ability to order-pick tiers off a unit load. Carton clamps work best with uniform loads that don't have voids, but have a carton height greater than seven inches and a shipping container with enough strength to protect the commodities. Clamping provides the same efficiencies of

Palletless Load Handling

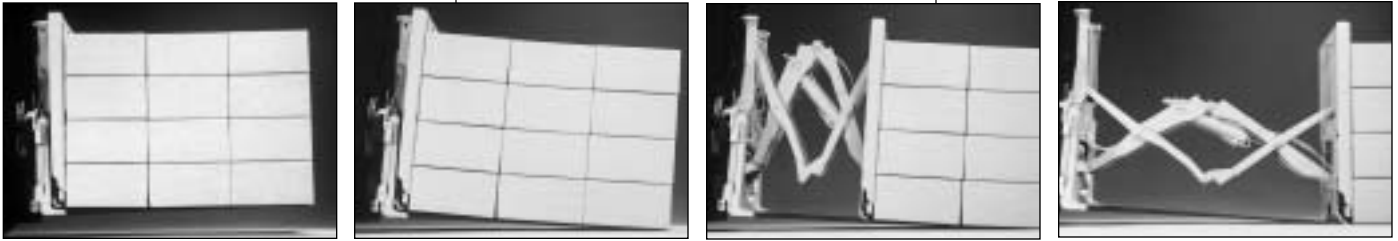


Figure 6: A sequence of loaded Cascade push/pulls

better space utilization in warehouses and in transport vehicles as the push/pull and slipsheet system provides. Often, productive palletless handling will mean using both push/pulls and carton clamps.

Cascade Carton Clamps are made in three weight categories: Models 15D, 25D, 35D, and 50D, with various pad surfaces and size configurations available. The units are specifically designed for durability and high visibility, and feature balanced force distribution over the entire pad surfaces. Thin-profile outside arms provide easier knifing between

loads during trailer or railcar breakout. The 15D and 25D Clamps are designed for lift trucks in the 2000-5000lbs. capacity range, and are used for handling relatively light unit loads such as consumer paper products. The 35D Clamp is a general-purpose clamp suitable for nearly any single unit load, and is designed for lift trucks in the 3500-5500lbs. capacity range. The 50D Carton Clamp is used for heavy single unit loads such as wine, and double unit load handling. It is designed for lift trucks in the 6000-8000lbs. capacity range.

CONCLUSION

In the product handling and distribution future, there will be increased demand to reduce costs and to be more environmentally responsible. Material handling unitized loads without pallets will reduce costs, save trees, and reduce the energy required to transport, manufacture and store pallets. The cost differential between pallets and slipsheets will continue to increase. Also expect governments to continue legislating sanitation and disposal regulation that will make pallet use even more difficult and costly.

Industrial Vehicle Technology '95

Contributed by Liz Nakazawa and Bill Peterson, Technical Communications; and Mike Tobin & Madalyn Piar-Katter, Cascade Corporation, USA

PUT IT ON A SLIPSHEET!

*“There is an opportunity to save money in palletless handling.”
Unitizing and slipsheeting are two ideas.*

By David K. Spencer

To understand the present and future trends in unit load handling, a brief review of it is in order. The greatest growth in unit load handling occurred following World War II. It was determined then that a load could be handled more economically by unitizing it rather than hand stacking and hand unstacking.

Several methods of handling unitized loads were originally considered. Some of these included unitizing on a pallet or palletless with clamp or slipsheet. The unitized load on a wooden pallet was adopted as the most popular system initially because the wood pallet was low in cost, availability of wood was adequate, and it was easy to teach an operator to handle the product on the wooden pallet. The necessary equipment to handle the product on the wooden pallet was also lower in cost. A pallet exchange system was established under the direction of the GMA (Grocery Manufacturers Association) to govern the exchange

of pallets between shipper and receiver. It was called the Grocery Pallet Council (GPC).

In theory, the exchange system will work. In practice, it failed and in January 1979, the GPC was disbanded. The reason – pallets returned were inferior to those shipped. Pallets had increased in cost from \$3.00 to \$8.00. Pallets were not returned in some cases, the pallet now consumes 50 percent of hardwood produced in the USA and 15 percent of total wood production. Pallet maintenance was costly, loss of cube and weight of the pallet and sanitation became a problem due to rodent leavings in the pallets which were stored outside. Because of these reasons, palletless handling systems are being reevaluated.

THE CLAMP

The clamp is one alternative that has been adopted by manufacturers and distributors for handling loads which lend themselves to clamp operations. Clamps work well with uniform loads that have no voids, have a carton height greater than 8 inches and a shipping container

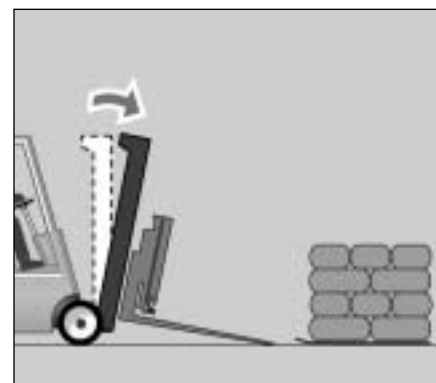
with sufficient strength to protect the commodities. The clamp was primarily used in the warehouse for storage although it can be used to floor load product in railcars and truck trailers. Most clamp loads are transferred to pallets or slipsheets for shipment. It has steadily grown in popularity. Today, 80-90 percent of all paper rolls are handled by clamps, a high percentage of cartoned paper products, appliance, and some food products are also clamp handled.

The slipsheet palletless unitized load system was also evaluated by many companies and was adopted initially by companies primarily to ship and receive their product at their own manufacturing and distribution centers. The slipsheet eliminated the cost of the pallet exchange systems, weighed less, and utilized space more efficiently. Companies like Hunt Wesson adopted carton clamps to warehouse their products at the processing plants on the West Coast and transfer their loads by clamp to slipsheets for shipment to Midwest and East Coast markets. They were received at the company owned-and-operated distribution centers and transferred back to pallets initially. About six years ago, they eliminated transferring the loads back to pallets for storage and began warehousing directly on slipsheets. Other

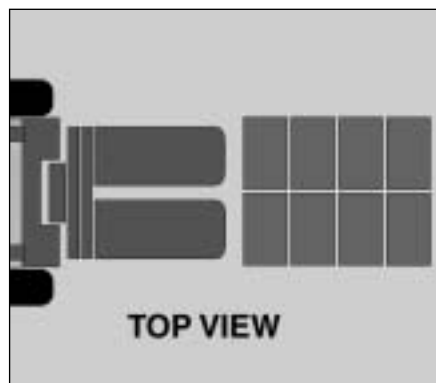
This article is adapted from a presentation made at a meeting of the Packaging Institute.



2. Raise the platens about three inches above the floor



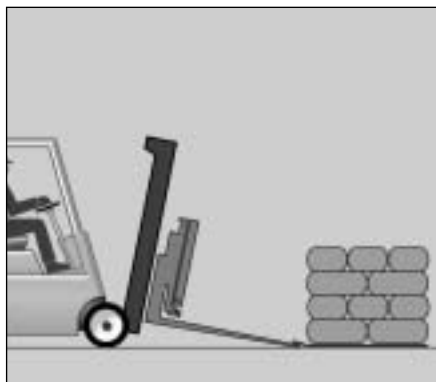
3. Tilt the mast forward until the tips of the platens touch the floor.



TOP VIEW

1. Line up the platens squarely with the load.

Unitizing & Slipsheeting

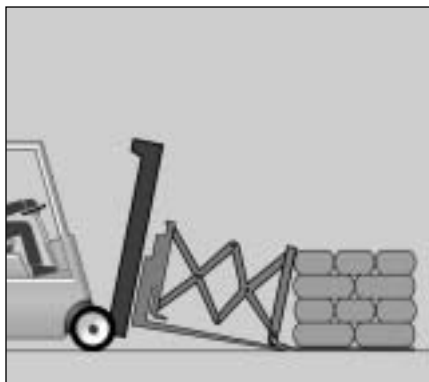


4. Drive the truck forward until the platen tips are under the slipsheet lip.

companies ship and warehouse their products similarly, including such companies as Libby's, Cal-Pak, Carnation, Seagrams to name a few. The latest major company to make the switch is General Foods. Other major processors are now evaluating this system or have made the commitment to make the conversion. Examples of these companies include standard Brands and Lever Brothers. Slipsheets have been received at major grocery chain warehouses on railcar siding for a number of years. Few truck shipments have been made because it is the common practice for the truck driver to unload his own vehicle and the cost for unloading the truck trailer is included in negotiated tariff rate.



7. Move forward slowly as the load is being pulled onto the platens.



5. Extend the pusher plate so that the slipsheet lip fits into the gripper channel opening

Times are changing. One major receiver, Jewel in Chicago, is requesting suppliers to ship to them on slipsheets because they want to eliminate the problems associated with the exchange pallet on their loading docks. Truck shipments are common between producer and their distribution center where the distribution center is unloading the truck trailer rather than the truck driver. Most major grocery receivers have not actively requested unitized slipsheet loads across their docks and some have discouraged these shipments because they did not feel they will benefit from this system. Some of their reasons include:



6. Retract the pusher plate. The gripper bar will automatically clamp the slipsheet lip.

- added cost of equipment to handle slipsheet
- driver training required
- additional time to transfer loads back to pallets
- poor condition of the slipsheet loads sometimes requires more than one person to unload the load

These problems can be overcome at the shipper, receiver and equipment suppliers work together. Examples of the benefits from this cooperation include:

Lower cost of equipment

- Crown outrigger truck with sideshift push/pull having a capacity of 3,000 pounds lifts up to 60 inches. Cost \$15,000.



8. As the weight of the load is transferred to the platens, they will deflect downward slightly. Raise the carriage about one inch to prevent the platen from digging into the floor. Slowly tilt the mast to a vertical position as you scoop up the load.



9. Tilt the mast back, and raise the load three-to-four inches above the floor. You are now ready to transport the load.

- Yale ESC modified electric counterbalance truck with sideshift push/pull, lifts 2,500 pounds up to 60 inches and 2,100 pounds to 130 inches and can carry pallets. Cost: \$21,000.
- Clark Walkie with push/pull having a capacity of 3,000 pounds. Cost: \$15,000.
- New Walkie Push/Pull scheduled for release from Cascade September 1979. Cost: \$11,000 approximately with OEM Walkie. Capacity 3,500 pounds.
- Light-weight push/pull scheduled for release from Cascade August 1979 for counterbalanced truck and outriggers, 3,000 pound capacity, 500 pounds lighter than the present unit and 1 1/2 inches less lost load to increase truck capacity.

Slipsheet Standards Committee

- ANSI (American National Standards Institute) form of adhoc committee members of companies and personnel interested in establishing slipsheet standards.
- API (American Paper Institute) composed of slipsheet manufacturers representatives to establish volunteer slipsheet standards and a movie on the proper method of handling slipsheet standards.

Regional seminars are being presented throughout the nation to educate users and to assist them. McDonald's has recently staged coast-to-coast visits with these seminars. In addition the United Fresh Fruit and Vegetable Association, New

York Chamber of Commerce as well as a major slipsheet manufacturer have conducted seminars. Cascade has participated in these seminars to train the key representatives of the users of slipsheets, the local lift truck dealer salesmen and slipsheet salesmen in the proper techniques of material handling with slipsheets. Slipsheets, properly used, will benefit your system and save money in materials handling. Improperly used, they create frustration and can reduce economical justification.

Cascade has assembled a manual that reviews the benefits of slipsheet handling, proper driver techniques, how to assemble a load, speeches and periodicals on the subject, slipsheet suppliers, types of slipsheets, outline for justifying economically, the slipsheet handling system and on-the-job reports. One of these can be furnished to you.

In summary, the slipsheet system can be used by itself or in conjunction with the wooden pallet. You must make the decision. There is an opportunity to save money in palletless handling of your products by using slipsheets. The decision is yours.

Reprinted from the October 1979 issue of **Paper Board Packaging** with permission of Joel J. Shulman, Editor, Magazines For Industry, Inc.

PUSH-PULL'S GLOBAL PROGRESS

Slipsheets are spreading world wide as innovative applications appear.

During a recent visit to the United States, members of a Japanese physical distribution study team were asked what they called slipsheets in Japan. Without hesitation and with hardly a trace of accent, they chorused, "Slipsheets." The generic terminology as well as the technology appears to have been successfully exported to the Far East.

Invented in the United States 33 years ago, (see H&SM, Oct. '78, pg. 42), the push/pull slipsheet method of unitized handling and shipping is beginning to spread throughout the world. Today slipsheets are used in Europe, South America, and the Far East, to handle goods ranging from chemicals and electrical appliances to food cases, seed bags, cement and beer kegs.

The reason for the interest in the method abroad are the same in the United States. The sheets offer a relatively inexpensive unit-load base that uses little space, weighs only a couple of pounds, and requires no repairs – all increasingly important economic factors in today's environment of continuously rising labor, material, and energy costs.

Japanese companies that have recently converted to slipsheets for highway transport of goods include shippers of milk, electrical appliances, confectionary products, liquors, and canned goods. The sheets are used mostly for transport. Unit-loads are warehoused on pallets then transferred to slipsheets for over-the-road haul.

The concept was introduced in Japan ten years ago by the Cascade Corporation, a U.S. manufacturer of lift truck attachments. It experienced little growth until 1978, a year which brought changes to Japan's transportation codes that strictly prohibit overloading highway vehicles. The reduced payloads caused by the weight and cube of pallets used for truck shipments, along with the high cost of wooden pallets in Japan, accelerated interest in the palletless method.

There are seven key suppliers of slipsheets in Japan today. Rento, Mead, and Bunyusha supply solid fibre sheets; Fukoka Seishi, corrugated sheets; and Nippon Petro Chemical, Mitsui Toatsu and Idemitsu Petro, plastic slipsheets.

In addition to Cascade, several Japanese companies, Toyota, Komatsu, Mitsubishi and Nippon Yusuki, have joined the ranks of push/pull attachment manufacturers. Sales of slipsheet attachments reportedly have doubled within a year.

The Japanese Physical Distribution Rationalization Institute, chaired by Sojiro Kamiyama, has actively promoted slipsheet use through distribution of literature, training seminars, and study team tours to observe applications in the United States.

BRITISH APPLICATIONS

In England, slipsheets are more commonly known as "skidboards" and "slip pallets." At least 28 large shippers use sheets. The relatively slow growth compared to the United States is attributed to the scarcity of high quality, low cost paperboard sheets, the high cost of

plastic sheets, and the difficulties of adapting sheets to warehouse operations, many of which utilize narrow aisle reach trucks.

Where successful applications are found, economic justification is often related to shipments of exported goods in containers. For that reason, major exporters of liquors – Dewar, Haig, Chivas and Strathleven Bond – are all slipsheet users.

One of the large shippers using sheets is Cadbury at Marlbrook (Herefordshire). To assure good space utilization for the company's chocolate products in ISO containers, pallets had been avoided, and the cases handpiled into containers.

Loading a typical container took about six manhours, and that was costly since half the company's annual chocolate production is exported in containers.

The use of sheets permit fast unitized handling on both shipping and receiving ends.

Not all English applications are related to exports, however. At English China Clays Sales Co., Ltd., Cornwall, fifty, 55-pound sacks of powdered ball clays are unitized on 52" by 47" expendable skidboard sheets. The loads are stacked five-high in the warehouse, and side-loaded for shipment onto lorries by Cascade push/pull attachments. The firm's promotional literature informs customers that skidboards are supplied free, offer many advantages over pallets such as lower cost, easier disposal, greater stack stability with a 20 percent saving in space, and finally, can be used with or without pallets on the receiving end.



A lift-truck with a push/pull attachment loads an ISO container with electrical appliances. Slipsheet shipping is increasing in Japan due to a new law banning highway vehicle overloading.



Three separate U.S. companies manufactured the lift truck, slipsheet attachment, and the slipsheet in use at Van Der Ploeg Zaden BFA Seed Company in Barrendrecht, Holland.

EUROPEAN PRACTICE

Slipsheet use is also increasing in France, Germany, Italy, and Spain. There are six suppliers of paper-board sheets; five suppliers of plastic sheets.

Push/pull attachments are available in most European countries through Cascade and three other manufacturers; Meyer and Kaup in Germany, Bolzoni in Italy.

Applications in Europe have been mostly for bagged or sacked goods like cement, seeds, and feeds. These loads are often handled by conventional forks in conjunction with "take-it-or-leave-it" type pallets and the chisel-under handling method. This handling avoids immediate purchase of push/pull attachments.

Use of sheets as an alternative to pallets is under study at many European companies for economic reasons, since, as one observer noted recently, "the investment carried in pallets is usually greater than the investment carried in the lift trucks themselves, and any way of reducing this massive invest-

ment in pallets must be given careful consideration."

Slipsheets have sometimes been criticized for not being as universally applicable as pallets. However, industry innovators have found some unique ways to use sheets.

One such application is the use of captive sheets in place of captive pallets to facilitate loading. The Van Der Ploeg Zaden, BFA Seed Company of Barendrecht, Holland, is one of several European companies using this approach.

Seed bag unit-loads are stacked on sheets, three and four high in the warehouse. When loaded into trucks, a special sheet retainer device on the push/pull attachment grips and holds the sheet as the load is pushed off. The sheet is used several times.

Due to height and sharp corners, pallets are impractical for this kind of operation.

At Bahlsen, a large biscuit manufacturer at Hanover, Germany, paper sheets have been integrated into the order assembly process. Products are unitized with a sheet

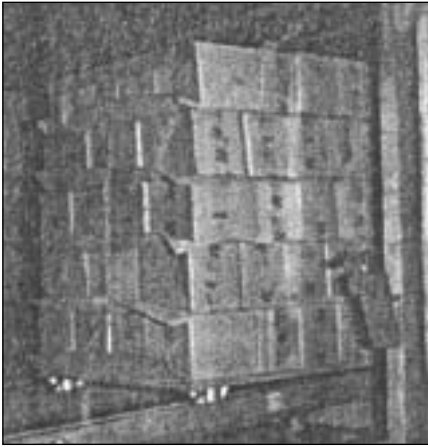
under each tier in the unit-load. The sheeted loads are then staged along a warehouse aisle and a stacker vehicle with a special gripper-puller device on board, moves along the aisle and grips and pulls one or more tiers of each product onto a low wheeled "buggy".

The sheets permit transfer of one or more tiers at a time. The method is more functional than suction head units which can transfer only single tiers at a time.

Assembled unit-loads of mixed products are then delivered to the staging area and pushed onto the outbound route vehicles.

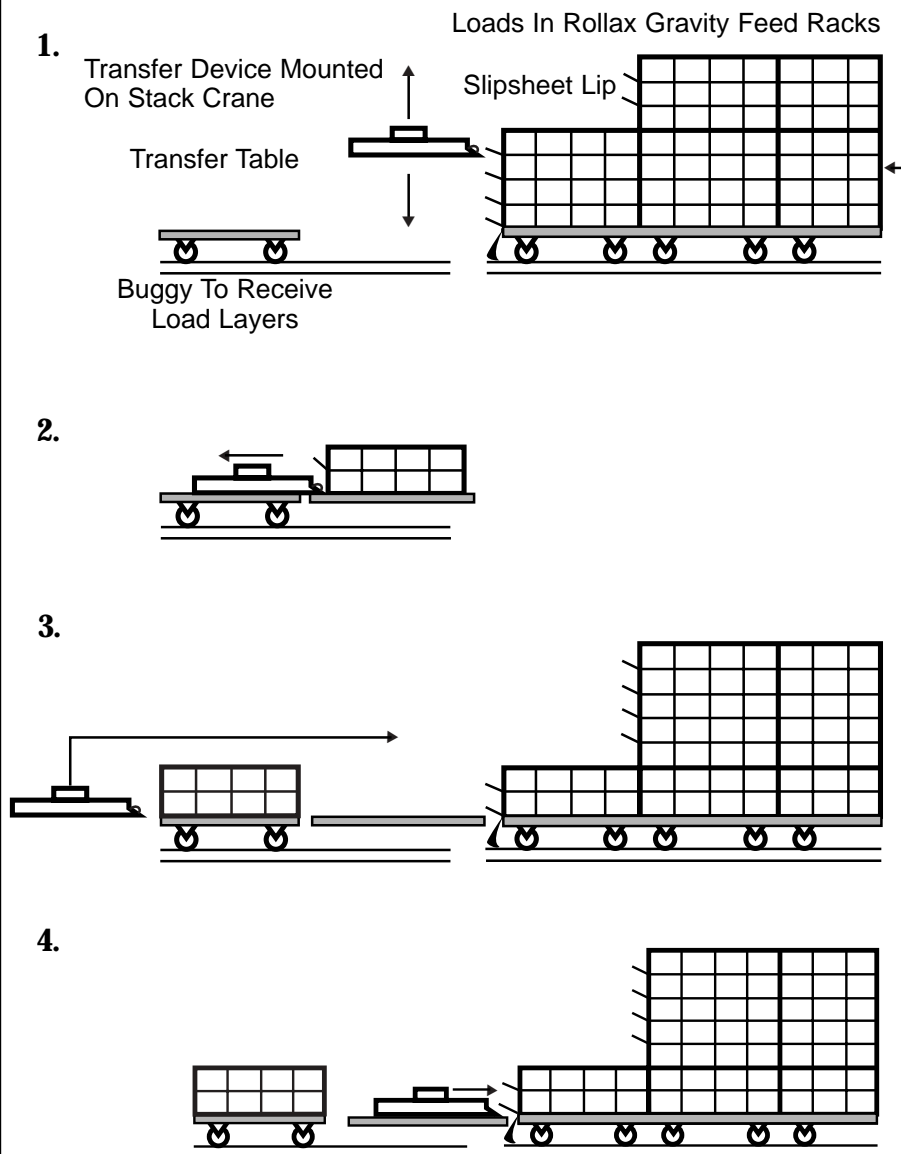
In New York, the popular air cargo pallet box of Containair Systems Corp., has recently become available with heavy duty slipsheets substituted for the pallet bases. The box can be handled easily by conventional forks chiseling under each load.

According to Julius B. Kupersmit, president of Containair, the slipsheet version costs less, reduces tare weight 28 pounds for each box, and increases the useable volume 12 percent.



Paper sheets have been integrated into the order assembly process at a company in Hanover, Germany. Products are unitized with a sheet under each tier in the unit load. Sheeted loads are staged along a warehouse aisle and a stacker vehicle with a special gripper-puller device on board moves along the aisle and grips and pulls one or more tiers of each product onto a low wheeled buggy. As assembled unit-loads of mixed products are then delivered to the staging area and pushed onto the out-bound route vehicles. (left)

ROLLAX TIERING MACHINE



Another kind of large corrugated container with a slipsheet base has been developed and tested by Union Camp Corp. for produce shipments.

Even watermelons have been shipped in the large bins.

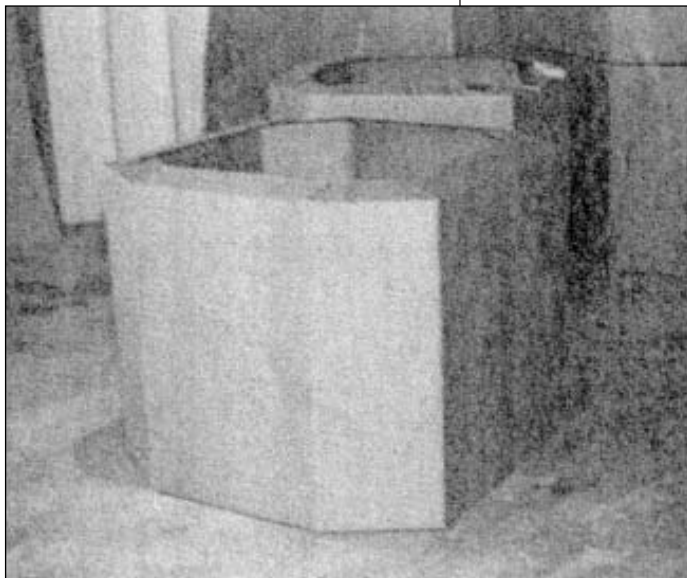
Flexibility of base dimensions is a distinct advantage for slipsheets over pallets for many users. One shipper observed that "for years we were tied to the 48" x 40" pallet base since it was impractical to maintain separate inventories of several different size pallets. It is a relatively simple matter to change base sizes on slipsheets."

Even rapid turnaround methods have been successfully adapted to slipsheet unloading. Automatic Truckloading Systems (ATS) of Easton, PA, exhibited an innovative trailer cable floor system at the 1979 National Material Handling Show that can unload an entire trailer of slipsheet unit-loads in minutes. (See H&SM, June '79, pg. 60)

Such a system is in use at the Hershey Chocolate plant at Hershey, PA., to shuttle loads both within the plant complex and to a warehouse in Mechanicsburg, PA.

UNTAPPED POTENTIAL

Potential exists for annual savings exceeding 150 million dollars for common carrier transport of food products on slipsheets, according to John C. Bouma, of the Market Research Division of the USDA. Speaking at a meeting of the Food Distribution Research Society at Portland, Oregon recently, Mr. Bouma based his reasoning on USDA field studies of comparative costs of shipping methods, and a survey of 129 food warehouse operators that revealed unitized



A large corrugated container with a slipsheet base made by Union Camp Corp. has been used to ship produce, including watermelons.



A slipsheeted, stretch-wrapped load of citric acid is placed on a pallet with standard forks in an experiment at Pfizer's Southport, N.C. plant.



Cables in decking of trailer move to transfer slipsheet loads from trailer to receiving dock at the Hershey Chocolate Plant in Hershey, PA.

unloading of common carrier trucks is almost non-existent.

Mr. Bouma noted that although low-cost material handling equipment exists for unloading pallet loads across truck docks, carriers lose revenue due to pallet weight and cube, which offsets a large part of the potential savings of palletized handling.

Slipsheets do not result in such loss of revenue, he noted, but are not in wide use either because suitable equipment to handle slipsheet loads is seldom found on truck docks.

Furthermore, little incentive exists for the receiver to provide the dock equipment as the freight costs for

most grocery loads are pre-paid and the carrier does the unloading as part of the rate.

Mr. Bouma suggests that the first step to implement slipsheet unitization in common carrier trucks be transfer of the unloading allowance now included in the tariffs from carrier to receiver.

PALLET VS. SLIPSHEET

Despite the successful integration of slipsheets and pallets in many applications, the methods continue to be debated by those intent on proving there must be "one best way."

This was evident in the reactions following issuance of the USDA Marketing Research Report No. 1075, titled "*Systems for Handling Grocery Products from Supplier to Distribution Warehouse.*"

The report, prepared by the USDA Science and Education Administration's Federal Research

Staff, contained cost data on a variety of grocery product shipments based on the observations of field researchers during 1974 and 1975. Due to delays in data reduction and publication, the report was not issued until June, 1978. Slipsheet use had grown substantially during the interim.

At the time of the USDA study, items observed on slipsheets were predominantly high bulk low-density types like cases of cereals or paper products that averaged only 39 cases per unit-load. Pallets were carrying mostly low bulk, high density items like cases of canned goods, which averaged 68 cases per unit-load.

These fundamental differences in the kinds and quantities of items shipped by each method, coupled with data summarization in terms of cost-per-1000 cases and 1000 pounds, resulted in incorrect interpretations.

For example, in the data summary concerned with loading rail cars, labor, equipment, material, and dunnage costs, averaged \$51.26 per car for the palletized loads and

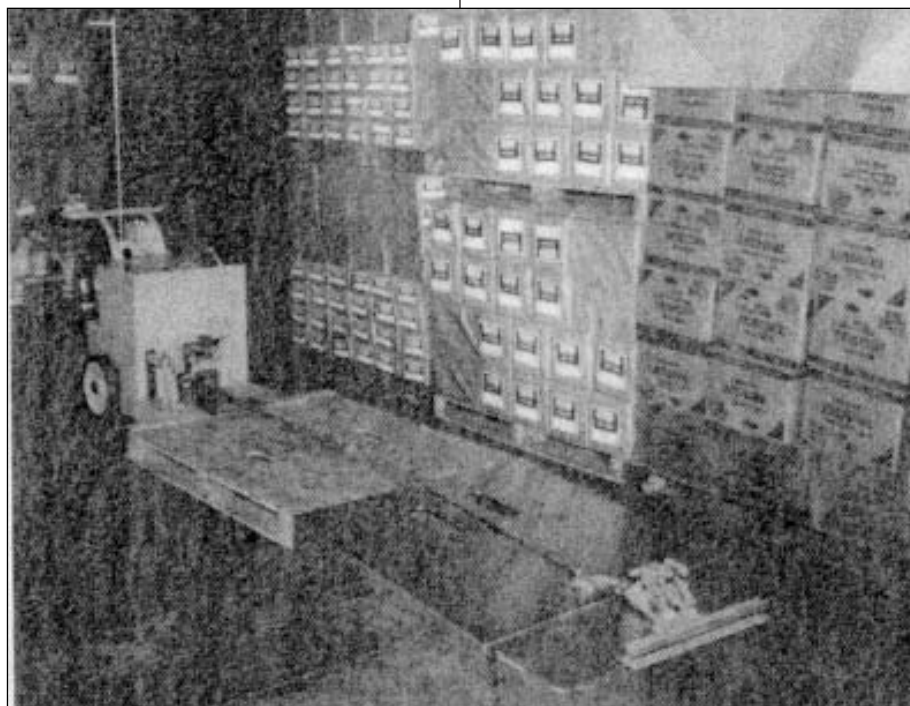


Containair's air cargo pallet box has recently become available with a heavy-duty slipsheet base.

\$36.78 per car for the slipsheet loads. The smaller cases on pallets totaled 3,012 cases per car, versus 1,863 cases per car for the bulkier cases on slipsheets.

Cost-per-1000 cases therefore calculates to \$17.01 for pallet shipments and \$19.74 for slipsheet shipments. This led several trade publications to announce the USDA report with superficial headlines to the effect that "Government research proves superiority of pallets over slipsheets."

On the other hand, several readers immediately noted that if adjustment to the weighting factors were made to show the same number of cases per unit-load on slipsheets as on pallets, the cost-per-1000 cases for slipsheets would drop to \$12.21. Conversely, if the pallets had been carrying the bulkier cases, their cost-per-1000 cases



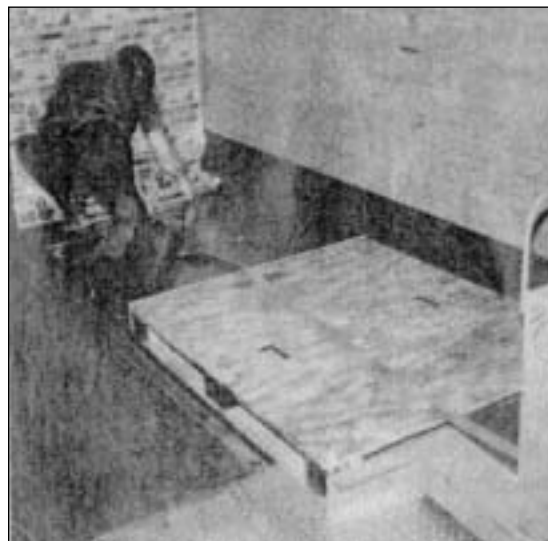
A low-cost lift truck is adapted to pull unit-loads on slipsheets from trailers (below) onto captive pallets for warehouse storage (1.) at Nabisco.

would have been \$27.51.

Actually, little can be concluded from such data except that the number of cases on pallets and slipsheets was not comparable, and the density of goods handled will affect unit-load handling costs, whether pallets or sheets are used.

The American Paper Institute (API), a trade association representing most U.S. Suppliers of fiberboard slipsheets, became concerned with the adverse publicity about the USDA data (on costs-per-1000 cases) that failed to explain the differences in unit-load weights or case counts.

Subsequent discussion between the Institute and USDA officials resulted in a USDA letter to the API confirming the significant differences in the



unit-load weights and case counts used in the report. The API subsequently decided to pursue the matter directly with shippers and potential users of slipsheets.

ANSI RECOGNITION

Within the past year, slipsheets have been recognized for the first time by the American National Standards Institute (ANSI). The title of the ANSI standards committee MH-1 that previously considered strictly pallets as a means of unitization,

has been changed to "MH-1, Standardization of Pallets, slipsheets, and Other Bases for Unit-Loads." An ANSI MH-1 subcommittee is drafting a proposed slipsheet standard that will provide standard definition and basic specifications for industry wide use.

In anticipation of continued expansion of the slipsheet method abroad and for international containerized shipments, attendees of the TC-51 committee of the International Standards Organization (ISO) in London, England, in January 1979, were posted on progress in the development of an ANSI slipsheet standard and the possibility of it becoming an ISO standard.

Although the rationalization of slipsheets as a unitized method is well underway, the issue of pallets versus sheets continues because the sheets have emerged only recently as a viable alternative and are still in the adaptive stage.

Many shippers already know that sheets can complement pallets in a unitized system, with pallets used in storage and slipsheets in transit. This is particularly the case where unit-loads are stored in racks which require a rigid base.

Slipsheets either ride with the loads on pallets through the storage rack system, or the unit-loads may be transferred from the pallets onto sheets at the shipping docks.

The needs for new and improved material handling equipment to provide cost effective interface of the two methods at shipping docks continues. In the absence of commercially manufactured equipment to do the job, one shipper, Nabisco, developed its own equipment to transfer inbound slipsheet unit-

loads received in trailers, onto pallets for storage.

Generally needed is a low cost dock truck to extract slipsheet loads from trailers as efficiently as low cost pallet jacks and trucks remove pallets. Several companies market low lift pallet trucks with slipsheet attachments, but cost is about \$15,000 each. At least two manufacturers are working on the equivalent of a pallet jack for slipsheets that will sell for about \$5,000 each, but are not yet ready.

So, as new equipment continues to appear, and innovative ways to employ slipsheets are found, there appears to be little doubt that the slipsheet method has gained a strong foothold. The method will continue to grow and contribute to economical handling and shipping goods and materials throughout the world.

Reprinted from the December 1979 issue of *Handling & Shipping Management* Magazine H.G. Becker, Jr., Editor.

SLIPSHEETS: THE PALLET'S SUCCESSOR?

Kansas City – Will the slipsheet eventually replace the wooden pallet in the fresh produce industry? It may be too early for an accurate prediction, but with uncertainties over future wood availability, escalating lumber costs and the problems of what to do with large, cumbersome wooden pallets once they reach their receiver, it is little wonder other alternatives to this dilemma are being considered.

When it comes to produce handling, slipsheets have been creating interest within the fresh fruit and vegetable industry. Slipsheets are not new. While fiberboard slipsheets have been in production about 25 years, plastic slipsheets have been around less than a decade. But slipsheets in general are relatively new to the produce industry, although they are commonplace in grocery shipments.

Just about anywhere one looks today, slipsheets, if not being used, are at least being considered. While the problem in produce shipments has often centered on a standardized wooden pallet, some produce shippers are wondering whether they should use wooden pallets at all.

For example, there are the one-way 35"x 42" softwood pallets used by the grape and tree fruit shippers in California. Overall in the produce industry, there is greater use of the 40"x 48" hardwood pallets. These particular shippers may like the wooden pallets, but this is not necessarily the case with receivers in the Midwest and East who have to

find ways for disposal. Disposal, in fact, may be the foremost problem with pallets. There have even been pallet pools (exchange programs) established, but with limited success.

Just recently, a member of Grocery Pallet Council (GPC) spoke at a meeting and said unless the pallet pool is turned around in the next two years, the GPC will be out of business. Not only have problems existed at the mill level where some poor quality pallets are being produced, but the return program for pallets has been a miserable failure in many instances.

Shippers commonly talk about shipping their fresh produce eastward on top-notch wooden pallets, only to have pallets returned damaged and in such poor condition they have to be thrown away. This is where slipsheets come in – they are easy to dispose of.

While shippers are showing interest in slipsheets, they also must look at the advantages and disadvantages of the plastic slipsheet – versus paperboard, fiberboard and corrugated slipsheets. But first, the pros and cons of slipsheets in general versus the wooden pallet are more pronounced.

Speaking at a transportation meeting last fall, Gordon Bard, head of the Productivity Committee of the American Frozen Food Institute's Physical Distribution Council, pointed out the advantages of paperboard slipsheets over wooden pallets.

COST COMPARISONS

While hardwood pallets cost anywhere from \$4 to \$13 per pallet in 1976, paper board slipsheets averaged only 37 cents to \$2.50 apiece. But this is just the beginning.

Other advantages include: The shipper normally gets back a pallet in worse shape than the one he shipped; wooden pallets require repair, while paperboard slipsheets are easily disposable; there is a possibility of hardwood shortages, but not with slipsheet materials; fifty paperboard slipsheets can be placed in the same area as one pallet; 10 percent more space is obtained in rail cars with slipsheets; slipsheets are safer without splinters and nails, and no return is required with fiberboard slipsheets.

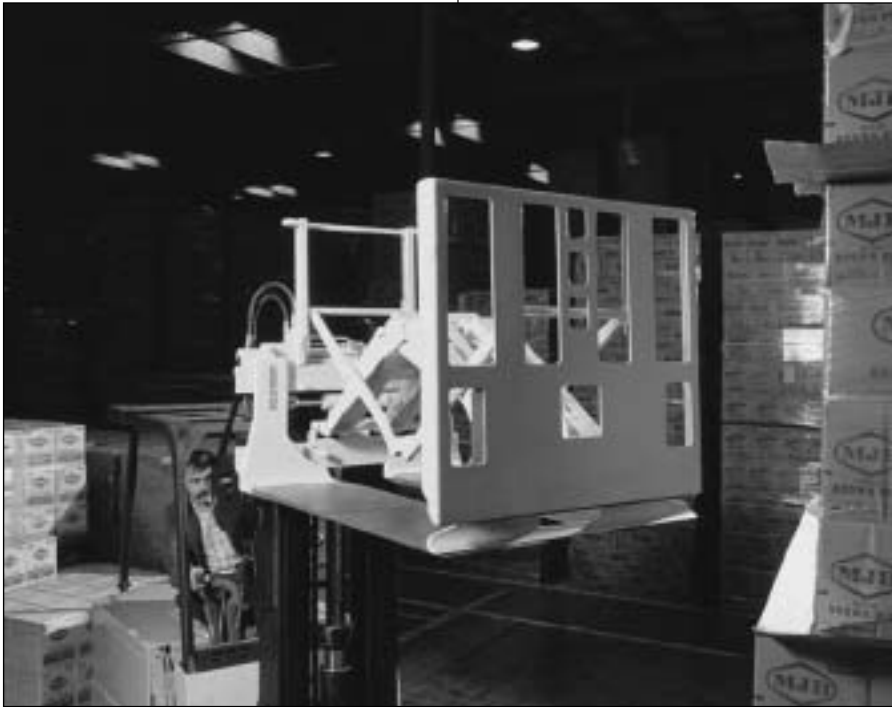
While the advantages of plastic sheets are similar to the advantages of paperboard sheets over wooden pallets, there are a couple of differences. In produce shipments where top icing in general is involved, paperboard slipsheets have been known to tear, a problem which does not affect plastic slipsheets. And at least one manufacturer of plastic slipsheets offer a 40 percent return on every dollar to its customers who return their purchased slipsheets.

Plastic slipsheets in 1976 normally ranged from \$1 to \$3, depending on size, thickness and entry. Depending on size, a softwood disposable pallet cost \$2.50 to \$4.

PALLET PROBLEMS

One example of the produce industry's interest in slipsheets is in California. Roger Rij, Agricultural Research Service, U.S. Department of Agriculture, Fresno, has been researching slipsheets for the California Tree Fruit Agreement, a study stemming from grower interest. Shippers of plums, nectarines, peaches and other tree fruit here have been unitizing their shipments on 35"x 42" one-way softwood dis-

The Pallet's Successor?



The Extender of this push/pull attachment is shown extended to the end of the platens. The gripper jaw, at the end of the attachment, is open and ready to clamp onto a slipsheet. (Photo courtesy of Cascade Corp.)

Phil Hale of the USDA's Agricultural Research Service in Orlando, Fla., said corrugated slipsheets have been in commercial use by citrus packing houses in the "Sunshine State" for four or five years now. These slipsheets are even being used successfully in many export shipments.

But strategic produce growing states such as California and Florida are not the only areas where slipsheets have made inroads. Shippers of potatoes in Oregon, Idaho, Washington and Wisconsin are turning more to the method.

SPUDS ON SLIPSHEETS

In December 1975, Jay Arend of Central Sands Produce, Inc., Bancroft, Wis., started using 350-pound corrugated slipsheets. Arend began using the produce after he had observed their use in other areas. The potato packer-shipper said the "cost of products (pallets) was getting outrageous." Arend still uses wooden pallets, but only on an in-house basis. "In our case and with any shipper, you have a graveyard of broken pallets," Arend says. "My feeling is this (slipsheets) is the way for the produce industry to go."

Arend said wooden pallets were alright to use on short hauls if an exchange program is available, but the extra weight of the pallets on the load, plus extra use of fuel are still negative factors to be considered.

The shipper said he feels some of his peers haven't realized as yet their advantages in using slipsheets, but he noted that at least three or

posable pallets. But whether these shipments are directed to terminal markets, or chain store operations, receivers are still faced with disposal problems. Rij said these pallets have to be broken down into smaller pieces for disposal and even then they "can't even get the garbage disposal companies to get rid of them." He noted California shippers would use the hardwood two-way pallets, but they don't like the idea of shipping out good pallets and "getting junky ones back."

One move that has helped in this area is the free pallet program, which the Santa Fe Railroad initiated in the fall of 1976. For every five car-lots of produce shipped east, one carlot of pallets will be returned. Shippers are not charged for the transportation of the pallets in either direction.

Although Rij is still in the middle of the study, he seems to be impressed with slipsheets. However, at the same time, he stresses the USDA is conducting an impartial study. "The USDA does not care which way it

goes (slipsheets or wooden pallets); we just want the best method," Rij said.

One advantage of slipsheets cited by the researcher is that by using the product on a truckload of tree fruit, a shipper can load up to 600 more pounds of fruit than if he were using wooden pallets. But before he gives a final stamp of approval on slipsheets, Rij has a lot more testing to conduct.

He said there "are things we do not know yet. How does it (slipsheets) affect air distribution and cooling? We want to get down to the real nitty gritty," Rij said. "We want to compare the ease of handling, quality and cost in our research."

The project included two shippers last summer who cooperated in the tests and Rij said about four more shippers have shown an interest in participating in the study next summer. One of the main problems in conducting the experiment has been finding receivers with the proper equipment to handle the slipsheets.

The Pallet's Successor?

four other shippers in the area have taken this direction.

Arend saves from \$120 to \$140 a semi-trailer load with slipsheets. He can load 4,000 unitized 10-pound bags of potatoes on 20 slipsheets. If a customer had to have these same potatoes in 8,000 master containers, costing 16 cents apiece, it would cost \$128 more. Arend also maintains receivers like the idea of quick unloads. Instead of manual unloads taking two hours, unitized unloads of potatoes on slipsheets only take 15 minutes. The shipper said his palletized loads of potatoes normally are shipped in 110-, 115-, and 120-pound packs.

BQP Industries, Inc., Denver, Colo., has been manufacturing plastic slipsheets for eight years and a spokes-man said the company is the oldest and largest manufacturer of this product. He noted the food and beverage industries are the largest users of plastic slipsheets and one major beer producer alone has two and one-half million sheets in its system.

While the use of slipsheets in general within the produce industry has a lot of growth potential, the grocery industry is much more familiar with this alternative to wooden pallets. One of the main problems, however, is the special equipment required to handle slipsheets. Fork lifts require a "push/pull" attachment to move these slipsheet-based loads. Cost of these special devices in 1976, not including fork lift (lift truck), ranged from \$5,700 to \$8,500, according to officials at Clark Equipment Company, Battle Creek, Mich., who build lift trucks as well as the slipsheet attachments.

However, there is one alternative to the costly lift trucks. Clark Equipment has recently placed on the market a "Walk/Ride Pul-Pac," possible better known as a "walkie." While a lift truck in 1976 with the special slipsheet attachment cost \$22,000 to \$24,000, a walkie only cost about \$13,000, including the push/pull attachment. The operator can ride this walkie, or operate it as a walkie unit.

Still, the old adage of "you pay for what you get" applies here. The walkie cannot stack loads, which would limit its usefulness in a warehouse. However, the walkie can be useful moving palletized loads in or out of trailers and rail cars.

This particular walkie has a 3,000-pound rated capacity, operates from a 24-volt battery and has a three-speed control, traveling up to six miles per hour, while unloaded.

But there are other problems in using slipsheets besides just the cost of special equipment. Apparently most receivers, at least in the produce sections of warehouses, do not have this equipment. Proponents of slipsheets say the cost savings of the produce alone as compared to the wooden pallet, will allow receivers to buy special equipment. However, this claim has not been readily accepted. Another problem involves the labor unions.

In some areas of the nation, labor unions are much stronger than in other areas. While some produce warehouses are able to borrow lift trucks with push/pull attachments, others, where there is union resistance, are not allowed to cross over into another department to borrow this equipment.

At BQP, a recycling program is available on plastic slipsheets. The company pays 40 percent of the original cost of the slipsheet when returned by a customer. Upon return, the product is run through a grinding machine, and reprocessed with a certain amount of virgin resin added.

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Edited by Thomas J. Andel,
associate editor.

ARE PACKAGERS READY FOR SLIPSHEETS?

If current efforts to replace wood pallets with slipsheets prove successful, industrial packagers may have to reconsider their standards on load limits and operating costs.

*By Alan Serchuk,
managing editor*

Industrial packaging may be on the verge of a new era—one in which the tried and true pallet gives way to a 30-year old newcomer: the slipsheet, or, as some call it, the pull pack.

For years, the pallet formed the base of unit-load shipments. Some go as far as to credit the pallet with the current state of efficiency of the nation's physical distribution system. But, for all of its virtues—and there are many—and its almost ubiquitous use, the pallet may finally be falling victim to a combination of circumstances and ailments brought about by those depending on it most—the shippers themselves. In its place, more and more high volume shippers, such as Jewel Foods and General Foods, are adopting specially constructed and treated sheets of corrugated and solid fiber board and plastic to form the base for their unitized loads.

What happened to the pallet? First, there's the constantly rising cost. Sixteen years ago a 48" x 40" four-way hardwood pallet cost perhaps \$3. Today it runs near \$8. Then, there are the periodic materials shortages due to the tremendous demand for lumber by this industry. By one estimate, .6% of all lumber produced in the US goes into pallet manufacture. Looking at hardwoods alone, 50% to 55% goes into pallets, and by 1982, the estimate is for between 75% and 90%.

Another area of concern: the rising cost of moving freight. With pallets weighing up to 75 lbs. each, the cost of shipping them can be significant. For example, on a truckload of 40 palletized loads, payload is reduced by 3,000 lbs; for a railcar shipment of 56 palletized loads the payload loss comes to 5,000 lbs. In addition, there's a cube loss of 10% to 12%.

But, these problems aren't new. Pallet users have had to deal with rising costs, sanitation, materials shortages and a host of other headaches over the years. They've developed lightweight wood pallets as well as plastic and corrugated versions. Suppliers even designed legs that can be strapped to a load in place of a pallet.

In addition, packagers, with the help of freight carriers, organized pallet pools that provided a way of returning pallets to a shipper on a one-for-one basis. One of the widest and most active of these was organized by the Grocery Manufacturers Association (GMA), which also set standards for pallet quality. Unfortunately, the pools did not function as originally planned, and it was their failure that most observers blame for the current shift to slipsheets.

For their part, slipsheets have not been met with total enthusiasm by packagers. The early history of these load unitizers included considerable failure. The sheets just didn't hold up to the demands of carrying perhaps a ton of merchandise.

Even now, slipsheets must be carefully selected for the application. Being paper products, corrugated styles, for instance, don't stand up well to cooler temperatures common to produce storage and shipment—the flaps tear off easily when they get wet. In fact, the United Fresh Fruit and Vegetable Growers Association advises shippers to use 100% virgin kraft fibre board sheet. Such sheets, especially when coated with a polyethylene or other moisture barrier, have been

tested for extended periods in temperatures as low as -20F. Completely submerged in water for 24 hours they pick up only 4% moisture and that has little effect on flap strength. Where shippers insist on corrugated, many produce organizations suggest using double slipsheets.

Slipsheet suppliers unanimously acknowledge early problems with moisture and lip failure, but note quickly that technology has improved in recent years to overcome most of them. Papermaking methods have improved, lips can be reinforced for added strength, and surfaces can be coated to resist shipping and storage environments. Further, plastic sheets are also available, which suppliers claim can carry any load that a pallet can carry.

Industry performance standards do not yet exist. However, the American Paper Institute and the American National Standards Institute are both working on them and expect to have proposals ready soon. Until then, prospective users will have to continue working with suppliers to develop their own performance requirements.

Suppliers explain that so many variables must be considered in describing slipsheet performance—materials and manufacture, types of load, environment, amount of handling, and equipment design are the major factors listed—that the only realistic way to design a slipsheet system is the empirical “cut-and-try” technique.

Still, most suppliers have enough data on their products to provide a starting point. For example, one lists tensile strengths for four weights of solid fibre board as:

CALIPER (<i>pt</i>)	50	60	70	80
MD	340	414	468	511
CD	148	198	216	221

Matters are somewhat different when considering plastic slipsheets. These 30- to 70-mil thick sheets presumably resist dents and puncture that could destroy corrugated or solid fibre units.

The biggest drawback to plastic is price, which is about \$2. That compares with 50¢ for corrugated and 70¢ for solid fibre. However, plastic sheets are reusable and recyclable. One major cosmetics user can get 15 to 25 trips for a sheet: three trips is considered break-even. (Most plastic slipsheets are used in tightly controlled distribution systems so that the shipper maintains control over them.) And, to increase the sheets' competitive standing, at least one supplier allows a 25¢/lb rebate on plastic slipsheets turned in for recycling. So far, though, plastic represents a fairly small part of the total slipsheet market.

EQUIPMENT: A MAJOR OBSTACLE

The relative merits of one type of slipsheet over another may be debatable. But, there's little question that the high cost of equipment is probably the largest obstacle to wider implementation of slipsheet systems of any type. Consider that all stations in a physical distribution system now own pallet-handling equipment. To adopt slipsheets requires an investment of \$5,000 or more for a simple piece of gear.

The basic device is a push/pull unit that grips the lip of the slipsheet and pulls the load onto a platen or

a set of wide forks. The full range of pallet-handling equipment can be had in slipsheet versions, with fully equipped lift trucks selling for \$30,000. A stand-up truck with a 2,500-lb capacity costs about \$21,000; and 3,000-lb rated outriggers and walkies go for \$15,000. For stations already equipped for pallet handling, push/pull attachments are available at considerably lower cost. For example, estimates for converting a fork lift truck run from \$5,000 to \$8,000. Just converting the normal forks to the 15", wide highly polished and case hardened chisel-tipped slipsheet forks runs near \$600.

A word of caution, though, when converting this equipment. The push/pull attachment sits astride the lift forks, effectively reducing their length. But more importantly, lift trucks must be derated to compensate for the attachment's weight—a normally rated 4,000 lb truck might be derated to 2,900 lb, 3,780 lb for a 5,000 lb rated unit. (Equipment manufacturers have full details.) As a practical matter, derating could prevent a piece of equipment's being used to move double tiered loads.

Yet another cost comes with this type of equipment. All sources emphasize the need for special operator training to make slipsheet systems work. Special techniques have been developed for pulling slipsheeted loads onto lift forks, chiseling under loads, picking off and depositing upper-tier loads, and maneuvering in railcars and truck trailers.

MAKE YOUR OWN PLANS

The best and most consistent advice that packagers who have switched to slipsheets can offer those consid-

ering the conversion is to study their own distribution system in detail, including incoming shipments and those receiving their loads. Those experienced are of one voice in emphasizing that each system is different, so what works in one place may not apply to another.

Among the major justifications for slipsheet use have been:

- Low unit cost—between 40¢ and \$2, depending on the type and design.
- Lightweight—about 3 lbs vs perhaps 75 lbs for wood.
- Smaller size permits perhaps 10% to 12% more cube in freight carriers. Being thinner and lighter, some 12,000 slipsheets can be shipped in the same truck trailer that carries only 430 pallets.
- Slipsheets aren't considered as dangerous a fire hazard as wood pallets and may be stored indoors where they can be protected and kept clean. They eliminate the expense of repair crews and other maintenance chores long a part of wood pallet use.

Negatives exist also. Cost of equipment has been cited as the number one obstacle to wider slipsheet use. The shipper must be equipped to move slipsheeted loads onto railcars and truck trailers. Truck drivers often unload their own trailers onto receiving docks, so they must be trained in the new methods and equipment. And, of course, the receiver must be equipped to deal with slipsheets.

Will slipsheets ever replace pallets? That depends largely on who's talking. In many shipping and receiv-

ing areas, slipsheeted loads are stored on pallets to keep them off the floor.

Further, certain heavy loads that might damage the paper units, or loads with high moisture content, may have to continue riding on wood. Pallets will also be used in distribution systems where conversion isn't cost effective.

In short, the slipsheet is here to stay, but it will have to share the nation's physical distribution channels with the wood pallet for a long time to come.

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Transportation & Distribution,
Edited by Thomas J. Andel,
associate editor.

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ARE SLIPSHEETS FOR YOU?

Deciding the relative merits of pallet and slipsheet systems requires a detailed analysis of the costs associated with each, as they would apply to a given company's needs. Cascade Corporation, which produces equipment for each system, suggests the following points be included in such a study.

PALLETS

1. Number of units shipped.
2. Cost per pallet.
3. Average pallet life.
4. Number of pallets owned.
5. Cost of money in percent.
6. Average weight of outbound freight.
7. Weight of pallets.
8. Cost of pallet return freight.
9. Total pallet repair cost annually.
10. Time required to store and remove loads from storage.
11. Time required to stage and load with pallets.
12. Labor rates.
13. Time to unload and return pallets, inspect, sort, and administrate.
14. Fire insurance for pallets.
15. Pallet shortages due to float.
16. Space occupied by pallet, versus that used for product.
17. Damage caused by pallets—broken deck boards, over or under hand of product, nails, etc.
18. Sanitation: The FDA inspects pallets for rodent leavings with black lights.
19. Pallets returned inferior to those shipped.
20. Storage space required.
21. Potential future shortage of pallets and increasing costs.
22. Safety.

SLIPSHEETS

1. Number of loads.
2. Cost of slipsheets.
3. Cost of slipsheet dispenser.
4. Slipsheet dispenser average life.
5. Number of slipsheet dispenser units required.
6. Cost of push/pull equipment.
7. Load push/pull average life.
8. Number of load push/pull units required.
9. Time to store and remove load from storage.
10. Time to stage and load.
11. Labor rate.
12. Cost of captive pallet.
13. Number of captive pallets.
14. Average life of captive pallets.
15. Repair of captive pallets.
16. Storage space required.

MAKING A CASE FOR SLIPSHEETS

They've been the Rodney Dangerfield of the Grocery Industry for years. However, new developments may win new respect for slipsheet technology.

By Tom Andel,
associate editor

What's 48 x 40 inches, has nine legs, weighs 30 pounds, is flat on top, protects whatever is placed on it from damage, is reusable and recyclable, and costs only \$3? Nothing – yet.

Such a shipping platform is the Holy Grail of shippers in many industries, particularly grocery manufacturers. In fact the Grocery Manufacturers of America (GMA), the National American Wholesale Grocers' Association (NAWGA), and the Food Marketing Institute sponsored studies analyzing various pallet makes and designs, looking for the best one.

This search has received a lot of press recently, but a small group of shippers feels the committee is overlooking an old but proven platform – slipsheets.

Over the past decade, slipsheets have been relegated to a narrow niche in the food industry – unitization of mostly lightweight, bulky loads during long haul transport. Horror stories about stacking damage and the cost of the push/pull equipment needed to handle slipsheeted loads kept this medium's growth in check.

"The pallet committee estimates that 15% of grocery distributors are prepared to take slipsheeted

loads," says Sam Caufield, section manager with Procter & Gamble and member of the Pallet Subcommittee. "In thinking of alternatives to the GMA pallet, slipsheets were never taken very seriously. No matter how you cut it, all product ends up on a pallet in a rack, regardless of how we handle it internally. We take on the system the customer uses. The common denominator for the grocery distributor is the pallet."

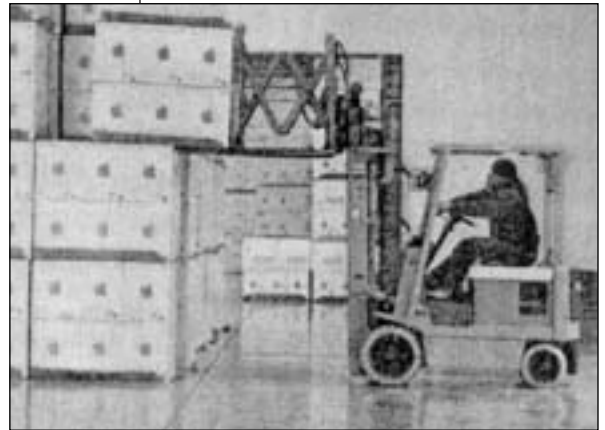
Grocery shippers taking issue with this opinion formed a users group to continue a dialog about slipsheets with their customers. This ad hoc committee includes representatives from General Mills, Coors, Ralston-Purina, Nestle, Quaker Oats, Lipton, Pillsbury, Kellogg's, Kimberly-Clark, and Hunt-Wesson.

"Some in the food industry would like to see slipsheets go away," says Ben Janson, vice president and director of logistics/customer service for the Grocery Products Group of Ralston-Purina.

"We're not trying to force slipsheets down everybody's throat," he adds, "we just don't want to see restrictions until some satisfactory alternatives emerge. So far they haven't."

PLASTIC DESIGNS

Companies in the slipsheet users group are working on ways to overcome the problems associated with slipsheets. Coors, for example, used itself as a guinea pig when it started experimenting with plastic slipsheets.



Apple Computer's requirement that overseas trading partners ship to them on slipsheets cut container unloading time from seven man hours per container to 45 minutes, using lift trucks with push/pull attachments.

Eighteen years ago, Coors shipped its beer on wooden pallets. They had a pallet exchange program, but the more good pallets they shipped out, the more damaged, low quality replacements they got back. Next they tried paper slipsheets, but moisture quickly made them unusable. Then they experimented with plastic extrusions and started using a plastic copy of the paper slipsheet they had used. That worked until Coors started making their cans from lighter, thinner aluminum.

"As we lightweighted our cans more and more, the weak point in the chain became the slipsheet," says Bill Longaker, business development manager for Golden Technologies, a Coors subsidiary. "We discovered as we shipped our cans down the road, the first tier would collapse. We learned we needed more cushioning."

Their next alternative was a corrugated plastic slipsheet. This provided a modicum of shock absorption, so they used this design from 1986 to 1988.

Further experimentation yielded the

A Case For Slipsheets

design they use today – a vacuum-formed slipsheet with small spherical dimples arranged in a close pattern across the sheet. Longaker says this design provides more cushioning than the corrugated design did. The design proved so successful, Golden Technologies was formed in 1989 to market the design outside the company. They didn't find a wide audience.

"Not everyone needs a platform that can carry 3,000 pounds," says Longaker. "We move 3.5 million loads that size every year. The design was overkill for many. If they didn't recover the slipsheet, they'd lose money."

Golden Technologies developed a lighter-weight, 20-30 mil slipsheet made of polyethylene instead of the previous polypropylene. Longaker says the new design provides a better return on investment. To add to its cost-effectiveness and live up to environmental concerns, Longaker says his company will buy

INTEGRATED PACKAGING SYSTEMS

Slipsheets play an important role in an integrated packaging system. Consultant Charles W. Ebeling includes a chapter on "Unitized Shipping on Slipsheets" in his book *Integrated Packaging Systems- for Transportation and Distribution*. Other chapters cover clamps, bulk container transport, and case histories in various industries.

The book is available for \$89.75 in the U.S. and Canada, & \$107.50 in all other countries. Contact: Marcel Dekker, Inc., 270 Madison Ave., New York, NY 10016, (212) 696-9000

back every slipsheet his company manufacturers, at a price he says is good for both the user and GTC.

ROI REQUIRES EDUCATION

Slipsheet critics say return on investment gets stifled by the expensive equipment necessary to handle slipsheets. There are also sticky side issues. Who should operate the equipment – the carrier or the receiver? Who's responsible for damages caused by improper operation? What if the carrier is left waiting while slipsheet handling equipment is tied up elsewhere at the receiver's dock?

The Clorox Company overcame these stumbling blocks by doing a little research and taking the time to train its people in slipsheet handling. Clorox moves over a million unit loads a year on slipsheets. Sixty percent of those slipsheets are plastic. Clorox engineer Bill Short attributes slipsheets' image problems to a lack of user education.

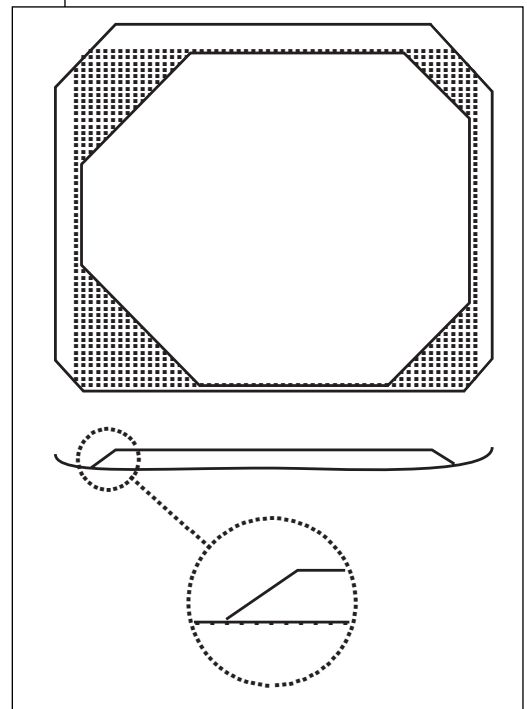
"We found that properly trained lift truck drivers can handle slipsheets with the same speed they handle wooden pallets," he says. "In our tests we've found that with hydraulically adjustable platens you could pick up a slipsheeted load, take it off a truck, then put it on a pallet. You can then use the same truck to pick up that palletized load and do what you want with it. The time differential (between slipsheet and pallet handling) is not significant."

Short believes there's a trend in the grocery industry toward high-rise warehouses using slave pallets in their racking systems. He sees slipsheets as playing a logical role in that trend.

"If you're going to have to put a unit load on a slave pallet, why not put a slipsheeted load on it and save 6 inches of stacking height?"

Even the most ardent slipsheet proponents admit that much work needs to be done to make slipsheets a more attractive unitizing alternative.

"The material handling industry has to come up with an economical way to unload slipsheets," says Bill Shrack, manager of field distribution for General Mills. "The cost of a big lift truck with an attachment has been an impediment. One alternative could be a walkie stacker that grips and slides under slipsheets. So far, the industry hasn't put the resources into this technology. Technically it shouldn't be hard."



Golden Technologies' vacuum-formed plastic slipsheet features closely-spaced spherical dimples which provide extra load cushioning during transport.

The costs of converting to slipsheets vary, but ballpark figures include \$20,000 for adapting a palletizer to slipsheets and \$7,000 to \$10,000 for converting lift trucks.

Golden Technologies' Bill Lonaker is working on a more attractive conversion option.

"We're involved in developing a hand-operated slipsheet handling device," he says. "By next year we'll have a more affordable means of handling slipsheets. The cost would be roughly the same as it would be to convert a lift truck. Plus, you won't need certified operators."

NEW APPLICATIONS

Slipsheets have gained proponents in non-grocery applications in recent years. Merchandisers are asking their suppliers to slipsheet products ranging from small lighting fixtures to cement. Ed O'Mara, product manager for Union Camp, a slipsheet manufacturer, sees great potential for slipsheets in third-world countries.

"This is new technology to them," he says. "With the acceleration of containerized freight through this decade, the slipsheet lends itself very nicely to loading and unloading. They can just put the slipsheet on the floor of the vehicle and manually build the loads using inexpensive labor. Slipsheets don't take up space or add weight, so they have no impact on freight costs."

Four years ago, Apple Computer watched what was happening with slipsheets in the grocery industry and adapted it to their overseas operations. They also watched what Panasonic was doing with their slipsheeted shipments to the U.S. Apple combined these lessons and came up with a system in which they not only ship on slipsheets, but receive on them as well.

"We went back to the Far East and trained our suppliers to use slip-

sheets," says Nigel Johnson, U.S. logistics manager for Apple. "Now we receive slipsheeted loads right from our overseas suppliers." After their first year of using slipsheets, Apple cut its freight costs 20%, translating to an annual savings of \$1 million. They also reduced labor by 75%, saving an annual \$500,000. A 78% reduction in pallet costs brought another \$500,000 savings.

Now in their third year using slipsheets, Apple estimates 1991 savings to be between \$3.5 million to \$4 million.

Using computer programs, Apple evaluated the size of the carton they used and established the ideal unit load to improve cube utilization. The pallets they purchased overseas took about 5% to 10% more space and cost from \$25 to \$30 each. Also, by switching to slipsheets Apple cut the time it took to unload ocean freight containers from six man-hours down to 30 minutes – a key benefit, considering the trend toward rising labor costs in Pacific Rim countries.

In the U.S., Apple selected carriers in various regions that could handle their products in full unit loads, using lift trucks equipped with push/pull attachments. This alleviates the damage caused by individual-case handling.

"Our competitors are asking us to share our successes with them, and they are looking at going to slipsheets," says Johnson. "At one time when the profit margins were there for our products, cost wasn't as much of an issue. Now competition is up and margins are down and logistics is getting attention in the electronics industry. We went to slipsheets for the same reasons the

grocery industry did – to reduce logistics costs."

In the next edition of IW &D, we'll look at trends in pallet design and handling. As *this* edition goes to press, the food industry's Pallet Subcommittee is looking at some new pallet prototypes. We'll tell you whether the industry is any closer to finding its Holy Grail.

GROCERY DISTRIBUTION

September/October 1991 Issue

Productivity in Pallet Management. "Chain details experience with national pallet pool program."
Page 22

"With pallet manufacturing constituting the second largest use of sawn lumber in the U.S., the potential for savings in lumber is enormous.

In 1988, seven million board feet of lumber were used in constructing white pallets. Studies indicate that as much as 2/3 of the lumber used making these pallets is now, a year and a half later, clogging landfills nationwide."

A Special Section of
Transportation & Distribution,
Edited by Thomas J. Andel,
associate editor.

SLIPSHEETS SAVE WEIGHT & COST IN THE AIR

As much as 51 pounds of excess weight flies with nearly every air freight shipment in the form of a wooden pallet. Slipsheets have proven themselves on the sea and now take to the air.

By C.W. Ebeling

In February 1991, the largest air cargo plane in the world, the Russian Antonov AN225 Mriya, landed at Bradley Field in Hartford, CT, on its first visit to the U.S. It was there to pick up 250 tons of medical supplies and equipment destined for the victims of the Chernobyl nuclear plant disaster. Though loaded to its full 250-ton capacity, it could have carried approximately 10% more medical supplies.

In addition to medical supplies, the Mriya carried approximately 25 tons of wood in the form of 672 standard 48" x 40" pallets.

The AN225 is like a flying warehouse. Built in the Ukraine, it is 276 feet long and has a wingspan of 290 feet. Powered by three giant turbofan engines underslung on each side, it is similar in appear-

ance to the four-engine Lockheed C5 Galaxy. However, its maximum takeoff weight of 1,322,770 pounds is significantly higher than the 840,000 pounds of the C5.

The fuselage of the AN225, like the C5, is hydraulically lowered to facilitate loading. Its nose cone is rotated upward over the flight deck and a ramp is extended to the ground for lift truck and other vehicle traffic.

For the Chernobyl mission, lift trucks carried stretch-wrapped, palletized unit loads into the cargo bay and stacked them three high, five rows across. The interior of the cargo aircraft holds the equivalent of 16 40' ISO ocean containers – or up to 672 standard pallet-loads. With each pallet averaging 75 pounds, the tare weight of that many pallets accounts for approximately 10% of the plane's 250-ton payload capacity and occupy 10% of the available cargo bay space.

RATIONALIZING UNIT LOADS

Turnaround time on the ground is

critical to the economic utilization of costly cargo aircraft – and the AN225 is reportedly priced at over \$200 million. Unitized handling is mandatory for fast loading and unloading. But because of its weight and bulk, the pallet seems incongruous to air freight transport.

One company which recognized this is Micropolis Corp. A manufacturer of high capacity computer disk drives and data storage systems, Micropolis ships 95% of its products internationally by air. It



Elimination of the pallet base allowed Micropolis to add a fourth tier of product to air shipments.

maintains a manufacturing site in Singapore and distribution locations throughout the U.S. and Europe. Air freight is justifiable because it reduces inventory levels on high-value products while providing more flexibility in meeting customer demands.

While it could take three to four weeks to move an ocean container of product from Singapore to the U.S., customers are looking for fast response to orders and just-in-time deliveries. Air freight shipments

The Antonov 225, with its 250-ton cargo capacity, is like a flying warehouse. It offers a good example of the potential savings when slipsheets replace pallets in air freight – a weight and volume reduction of approximately 10%



from Singapore can actually arrive the same day in the U.S. because of the international date line.



Micropolis unitizes loads on slipsheets at its Singapore plant and places the load on a pallet for the trip to the airport. When it arrives in Los Angeles, it is again placed on a pallet for handling ease.

Micropolis' existing shipping method called for product to be unitized three tiers high on wooden pallets and then overwrapped with stretch film. The freight forwarder at the airport transferred the palletized loads onto LD7 or M1 air cargo container shipping bases for loading in widebody jets.

The typical net payload of products in each unitload was 932 pounds – to which the tare weight of the pallet added another 55 pounds. Clearances within the cargo bays kept pallet tiers three high.

SLIPSHEET ALTERNATIVE

This began to change after Bill Faridan, corporate packaging engineer at Micropolis, attended a packaging conference sponsored by the Institute of Packaging Professionals (IOPP). There he learned of Apple Computer's success shipping computer products on slipsheets in ocean containers from sources throughout the world. (See T&D's 1988/89 *Presidential Issue*, pg. 30.)

Apple had converted its foreign suppliers to slipsheets and had the method fully implemented by 1990. Annual savings had topped \$3 million.

The slipsheet unitization method made sense for international shipments in ocean containers, and it seemed it would provide even more benefit in air freight. The slipsheets weigh four pounds and so add very little to the gross weight of a shipment. They also occupy a negligible amount of space under unit loads. In addition, slipsheets cost far less than a pallet and are easier to dispose of on the receiving end.

Raridan identified a few concerns connected with the integration of slipsheets into an air freight system:

- Lift trucks at Micropolis' shipping and receiving locations – as well as those operated by freight forwarders at the airports – would have to be equipped with push/pull handling attachments.
- Lift truck operators would require special training to become proficient in operating the push/pull attachments and with slipsheet handling methods.
- Resources would have to be provided to set up and coordinate the entire slipsheet program.

To build further knowledge about slipsheets, Micropolis' logistics system planners subsequently visited

THE FUTURE FOR SLIPSHEETS IN AIR TRANSPORT

The use of slipsheets for international air cargo shipments can be expected to multiply rapidly now that the practicality of adapting them to air freight systems has been demonstrated by Micro-polis and now that air forwarders are installing push/pull attachments on their lift trucks. Freight shippers who ship on large cargo planes such as the Antonov 225 and the C5 Galaxy that carry mostly military supplies, or those who ship in plane-load quantity may also find that the slipsheet alternative can be adapted to improve payloads and reduce shipping costs for their unitized freight shipments.



Slipsheeted loads are placed on LD7 air freight bases for air shipment and then removed at the destination.

Apple Computer's slipsheet handling operations at Cupertino, CA. What they saw there helped them visualize how to adapt the method to an air freight program. Since their products were hand loaded onto pallets at Singapore the immediate plan was simply to place a slipsheet onto each pallet and then build the unitload on it.

The unitized loads on slipsheets

would remain on the pallet for the trip to the airport. There the freight forwarder would install push/pull attachments on the lift trucks to transfer the loads off the pallets and onto the air cargo container bases. The empty pallets were then returned to the Singapore plant for reuse.

Correspondingly, the freight forwarder on the receiving end would install push/pull attachments for the lift trucks at the airport in order to remove the slipsheet loads. In the beginning the loads would be transferred back onto pallets for trucking to the Micropolis facility at Chatsworth, CA, or directly to certain customer destinations.

For the second phase of implementation, push/pull attachments would be installed at the Micropolis shipping and receiving facilities in order to eliminate the need for pallets in the shuttle hauls to and from the airports.

A critical accomplishment in the program was gaining the agreement of the freight forwarders to purchase push/pull attachments for the lift trucks and to train their operators to use them.

CHANNEL PARTNERS AGREE

Micropolis' project managers went to Singapore for meetings with their operations people and the freight forwarders. It was important to acquaint all who would play a role in the project with the slipsheets method. Tours of Apple Computer's Singapore facilities were arranged so that all involved could observe the slipsheet handling methods and equipment firsthand.

In the plan that evolved, packaging was redesigned as necessary to

make best use of slipsheets. Raridan clarified that the design changes which were eventually made were related to the height dimension of the shipping cases. This was necessary in order to optimize the use of the space that became available when the pallets were removed from under the loads. Previous packaging design changes had already been made to achieve efficient configurations for the 48" x 40" surface dimensions of each unitload.

Micropolis began initial air shipments of slipsheet-unitized loads in July 1991. Airport transfer operations were not as difficult as anticipated. Replacement of the wooden pallets with paperboard slipsheets reduced the tare weight approximately 51 pounds per unitload. With pallets removed, it was possible to increase the number of tiers of product on each unitload from three to four and still stay within required height clearances.

The load density increase amounted to 33%. A typical shipment is an LD7 space configuration increased from 2,325 kb (5,126 lbs.) to 3,100 KG (6,834 lbs.). Translated into cost savings, Micropolis projects an annual net savings of \$342,000 based on current volume.

According to Bill Raridan, the company intends to integrate the slipsheet air freight method into its entire global logistics system. It will include shipments from their Bangkok manufacturing centers as well as Singapore and will encompass destinations in the U.S. and Europe. Raridan adds that all of Micropolis' new shipping cartons and systems are now being

designed for slipsheet use. Slipsheet use is being extended from finished products to components and assemblies worldwide. Containers intended for UPS and other parcel carriers have also been redesigned so they can be handled unitized on slipsheets at Micropolis facilities.

Bill Schubne., manager of corporate logistics at Micropolis, summarized the success of their program as the result of the cooperation and joint effort of the airlines, the freight forwarders, and Micropolis. Important too was the technical support of the slipsheet supplier and the push/pull attachment vendor.

Ebeling is an international logistics consultant and regular editorial contributor to T & D. He is author of the book **Integrated Packaging Systems for Transportation and Distribution** published by *Marcel Dekker Inc., New York*

Inside Global Logistics, a special section of T&D
February 1992 T&D

GERMANY SAYS NO TO NORTH AMERICAN PALLETS!

What happened to the good old days when a pallet company did not have to worry about what happened to a pallet after it was accepted by a customer? The picture is shifting, but just how far is it going to change?

In some parts of the world, most notably Germany, the picture is intense. The Germans used to land-fill or incinerate unwanted wooden pallets, including North American stringer pallets. This is no longer permitted. Germany passed a new recycling law which is generating real concern. According to Brian McGregor, Assistant Chief of the International Transportation Branch, USDA, it is causing a stir throughout Europe, including Germany, as well as with U.S. exporters. The overall thrust of this law is that companies which originate a packaging product which eventually ends up in the solid waste stream will be held responsible for disposing of that packaging. This includes wooden pallets!

Germany's Packaging Regulation passed on April 19, 1991; the new package recycling requirements will come into effect in three stages. The first stage started **December 1, 1991**. At that time, manufacturers and distributors were required to take back all used transportation packaging. This includes pallets, crates, styrofoam containers, and other packaging forms used to protect goods during shipment. Starting on **April 1, 1992**, manufacturers, distributors and retailers will have to accept back all second-

ary packaging, which includes cardboard boxes and blister packs. Sounds like a good April Fool's joke, doesn't it. Starting on **January 1, 1993**, retailers, distributors and manufacturers in turn will have to take back sales packaging, which refers to packaging needed to transport and hold the goods until consumption. This includes cans, foil wrapping, plastic containers and cardboard packages.

We have heard stories that U.S. exporters are going to have to ship on Europallets or pay for having goods transferred to a Europallet, pay for the Europallet, and pay to have the pallet shipped back to the U.S. for disposal. There is a great deal of confusion about what this new packaging legislation will ultimately mean. It is our understanding, however, that Germany is enforcing its pallet rule.

Under the law, the business entity bring imported goods across the German border, be it a German or foreign firm, is responsible for the recycling or reuse of packaging as described by the ordinance. Either the firm must take back its packaging or pay a German firm to dispose of it in accordance with the law. German government officials expect foreign firms to follow the latter course.

Those U.S. firms which ship their final product from the U.S. to Europe and their importers face a major problem. This problem is a result of the different shipping pallets used by American and European exporters. Europeans use a reusable 80 x 120 cm "Europallet," while Americans use the one-way 100 x 120 cm "sea pallet." In the past, these sea pallets were simply thrown away when

the goods reached their final destination. The new packaging regulation, however, eliminates this option. In the future, all imported goods are likely to be transferred from sea pallets to Europallets at the German port; sea pallets will not be allowed to leave the port area. Theoretically, then, the sea pallets will simply sit at the Germany port until they are used by German exporters or periodically loaded empty onto U.S. bound ships. German importers will want to pass on the cost of the second option to American exporters.

One might suggest that U.S. exporters simply switch to a Eurostyle pallet. This may not be as easy as it sounds. The 80 x 120 cm pallet roughly corresponds to a 32 x 48 North American pallet. U.S. boxes may not properly stack on this pallet size. In addition, the shipping containers used to ship to Europe are designed to fit 48 x 40 pallets. The smaller Europallet will leave a great deal of room inside shipping containers for products to shift, allowing for potential product damage.

The bottom line is that one-way wooden pallets are not going to be acceptable in Germany. The other EC countries are studying their options and considering what kind of similar action they, too, will take. They generally do not like the German law, at least partially because many shippers find the 48 x 40 size to be preferable over the 48 x 32 pallet. The U.S. may find itself having to ship on Eurostyle pallets. Block pallet talk is everywhere today. As the world shrinks and seeks uniformity to reduce shipping costs, block pallets may well become the norm. For North American pallet manufacturers who

are used to stringer style pallets, this may all seem like so much folly. Make no mistake about it, however, there are some very good reasons why block pallets may become the pallet of choice for international markets. This alone will cause U.S. firms to move in that direction as they seek to expand their export opportunities.

Readers may be sensing another direction to this editorial. This whole scenario opens the door that much further to pallet pools, including pallet rental options.

Alan French, GKN Chep Ltd. UK wrote in the September 1991 *Eurofruit* magazine, "The topfer legislation (recycling law) in Germany is encouraging the market to move towards standardization and the use of returnable equipment. This is precisely the business in which Chep specializes."

What does this mean in North America? Brian McGregor of the USDA suggests. "U.S. exporters should get in touch with their buyers. Inform them what is going on and ask what they suggest be done. Get the official representative of the U.S. pallet industry to talk with U.S. Dept. of Commerce, U.S. Dept. of Agriculture, and foreign services."

At this point there is no reason to do anything rash. But it is time to start acting by talking to the right people in positions of influence.

GERMANY GETS TOUGH ON PALLET DISPOSAL

Germany has adopted a new environmental packaging law that is making headlines throughout the world. The law requires companies that ship products into Germany to

take back and recycle the resulting packaging waste. The new law is being touted as tougher than anything introduced in any other country in the world. The reason is that landfills in Germany are likely to fill up within five years.

The new law has many companies around the world up in arms because of the substantial increase in costs to export to Germany. The law has also been criticized for discriminating against small exporters and interfering with the single European market since it prevents the free movement of goods across borders.

The Timber Packaging and Pallet Confederation (TIM CON) located in the United Kingdom, estimates the cost to British industry of complying with the law could run into millions of pounds. "One can only ask whether this is simply a case of ill-thought-out legislation or something more sinister," said Alain Skelding, a TIMCON official. "If other member European states take similar action, we can say farewell to the single market before it has even begun."

Germany's new law will be implemented in three stages. The first stage began December 1, 1991, and affects transport packaging and items such as wood pallets. In April 1992, stage two will become effective and covers intermediate packaging such as cardboard boxes. And beginning January 1, 1993, all packaging will be covered, even items like yogurt containers and butter wrappers.

Manufacturers and distributors of the finished product will be responsible for their own packaging waste. They do not necessarily have to take it back themselves, but can

contract the disposal to a recycling firm located in Germany.

A similar trend is developing in the U.S. A 1988 report to Congress from the Environmental Protection Agency (EPA) indicates that since 1978, 70% of the 14,000 operating landfills have closed. With the drop in the siting of new landfills that has occurred over the past 10 years, there are now less than 6,500 landfills currently operating.

EPA projects that more than 2,000 of these active landfills will close by 1993. Four states – Florida, Massachusetts, New Hampshire and New Jersey – will close virtually all currently active landfills by 1998. Across the U.S. industry leaders fear that as more and more landfills close, lawmakers will see few alternatives to creating legislation similar to Germany's new law.

(Editors Note: If you have a customer that is exporting palletized goods to Germany, they need to make arrangements for the pallets to be taken back or disposed of in Germany. One firm that can be contacted which has more than 600 partners to handle the removal of packaging from Germany is (Interseroh AG". Contact Rudolf Trum or Wolfgang Jansen at: Industriestrasse 11, D-5000 Koln 90 (Porz), Germany, Phone (0 22 03) 1 7040 Fax (02203) 17 04 17

U.S. TELLS IMPORTERS: PESTS ARE 'UNPALLETABLE'

*USDA to Impose
Certification Burden*

*By William DiBenedetto
Journal of Commerce Staff*

SEATTLE—On Wednesday, an importer of, say, sewing machines or refrigerators will have to start worrying about tree bark and bugs.

That's because inbound pallets – those ubiquitous flat wooden crates on which just about any type of cargo is secured for shipment – must be certified as “totally free of bark and apparently free from live plant pests” under regulations issued by the U.S. Department of Agriculture's Animal Plant and Health Inspection Service (Aphis). Other types of wooden packing materials also are subject to the new rules.

Certification that a pallet is bark free and pest-free must be part of one of the import documents, such as a manifest, bill of lading or general permit. If not, the entire shipment will be delayed while the cargo is either shifted to a clean pallet or the suspect pallet is fumigated or otherwise treated.

No one knows how many pallets are used in the import process and thus how many will need to be certified. But there were about 400 million pallets built in the United States last year, so there are probably billions of pallets in world commerce, said Sam Baker, director of technical services for the National Wooden Pallet and Container Association in Alexandria, VA.

“About 98% of everything we use was on a pallet at some point,” Mr. Baker said.

While Aphis has indicated that the rule won't be enforced immediately, compliance at any point could mean substantial additional cost. And that's not playing too well with customs brokers and freight forwarders.

Pallets have always been subject to inspection for pests. But putting the burden of certification on importers is new. How, for example, is an importer of widgets – who may not even know whether a shipment entered the country on pallets, and who probably has no direct knowledge of their source and condition in the transportation chain – to make the required certification?

“An importer sometimes doesn't know if the stuff is on pallets or not and has no idea where the wood comes from,” said Norman Elisberg, owner of Lafayette Shipping Co., a licensed customers broker in Englewood Cliffs, N.J. “And they don't know what Aphis is.

“It would be like you and I certifying there are no cockroaches on Mars,” he said. Brokers, who prepare the import documents, and shippers “Often don't know if there are pallets involved in the shipment,” said Mr. Elisberg.

Verifying the certification statements could mean “stopping container after container. An awful lot of cargo could get delayed. I agree there's a problem that Aphis wants to address, but the solution is a disaster,” he said.

Mr. Baker, however, said certification is a “Logical extension to the inspection process.”

“It's not asking too much to expect that pallets be free of bark and bugs,” he said.

The Aphis rule is not very novel or different from what other countries, such as Japan and Australia, require, “so this shouldn't come as a massive surprise,” he said. Fumigation and heat treatment are “common-sense industrywide practices that are well known, if not always used. Some people might have to clean their act up and spend more money if they have to upgrade their pallets.”

Fumigation can delay a shipment for a week to 10 days, and fumigating pallets is a 40-foot container can cost \$900 to \$1,400, depending on whether the cargo has to be unloaded and reloaded, said Crystal Osborne, president of A.H. Marzolf & Co., a Seattle brokerage and forwarding firm. “Yes, I do have concerns. It's definitely going to have an impact.” Ms. Osborne is also president of the Customhouse Brokers and International Freight Forwarders Association of Washington State.

Richard Orr, an operations officer for Aphis in Riverdale, Md., said there will be a grace period of up to a year to make sure everyone understands the certification requirement.

“We don't anticipate any problems, but that's probably naive,” he said.

“We do not intend to precipitously start enforcing the rule,” said Jim Fons, a senior operations officer. Delays will occur when bark or live pests are present, he said, but that is already the case.

Once the rule is fully enforced, though, failure to have the certification could result in criminal and civil sanctions.

The pallet-certification requirement is a part of a larger, more complex

regulation that finalizes interim standards for importing logs, lumber and items such as wood chips. It includes specific requirements – heat treatment and fumigants – for imports from all countries except Canada and Mexico.

Requiring importers to have certification is the “hang-up,” said Fred Higdon, director of import compliance for Fritz Cos. in San Francisco. “They went after the importer, even if they have nothing to do with wood packaging. The burden is on the importer to tell shippers to use bark and pest-free pallets.”

Still, Mr. Higdon said, delaying enforcement will lessen the immediate effect of the rule. “Perhaps it will only be a speed bump,” he said.

Mr. Baker said he did not view the Aphis rule as a nontariff trade barrier, “although someone may be unhappy and want to make that claim. It’s not taking effect as though a guillotine will fall. There will be time for people to make the adjustment.”

*Reprinted from
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FREIGHT PROCESSING CENTERS: LOGISTICS' MISSING LINK

Enigmatic Asia exemplifies the need to bring modern logistics to emerging nations. Third parties can provide the answer—and overcome infrastructure limitations.

By C.W Ebeling

Beijing, China today is a city of contradiction. A bustling center for commerce, it is the hub of the nation's railway and airline networks. China's tallest hotel (52 stories), and its tallest TV Tower with an observatory (1,300 ft. high) are recent additions to the city's skyline. Yet, down on the busy streets, thousands of three-wheel pedal vehicles still deliver retail products and other goods and materials.

To Western observers, the contrast of primitive freight handling and transport methods amidst cities with modern tall buildings and state-of-the-art communications facilities is bewildering. Such, however, is the dilemma of logistical technology in many countries in Asia.

While highly visible in China, this enigmatic condition is not exclusive to any particular part of the world. The development of physical distribution methods and systems has lagged behind the technological progress made in other fields in many countries. Government and industrial management priorities are given to the development of other areas of commerce and world trade. The products are packaged, shipped, and distributed by whatever means are expedient to the individual shipper.

Unfortunately, such traditional trade practices do little to improve the physical logistical methods and cost efficiencies for the movement of goods and materials in an expanding global economy. Third-party, independent companies that specialize in the development and application of new and innovative methods of packaging, handling, shipping, controlling, and distributing freight can contribute greatly to logistics technology and help it to keep pace in a high-tech world. Norvanco International demonstrates the value of this approach in Asia.

On April 1, 1992, Norvanco announced the opening of a new



Inbound cases at Norvanco's Singapore freight processing center are unloaded and moved to unitizers via conveyor.

kind of freight processing facility at Singapore. The facility, a three-story, 300,000 sq. ft. freight processing plant, is the consummation of a joint venture formed by Norvanco with Integrated Agency Pte. Ltd. of Singapore. It is operated under the name, Main Distribution Services Pte. Ltd.

It could be the prototype for similar facilities throughout the world by the turn of the century. The new freight service center brings advanced technology to the planning, preparation, loading, dispatch, control, and delivery of containerized freight throughout the logistical process. The facility is equipped with state-of-the-art unitizing equipment, stretch film wrappers, and lift trucks equipped with push/pull attachments.

Norvanco International, headquartered in Kent, WA, provides a comprehensive service package that, in addition to the latest freight preparation and material handling methods, includes custom house brokerage, transportation and logistics

Pedal vehicles are well integrated into the distribution systems of many Asian countries.



management, warehousing, value-added distribution (labeling, bar coding, serial number retention), quality assurance, and computer and communications support.

Norvanco does not manufacture a product. Its entire business is the application of state-of-the-art logistical methods. It is distinguished for its innovative developments such as INVENTECH, a computerized, real-time inventory control and tracking system, and its automated freight handling operations at Kent and in Los Angeles, CA.

KEEPING PRODUCTIVITY UP

Few shippers, if any, in the developing countries are capable of providing their own in-house systems and equipment that the facility at Singapore provides. Even the larger shippers in the less industrialized countries have little incentive for making expenditures to provide unitized shipping and mechanized handling across their docks. In most cases, they have an abundant source of low-cost labor for handstacking operations. Consequently, the benefits of unitized shipping and mechanical handling are lost throughout the logistics process. The cost impact of this use of low-cost labor for hand stacking is especially unfavorable on the high-labor-cost receiving docks of developed countries as containers arrive with freight that must be unloaded by hand.

Pallets are not uncommon in many of the developing countries but palletized shipping in ocean containers is ordinarily avoided. The tare weight and the space taken up by pallets under the unit loads adds to overall net shipping costs.

Palletless unitized methods such as slipsheets discourage most shippers

due to the cost of special equipment and the training required to operate it properly. As a result, the slow, labor-intensive process of hand loading and unloading is perpetuated.

The few large international shippers that have implemented their own programs for shipping on slipsheets have gained substantial cost benefits. As examples: Apple Computer saved millions of dollars annually by eliminating the time-consuming and labor-intensive hand unloading operations at their docks. (See T&D Presidential Issue, 1988/89 pp. 30-34)

Another company, Micropolis, integrated the use of slipsheets in place of pallets for international air freight shipments of their computer peripheral products and achieved sizable transportation cost savings through the greatly improved load densities that resulted. (See T & D, Feb. 1992, pp. 53-55)

Both Apple and Micropolis enjoyed the shipping volumes that enabled them to maintain in-house support for the planning, development, and implementation of their slipsheet programs.

KEEPING COSTS DOWN

By channeling their exported products through the new cargo processing facility at Singapore, all shippers can enjoy the benefits of slipsheeted unitized shipping without investing in special equipment, trained personnel, or specialized administrative functions at their shipping and manufacturing locations. Furthermore, they need not change their existing methods of shipping outbound from their manufacturing plants.

Upon arrival at the freight processing facility, the most efficient unit-load patterns for the particular products are determined by computer. The cases are then transferred onto a conveyor and taken to the unitizing machine for forming into compact unit loads on slipsheets. The unitized loads are then stretch wrapped and moved to the dock where lift trucks equipped with push/pull attachments transfer them into the ocean containers. Some shippers may send their products to the facility already properly unitized on pallets. In those cases, special machines are available to switch the loads from the pallets onto slipsheets.

The lift truck operators have been well trained and are skilled in the use of the push/pull equipment. Loading time for the slipsheet unit-load method is less than one man-hour for each ocean container. That compares with five to ten man-hours for each container if loaded by hand. Since the new facility is mechanically equipped to load over 100 ocean containers a day, several hundred manhours are saved daily in the logistical process on the shipping end and likewise can be saved at the receiving locations.

IMPROVING SERVICE

Shippers gain the advantage of having their products properly unitized for the highest load densities possible along with the mechanized loading and unloading capabilities. Ocean freight and material handling costs are thereby minimized.

The receiver is able to rapidly unload the container by lift truck. The container can be turned around in less than an hour at the dock, thereby getting it back into

Freight Processing Centers

productive use sooner as well as freeing up dock space at the receiving location. The entire logistical process becomes much more cost efficient. Both large and small companies can benefit from this new kind of third-party logistics service. One of Norvanco's first customers is the Japanese giant Matsushita (Panasonic).

Not all inbound containerized shipments are routed directly through to the ultimate receiving locations. Norvanco's service at its receiving centers at Kent and Los Angeles includes the consolidation of unit loads for routing to two or more final destinations. Slipsheeted loads might be removed from inbound containers and placed back onto pallets for final delivery to those shippers who prefer to receive the loads on pallets. When necessary the unit loads will be broken down and smaller orders unitized or packaged in large bulk containers for final delivery. Fast response is possible since the instructions for the deployment of products enroute to Norvanco's terminals are received in advance through the company's computerized in-transit inventory management system.

Cargo processing centers help shippers gain the benefits of state-of-the-art unitized shipping methods and freight processing without the investment in the required special handling equipment, communications systems, and trained personnel.

Norvanco's new freight processing concept could be the forerunner of the worldwide network of new facilities of this kind. Visualize the expansion of trade relations with countries in the Far East such as China, and with Russia, the Ukraine, and the newer nations of

Eastern Europe. It could take many years to upgrade the freight handling and shipping methods of the thousands of shippers in those countries to the present day unitized freight handling methods of the Western world. The availability of the new kind of cargo preparation and processing centers would provide a channel through which freight can be shipped to the West with the most cost-effective packaging and shipping methods available today. Freight processing centers could in the future prove to be the missing links that are urgently needed to modernize global logistics.

C.W. Ebeling is an international logistics consultant and regular contributor to T & D. He is author of the book *Integrated Packaging Systems for Transportation & Distribution* published by Marcel Dekker of New York.

PUSH/PULL & SLIPSHEET HANDLING MANUAL

Cost Comparisons

SLIPSHEETS & PALLETS: A COST COMPARISON

The rising cost of wooden pallets, coupled with the industry's reluctance to engage in a workable pallet exchange program, has opened the way for more widespread use of slipsheets. Here, a director of distribution examines the costs of the two systems, their individual strengths and weaknesses and arrives at some conclusions about the future use of pallets/slipsheets in the food distribution system.

***By Michael Pregmon, Jr.,
Director of Distribution,
Citrus Central, Inc.***

The determination of whether pallets or slipsheets should be used is often a difficult question confronting many distribution of materials managers. There are many notable advantages for using slipsheets. Foremost of course is the extreme lower capital investment in supplies. Wooden pallets currently cost approximately \$7.50 each. The current price quotation for slipsheets is 48.5¢ each. Let's review some other considerations.

Obviously, slipsheets are designed to be expendable once they leave the shipping point. However, many firms reuse slipsheets within their warehouse operation. Experience

dictates that using wooden pallets is a better method for intra-plant/warehouse handling. But, to maintain the unit handling integrity and cost savings, slipsheets are much better in an open distribution loop (when shipping to customers or public warehouses, etc.). The reason for this is that it is often difficult and costly to handle and arrange for the return of wooden pallets to the original shipping point.

We have calculated an outright loss of approximately 15% of the pallets we release when participating in the so-called "pallet exchange" programs. Further, of those which are returned, 29.8% require repairs before reuse. Why are these percentages so large? There are many reasons for this. But, principally, two main explanations surface repeatedly.

All carriers recognize the financial benefit of a revenue generating back-haul. Empty pallets require space which can be utilized for revenue traffic. As a result, pallets which may have been tendered to a carrier by a consignee in an exchange are often discarded somewhere at the expense of revenue freight. This is particularly common with motor carriers who use owner-operators. Repeated claims against the carrier for non-delivery of pallets only serves to

drive upward carrier costs and likewise freight rates.

The high percentage for returned pallet repair costs obviously results from the prudent action by receivers. If pallets are to be returned, needless to say the new and good pallets will be retained as much as possible and usually those in questionable repair will be offered for return. This in fact has been one of the major challenges encountered by the National Pallet Leasing Systems Incorporated

Michael (Mike) Pregmon, Jr. is director of distribution for Citrus Central, Inc., Orlando, Fla. A graduate of Pennsylvania State University, he holds a Bachelor of Science degree in Transportation and Logistics. In addition, he has an MBA degree from the New York Institute of Technology. Prior to his affiliation with Citrus Central, Inc., Mr. Pregmon performed as distribution manager with the McCormick & Co., Inc., Schilling Division, Salinas, California. A member of a number of professional and industry organizations, Mr. Pregmon is also adjunct professor, Graduate School of Business, Nova University, Fort Lauderdale, Fla.

Cost Comparisons

(PEP) organized a few years ago. The problem of exchanging pallets of like quality is ever present. Because of the initial cost outlay for wooden pallets, most firms must undertake a pallet repair program to extend the useful life of wooden pallets. This is a costly venture.

In the food industry, warehouse cleanliness is imperative. We have discovered a considerably greater incidence of infestation with the use of wooden pallets. This is even more prevalent when pallet exchange programs in the distribution channel are entertained. Nevertheless, this is a greater concern in dry storage warehouse operations than it is in refrigerated warehouses.

A larger number of cases can be loaded into a rail car when using slipsheets. Of the refrigeration equipped rail cars we have available to us 26.6% classified as "intermediate," and 44.8% as "jumbo."

Exhibit "A" shows the comparative heights of products stacked on wooden pallets and on slipsheets.

Note that in most cases an extra one or two tiers of cases can be added when slipsheets are used. Since the mechanical refrigeration charge by the railroads is a fixed cost per trip, the refrigeration cost per case can be reduced. Obviously, where freight tariffs provide for a per car freight charge, the cost savings are dramatic when loading cars to their full volume and weight capacities.

The important thing with slipsheet usage is that interior loading space is not sacrificed at the expense of the pallets. Yet, the load can be mechanically loaded and unloaded reducing warehouse labor costs.

There is no concern for protruding nails or damaged pallet parts which often cause damage to cases.

SLIPSHEET BENEFITS IN THE FOOD DISTRIBUTION SYSTEM

- *The use of slipsheets in the shipping operation can reduce costs considerably considering the expendable nature of the slipsheet and the uncertainty of regaining like-quality pallets in a wood pallet exchange program. Also, freight costs for manufacturers can be reduced because of the weight differential, slipsheets weighing five pounds each and wood pallets 55 lbs. each.*
- *In the warehousing operation, slipsheets can be economically stored inside to eliminate infestation concerns. The storage space required is considerably less than for pallets. Further, use of slipsheets requires a much lower investment in materials handling supplies. This is of particular concern to multi-product manufacturers or food processors who produce their entire annual output in a few weeks.*
- *Unloading time for the average freight car might be six hours for a crew of three workers, or 18 man hours. With slipsheets, it is possible to unload the car with one man using a push/pull attachment in two man hours. If pallets were used the shipper would have expended \$390 for pallets versus \$25 for slipsheets, adding to product costs.*

EXHIBIT A				
UNIT STACKING HEIGHTS				
Case Height	Total Height Stacked Two Units High		Interior RR Car Ht.	Extra Tiers when Using Sheets
	On Pallets	On Slipsheets		
8.6"	106.7"	96.7"	114.5"	2
5.00"	110.00"	100.00"	114.5"	2
10.00"	110.0"	100.0"	114.5"	1
6.37"	112.0"	102.0"	114.5"	1

Cost Comparisons

EXHIBIT B PALLET/SLIPSHEET/DUAL METHOD

For this analysis we must make the following assumptions. The average units in storage is 10,000 pallet spaces. The mean inventory turnover is three times per year – once every four months. Wooden pallets cost \$7.50 each (GMA approved type). Fiberboard slipsheets cost 48.5¢ each. Pallet repair costs \$2.50 each. Pallets shipped in an open distribution system loop results in a loss of 15%. Approximately 30% of the pallets returned to the original plant or warehouse requires repair before reuse. Pallets used on an intra-plant basis must be repaired once every two years. Useful pallet life is expected to be five years.

Wooden Pallets Only

Initial pallets purchase:		
10,000 at \$7.50 = \$75,000	\$75,000	
Inventory Turnover: Once every four months		
Loss:		
10,000 x 15% = 1,500 x \$7.50 = 11,250 x 3	33,750	
Repair:		
8,500 x 30% = 2,500 x \$2.50 = 6,375 x 3	19,125	
Effective Annual Cost		<u>\$127,875</u>

Wooden Pallets and Slipsheets

Initial pallets purchase:		\$75,000
Initial slipsheets purchased: 10,000 at 48.5¢ =		4,850
Inventory Turnover: Once every four months		
Loss:		
Pallets: (None – retained for internal use only)		
Slipsheets: \$4,850 x 2 =	9,700	
Repair:		
Pallets: 10,000 x \$1.25 =	12,500	
Effective Annual Cost		<u>\$102,050</u>

Fiberboard Slipsheets Only

Initial slipsheets purchase:		\$4,850
10,000 at 58.5¢		\$4,850
Loss:		
10,000 at 48.5¢ x 2 =	9,700	
Effective Annual Cost		<u>\$14,550</u>

First Year Cost Comparison:

Wooden pallets only	\$127,875
Dual System	102,050
Slipsheets only	14,550

Five Years Cost Comparison

	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
Pallets Only						
Beg. Yr. Pur.	\$ 75,000					
Loss	33,750	33,750	33,750	33,750	33,750	
Repair	19,125	19,125	19,125	19,125	19,125	
	<u>\$127,875</u>	<u>52,875</u>	<u>52,875</u>	<u>52,875</u>	<u>52,875</u>	\$339,375
Dual Method						
Beg. Yr. Pur.	\$ 79,850	4,850	4,850	4,850	4,850	
Loss	9,700	9,700	9,700	9,700	9,700	
Repair	12,500	12,500	12,500	12,500	12,500	
	<u>\$102,050</u>	<u>27,050</u>	<u>27,050</u>	<u>27,050</u>	<u>27,050</u>	\$210,250
Slipsheets Only						
Beg. Yr. Pur.	\$ 4,850	4,850	4,850	4,850	4,850	
Loss	9,700	9,700	9,700	9,700	9,700	
	<u>\$ 14,550</u>	<u>14,550</u>	<u>14,550</u>	<u>14,550</u>	<u>14,550</u>	\$72,750

Cost Comparisons

The use of slipsheets is more applicable to the module concept. This concept is a relatively new idea in materials handling and is gaining wider acceptance. It provides greater flexibility to minimize the labor cost for handling individual cases. Basic unit modules can be designed to fully utilize available storage or volume of space available while minimizing labor handling costs.

A vertical stack of products on slipsheets will naturally exert less weight on the bottom case layers than will a stack of products on wooden pallets. This of course results from the absence of pallet weight. Each Grocery Manufacturer Association (GMA) size pallet weighs approximately 55 pounds. A vertical column consisting of six units will provide 275 excess pounds of pressure on the bottom case layers.

Storage space requirements are considerably less for slipsheets than for a commensurate amount of pallets. The differential here is approximately 20 to 1. Therefore, slipsheets can most effectively be stored indoors.

Now let's consider some drawbacks when using slipsheets. Obviously, almost all ideas or concepts have some shortcomings. So be it with the slipsheet concept. First, the use of slipsheets requires more operator care and training. A slipsheet does not provide the forklift "bumping" surface provided by a pallet. As a result, the lift operator must carefully position the lift surface under the load and not run into the load before stopping. To do so would damage the bottom layer of cases nearest the lift.

Next, a lift operator must not push the lifting forks beyond the load depth. This is important when loading a rail car or truck because to do so would damage the unit immediately in front of the load he is positioning.

A rough or abrupt operator can easily damage the "lip" surface of the slipsheet. There are many slipsheet designs which have a reinforced lip surface. However, even these are defied by many inexperienced or oblivious operators.

Finally, a special slipsheet attachment or Push/Pull lift truck should be used. This equipment is specially designed to grip the lip surface of the slipsheet to pull the load onto or push the load from the lift plates or forks. Not all firms have this type equipment since slipsheets are not as universally used as pallets. The accompanying photos depict an example of a push/pull lift truck. Most "push/pull" attachments sell for approximately \$6,000 to \$7,000. Nevertheless, there are many makes and models competitively marketed today.

Should a load of liquid contents be damaged while loading or unloading or while in transit, the slipsheet could become saturated, which would reduce the tensile strength of the fiberboard. Slipsheets with a special laminated treatment are available which may reduce or eliminate this concern. However, this has not been a problem in the shipment of frozen juice or beverage concentrates. Storage in freezer warehouses or refrigerated rail car or trailer environment has not thus far to our knowledge reduced the effectiveness of slipsheets.



Photo shows storage of wooden pallets. Due to fire safety regulations, pallets can be stored to maximum of 20 units high.



Photo shows hundreds of slipsheets stored on pallet, providing sharp contrast to wooden pallet storage.

Cost Comparisons

For a comparison of costs for three different unit handling methods, please refer to **Exhibit "B"**. These three methods include: (1) Use of hardwood pallets only; (2) Dual method using wooden pallets and slipsheets. The wooden pallets are used only for intra-plant movements and storage. A slipsheet is placed upon each pallet before the merchandise is palletized. (3) Fiber-board slipsheets only. Based on certain materials handling experiences as stipulated in Exhibit "B", here are the relative costs amortized over a five year period:

Wooden Pallets only -\$339,375
Dual Method -\$210,250
Slipsheets only -\$ 72,750

It should be emphasized that if the inventory turnover of a firm is greater than once every four months (three times per year) the economies favoring the use of slipsheets becomes even more appealing.

Here is a comparison of some of the overall benefits of each method:

In summary, the use of either method will depend largely upon the intended application. As a generalization, the prevailing factors are cost and control. Open distribution loop channels favor slipsheet usage, while closed loop systems favor wooden pallet usage. But, this is a generalization. Many factors must be considered by the decision maker. However, it is most difficult to overlook the tremendous cost savings which a firm can realize when using slipsheets.

CONCERNS	FAVORS	
	Slipsheets	Wooden Pallets
<i>Capital Cost</i>	X	
<i>Lift Operator Training Requirements</i>		X
<i>Carrier Cube Utilization</i>	X	
<i>MHE Cost Outlay</i>		X
<i>Reusability Feature</i>		X
<i>Infestation</i>	X	
<i>Pallet Repair Cost</i>	X	
<i>Expendability</i>	X	
<i>Better for Closed Loop Systems</i>		X
<i>Better for Open Loop Systems</i>	X	
<i>Liquid Damage Retardation</i>		X
<i>Damage from Protruding Objects</i>	X	
<i>Storage Requirements Advantage (Unused Pallets vs Slipsheets)</i>	X	

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WHY GENERAL FOODS CONVERTED TO SLIPSHEETS

After months of intensive research and testing, General Foods began a conversion process that was to eliminate more than 350,000 wood pallets from its distribution system through a changeover wherever feasible to slipsheets.

*By C.W. Ebeling
Methods and Facilities
Development Manager,
General Foods Corporation*

General Foods began the first major unitized shipping program in the food industry 16 years ago. It represented the culmination of several years of planning and testing alternative unitized shipping methods. Many different kinds of pallets, both returnable and one-way types, had been tried during the testing period along with multi-tine and slipsheet palletless methods.

The 48" x 40" four-way wooden pallet emerged as the preferred unitized shipping method at the time for several reasons. It was relatively low cost. Good hardwood pallets could be purchased for less than \$3.00 each and lasted up to three years of use. Cost per trip was in the 10¢ to 15¢ range. It was flexible in that it could be shipped either in railcar or truck and was capable of being handled by fork lift trucks from all sides and by relatively low cost pallet jacks and walkies from two sides.

Implementation of an industry wide unitized program overwhelmingly favored the pallet method at the time. Most of fork lift trucks and used pallets for storage of products in their warehouses. Few, however, had slipsheet attachments then. Out customers liked the palletized method. Quick turnaround of equipment on the docks appealed to them and many extended the concept all the way to their retail store deliveries.

By 1974, approximately 65% of our volume moving between plants and the field warehouses was palletized and 75% of the volume shipped from the field warehouses to customer terminals was palletized. Had this volume been shipped non-unitized, annual labor costs to load and unload piece by piece would have increased over 4 million dollars a year and customers costs to receive General Foods' products across their docks, over 2 million dollars a year.

Despite the fine record of achievement for palletized shipping during the early years of the program, the quality of the pallets began to deteriorate as shipping volumes grew and the pallet exchange pool expanded to include a large number of other shippers and customers. It became more and more difficult to obtain good hardwood pallets to the original specifications established for the program and it became virtually impossible to keep up with pallet repairs.

The problems of pallet quality in an exchange pool became apparent as early as 1965. In order to reduce dependence upon the number of

The obvious space-saving advantage of using slipsheets was a major factor in General Foods' change to slipsheets



At a General Foods plant, a push/pull attachment handles slipsheet loads of Kool-Aid product. The investment required to equip trucks with attachments to handle slipsheet loads was offset by General Foods through reduction in pallet costs and benefits from increased storage and shipping space.

pallets required in the system, General Foods inaugurated a clamp program that year for the handling and storage of a large number of the products that were clampable. That took a sizable number of pallets out of the warehouses but had no effect on the number required for shipments between plants and warehouses and customer terminals. In subsequent years more products were made clampable by shrink wrapping methods until by 1976 about 50% of the throughput volume was handled by clamps. Although very effective for storage, the use of clamps for shipping is limited. The problem is at the unloading ends since maintenance of voids around the clampable loads to permit entry of clamp pads is difficult to maintain in transit. That, along with the high cost of pre-packing loads for clampable handling, (many loads require film wrapping) discouraged the idea of going to an all clamp program.

By the end of 1976, the need to do something about the problems with pallets had become more urgent than ever. The cost of new pallets had doubled as had the costs of repair. Few pallets lasted even a year and cost per pallet trip was in the area of \$1.00 each. Industry efforts to control the quality of pallets in the exchange system were not proving to be successful. Problems of sanitation increased with general deterioration of the pallets in the pool and damage to products caused by broken boards and protruding nails became common.

With the onset of the energy crisis and demand for high utilization of transportation equipment, carriers realized that pallets were taking

considerable space and displacing room for revenue producing payload. (See photo comparing stack of 56 pallets, the number in a rail car, vs. a stack of 56 slipsheets.) The free return of pallets in rail cars was under questions. Without that privilege the cost per pallet was expected to increase about \$1.20 each trip in order to return the pallets.

General Foods then took another look at the prospect for the disposable slipsheet. By 1976, several large manufacturers had converted to slipsheets for rail shipments and most of our customers had equipped their rail docks with slipsheet handling equipment.

In the beginning, we had a number of concerns about the use of slipsheets. These were:

■ ***Handling efficiency in relation to pallets—***

Pallets, despite their problems are a simple handling device. We expected some loss of productivity in a conversion to slipsheet handling and storage but were not sure just how much.

■ ***High stacking on slipsheets on warehouse floors appeared to be especially difficult if at all feasible—***

It is easy to run forks into a pallet and pull off a load 15 feet or more high, and it is a simple matter to move clamp pads around top loads, but the idea of gripping a sheet under a top load and pulling it onto an attachment without pulling the entire stack over was expected to create problems.

■ A survey of our customers indicated that although just about all of them had slipsheet equipment on rail docks and would participate in

a slipsheet rail program, few felt ready to accept deliveries of slipsheet loads in trailers across their rail docks. There were different reasons for this, probably the most common being that there was no simple handling equipment the equivalent of pallet walkies to extract slipsheet loads from trailers.

■ A substantial capital investment was expected in order to convert automatic palletizers to slipsheet unitizing and to provide slipsheet attachments for the lift trucks. In some cases it would be necessary to replace lift trucks that did not have sufficient counter weight capacity for installation of a slipsheet attachment that weighs nearly a ton and still carry the required payloads.

The concerns listed above were handled as follows:

■ In order to establish productivity of slipsheets vs. pallets, we carried out a long series of test shipments and a pilot storage operation. In the process, the importance of special handling techniques and operator training were found to be especially critical to minimizing handling penalties. Our field operations people produced a training film and manual and provided copies to each field location. They converted one warehouse completely to the palletless methods and used it as a central slipsheet training center for supervisors from 34 other warehouse and plant locations.

■ The problem of high stacking the slipsheet loads was solved partly by training in the technique, but also by improved stabilization of the slipsheet loads. Where justifiable, shrink or stretch film wrapping is by far the most efficient form of load stabilization.

The use of palletizing adhesives proved to be both cost and performance effective for a number of the products. A liquid type glue is used that loses its tensile strength after a couple of days thereby making cases easy to lift off on receiving ends. It maintains shear resistance, however, thereby stabilizing the loads for ship-ping and for handling in high stacks.

■ It was recognized that customers receiving by trailers, (roughly 50% of our outbound shipments from field warehouses) would want to continue to receive on pallets for some time, at least until some simple handling equipment is developed that will extract slipsheet loads as effectively as do hand walkie trucks with pallet loads. Our immediate objective became one of minimizing the number of pallets in the system and doing all we could to get a slipsheet low lift truck developed for the future. In the meantime, loads stored on slipsheets and clamp loads are simply placed on to the pallets for outbound shipments via trailers.

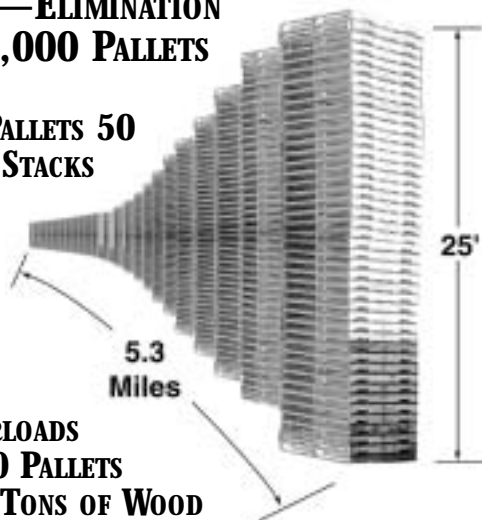
■ The capital investment necessary to convert plant equipment to unitize on slipsheets and to provide slipsheet attachments and new trucks where needed, was justified by the reduction of pallet costs, and the benefits from higher density storage and shipping of many of the products.

The conversion to slipsheets was started early in 1977, and is now nearing completion at all locations. The number of pallets being eliminated from the system exceeded original projections of 350,000. The accompanying drawing gives an idea of how big a pile of wood that many pallets represents. If you place the empty pallets in stacks 50 high each

IMPACT—ELIMINATION OF 350,000 PALLETS

EMPTY PALLETS 50 HIGH IN STACKS

650 CARLOADS
350,000 PALLETS
16,000 TONS OF WOOD



The illustration shows the impact of the conversion to slipsheets at General Foods. More than 350,000 wood pallets have been eliminated from the system. Stacked 50 high, that amount would represent a wall of pallets 25 feet high and 5.3 miles long. The total weight would come to 16,000 tons.

and the place the stacks end to end, you have a wall of wood 25 feet high and 5.3 miles in length. It amounts to approximately 16,000 tons of wood that are no longer needed to get our products to market.

To sum it all up, UNITIZED SHIPPING is essential to cost effective handling and shipping in the food industry. The wooden pallet, the mainstay method of unitized shipping over many years that contributed so much to economical handling and shipping and which was such a simple and effective device to use, ran into changing conditions occasioned by growing shipping volumes and the difficulties of controlling their quality of returnable pallets in a vary large pallet exchange pool.

We at General Foods, feel that disposable slipsheets are better suited to today's needs and conditions, and, despite the concerns and the difficulties of converting a long standing unitized system based upon use of wooden pallets, believe that a substantial part of unitized shipping volume must be converted to slipsheets if the food industry is to continue to receive the benefits of unitized handling in the future.

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PALLET VERSUS SLIPSHEET COSTS COMPARISON

Pallet System – Data Required

- | | |
|---|-------|
| 1. Number of units shipped | _____ |
| 2. Cost per pallet | _____ |
| 3. Number of pallets owned | _____ |
| 4. Average pallet life | _____ |
| 5. Cost of money in percent | _____ |
| 6. Average weight of outbound freight | _____ |
| 7. Weight of pallets | _____ |
| 8. Cost of pallet return freight | _____ |
| 9. Total pallet repair cost annually | _____ |
| 10. Time required to store and remove loads from storage | _____ |
| 11. Time required to stage and load with pallets | _____ |
| 12. Labor rates | _____ |
| 13. Time to unload and return pallets, inspect, sort and administrate | _____ |

FORMULA (*Store & Ship on Pallets*)

Cost per pallet x No. of Pallets Owned ÷ Average Pallet Life = Annual Replacement Pallet Expense

_____ x _____ ÷ _____ = _____

Cost per pallet x No. of Pallets Owned x Cost of \$ Percent = TOTAL Interest of Expense

_____ x _____ x _____ = _____

Total Pallet repair cost annually = TOTAL Pallet Repair Costs

_____ = _____

No. of Units shipped x Weight of Pallets x Average Cost of Outbound Freight = TOTAL Freight Costs to Ship Pallets

_____ x _____ x _____ = _____

Work Sheet

FORMULA (*Store & Ship on Pallets*) (cont.)

Number of units shipped	x	Weight of Pallets	x	Average Cost of In-bound Returned Frght.	=	TOTAL Freight Costs to Return Pallets
_____	x	_____	x	_____	=	_____
Time to Unload and Return Pallets, Inspect, Sort and Administrate	x	Number of Loads	x	Labor Rates	=	Pallet Exchange Expense
_____	x	_____	x	_____	=	_____
Time required to Store and Remove Load from Storage	x	Number of Loads	x	Labor Rates	=	TOTAL Labor Cost to Store and Remove from Storage
_____	x	_____	x	_____	=	_____
Time required to Stage and Load with Pallets	x	Number of Loads	x	Labor Rates	=	TOTAL Labor Cost to Stay and Load
_____	x	_____	x	_____	=	_____
TOTAL COST TO SHIP ON PALLETS					=	_____
TOTAL COST TO SHIP ON PALLETS	÷	NUMBER OF LOADS			=	COST PER LOAD
_____	÷	_____			=	_____

PALLET VERSUS SLIPSHEET COSTS COMPARISON

Additional items not included but should be considered when comparing slipsheets to wood pallet handling

1. Fire insurance for pallets
2. Pallet shortages due to the pallet float
3. Space occupied by pallet versus used for product can be up to 10%
4. Damage caused by pallets – broken deck boards, over or underhang of product, nails, etc.
5. Sanitation: The FDA is inspecting pallets for rodent leavings with black lights.
6. Pallet returns interior to those shipped
7. Storage space required for pallets versus slipsheets – 100 slipsheets stored is the same as 1 pallet
8. Potential future shortage of pallets and increasing costs
9. Safety

PALLET VERSUS SLIPSHEET COSTS COMPARISON

Slipsheet System – Data Required

- 1. Number of loads _____
- 2. Cost of slipsheets _____
- 3. Cost of slipsheet dispenser _____
- 4. Slipsheet dispenser average life _____
- 5. Slipsheet dispenser number of units required _____
- 6. Cost of load push/pull _____
- 7. Load push/pull average life _____
- 8. Load push/pull number of units required _____
- 9. Time to store and remove load
from storage on captive pallet _____
- 10. Time to stage and load with slipsheets _____
- 11. Labor rate _____
- 12. Cost of captive pallet _____
- 13. Number of captive pallets _____
- 14. Average life of captive pallets _____
- 15. Cost of Money _____
- 16. Pallet repair of captive pallets _____

Work Sheet

FORMULA (Store on Captive Pallets – Ship on Slipsheets)

Number of Loads Shipped	x	Cost of Slipsheets		=	TOTAL Slipsheet Expense	
_____	x	_____		=	_____	
Cost of Slipsheet Dispenser	x	Number of Units Required	÷	Average Life	=	Annual Capital Expense for Slipsheet Dispenser
_____	x	_____	÷	_____	=	_____
Cost of Load Push/Pull	x	Number of Units Required	÷	Average Life	=	Annual Capital Expense for Load Push/pulls
_____	x	_____	÷	_____	=	_____
Time to Store and Remove Load from Storage on Captive Pallet	x	Number of Loads	x	Labor Rate	=	TOTAL Labor Cost to Store and Remove Loads from Storage
_____	x	_____	x	_____	=	_____
Time to Stage and Load with Slipsheets	x	Number of Loads	x	Labor Rate	=	TOTAL Labor Cost to Store and Remove from Storage
_____	x	_____	x	_____	=	_____
Cost of Captive Pallets	x	Number of Captive Pallets	÷	Average Life of Captive Pallets	=	Annual Captive Pallet Replacement Cost
_____	x	_____	÷	_____	=	_____
Cost of Captive Pallets	x	Number of Captive Pallets	x	Cost of Money	=	TOTAL Interest Expense
_____	x	_____	x	_____	=	_____
Pallet Repair of Captive Pallets					=	TOTAL Repair of Captive Pallets
					=	_____
TOTAL COST TO STORE ON CAPTIVE PALLETS & SHIP WITH SLIPSHEETS					=	_____
TOTAL COST TO STORE ON CAPTIVE PALLETS & SHIP WITH SLIPSHEETS					÷	Number of Loads
					=	COST PER LOAD
_____					÷	_____
					=	_____
SUMMARY		PER LOAD		SAVINGS PER LOAD		TOTAL SAVINGS
Pallets Only						
Captive Pallets & Slipsheets		_____		_____		_____

PALLET VERSUS SLIPSHEET COSTS COMPARISON

Optional methods to consider in storing & shipping unitized loads:

1. Store on slipsheet and ship on slipsheets
 2. Store products that are clampable with carton clamps – the balance on slipsheets on captive pallets and ship on slipsheets
-

Because of problems associated with pallets and pallet exchange programs, the food industry is accelerating its transition for handling products either on slipsheets or palletless. The key to a successful program is proper initial planning including:

1. Education of top management
2. Training of lift truck drivers
3. Proper equipment
4. Establishing a test location to develop a successful slipsheet material handling system that will enable personnel within your company to become familiar with the requirements of slipsheet handling prior to expanding it to all of your shipping and receiving locations.

PALLET VERSUS SLIPSHEET COSTS COMPARISON

Pallet System – Data Required

1. Number of units shipped	450,000
2. Cost per pallet	\$8.50
3. Number of pallets owned	300,000
4. Average pallet life	3 years
5. Cost of money in percent	12%
6. Average weight of outbound freight	40,000 lbs.
7. Weight of pallets	292,500
8. Cost of pallet return freight	\$1.00
9. Total pallet repair cost annually	\$100,000
10. Time required to store and remove loads from storage	4 min.
11. Time required to stage and load with pallets	2 min.
12. Labor rates	\$9.00/hr.
13. Time to unload and return pallets, inspect, sort, and administrate	.24 min.

Work Sheet

FORMULA (*Store and Ship on Pallets*)

Cost per Pallet x Number of Pallets Owned ÷ Average Pallet Life = Average Replacement Pallet Expense

\$8.50 x 300,000 ÷ 3 years = \$850,000

Cost per Pallet x Number of Pallets Owned x Cost of \$ Percent = TOTAL Interest of Expense

\$8.50 x 300,000 x 12% = \$306,000

Total Pallet repair cost annually = TOTAL Pallet Repair Costs

\$100,000 = \$100,000

Number of units shipped x Weight of Pallets x Average Cost of Outbound Freight = TOTAL Freight Costs to Ship Pallets

450,000 x 65 lbs. x \$1.00 cwt = \$292,000

Number of units shipped x Weight of Pallets x Average Cost of Inbound Freight = TOTAL Freight Costs to Return Pallets

450,000 x 65 lbs. x \$1.00 cwt = \$292,000

Time to Unload and return Pallets, Inspect, Sort and Administrate x Number of Loads x Labor Rates = Pallet Exchange Expense

.24 min. x 450,000 x \$.15/min (\$9.00/hr.) = \$16,200

Time required to Store and Remove Load from Storage x Number of Loads x Labor Rates = TOTAL Labor Cost to Store and Remove from Storage

4 min. x 450,000 x \$.15/min (\$9.00/hr.) = \$270,000

Time required to Stage and Load with Pallets x Number of Loads x Labor Rates = TOTAL Labor Cost to Stage and Load

2 min. x 450,000 x \$.15/min (\$9.00/hr.) = \$135,000

TOTAL COST TO SHIP ON PALLETS = _____

TOTAL COST TO SHIP ON PALLETS ÷ Number of Loads = COST PER LOAD

\$2,261,200 ÷ 450,000 = \$5.02

PALLET VERSUS SLIPSHEET COSTS COMPARISON

Additional items not included but should be considered when comparing slipsheets to wood pallet handling

1. Fire insurance for pallets
2. Pallet shortages due to the pallet float
3. Space occupied by pallet versus used for product can be up to 10%
4. Damage caused by pallets – broken deck boards, over or underhang of product, nails, etc.
5. Sanitation: The FDA is inspecting pallets for rodent leavings with black lights.
6. Pallet returns interior to those shipped
7. Storage space required for pallets versus slipsheets – 100 slipsheets stored is the same as 1 pallet
8. Potential future shortage of pallets and increasing costs
9. Safety

PALLET VERSUS SLIPSHEET COSTS COMPARISON

Slipsheet System – Data Required

1. Number of loads	450,000
2. Cost of slipsheets	\$.70
3. Cost of slipsheet dispenser	\$30,000
4. Slipsheet dispenser average life	10 years
5. Slipsheet dispenser number of units required	5
6. Cost of load push/pull	\$7,000
7. Load push/pull average life	5 years
8. Load push/pull number of units required	10
9. Time to store and remove load from storage on captive pallet	4 min.
10. Time to stage and load with slipsheets	4 min.
11. Labor rate	\$.15/min. (\$9.00/hr.)
12. Cost of captive pallet	\$20
13. Number of captive pallets	50,000
14. Average life of captive pallets	5 years
15. Cost of Money	12%
16. Pallet repair of captive pallets	\$120,000

Work Sheet

FORMULA (Store on Captive Pallets – Ship on Slipsheets)

Number of Loads Shipped	x	Cost of Slipsheets		=	TOTAL Slipsheet Expense
450,000	x	\$.70		=	\$315,000
Cost of Slipsheet Dispenser	x	Number of Units Required	÷	Average Life	= Annual Capital Expense for Slipsheet Dispenser
\$30,000	x	5	÷	10 years	= \$15,000
Cost of Load Push/Pull	x	Number of Units Required	÷	Average Life	= Annual Capital Expense for Load Push/pulls
\$7,000	x	10	÷	5 years	= \$14,000
Time to Store and Remove Load from Storage on Captive Pallet	x	Number of Loads	x	Labor Rate	= TOTAL Labor Cost to Store and Remove Loads from Storage
4 min.	x	450,000	x	\$.15/min. (\$9.00/hr.)	= \$270,000
Time to Stage and Load with Slipsheets	x	Number of Loads	x	Labor Rate	= TOTAL Labor Cost to Store and Remove from Storage
4 min.	x	450,000	x	\$.15/min. (\$9.00/hr.)	= \$270,000
Cost of Captive Pallets	x	Number of Captive Pallets	÷	Average Life of Captive Pallets	= Annual Captive Pallet Replacement Cost
\$20	x	50,000	÷	5 years	= \$200,000
Cost of Captive Pallets	x	Number of Captive Pallets	x	Cost of Money	= TOTAL Interest Expense
\$20	x	50,000	x	12%	= \$120,000
Pallet Repair of Captive Pallets					= TOTAL Repair of Captive Pallets
TOTAL COST TO STORE ON CAPTIVE PALLETS & SHIP WITH SLIPSHEETS					= \$1,204,000
TOTAL COST TO STORE ON CAPTIVE PALLETS & SHIP WITH SLIPSHEETS					÷ Number of Loads = COST PER LOAD
\$1,204,000			÷	450,000	= \$2.67
SUMMARY		PER LOAD		SAVINGS PER LOAD	TOTAL SAVINGS
Pallets Only		\$5.03		Base \$.00	Base \$.00
Captive Pallets & Slipsheets		\$2.67		\$2.36	\$1,062,000

PALLET VERSUS SLIPSHEET COSTS COMPARISON

Optional methods to consider in storing & shipping unitized loads:

1. Store on slipsheet and ship on slipsheets
2. Store products that are clampable with carton clamps – the balance on slipsheets on captive pallets and ship on slipsheets

Because of problems associated with pallets and pallet exchange programs, the food industry is accelerating its transition for handling products either on slipsheets or palletless. The key to a successful program is proper initial planning including:

1. Education of top management
2. Training of lift truck drivers
3. Proper equipment
4. Establishing a test location to develop a successful slipsheet material handling system that will enable personnel within your company to become familiar with the requirements of slipsheet handling prior to expanding it to all of your shipping and receiving locations.

SLIPSHEETS VS. PALLETS: THE DECISION MAKING PROCESS

There are many considerations, and considerable analysis that has to be performed, prior to a determination by a company, as to whether or not slipsheets should replace long standing pallet programs, either partially or totally.

There are comparisons and evaluations that must precipitate any major conversion of this nature. What is helping stimulate this thinking process is the abnormally high cost of pallets.

While it is true that slipsheets do not have the rigidity of a wooden pallet, there are other considerations that must be examined in the potential developmental process. The internal combustion engine and the airplane were not booming successes the first time out. Proper, sound economic reasoning must prevail, in order to determine not only the financial soundness of a program of this magnitude, but all the ramifications that are contingent to a program of this scope.

Savings are not the sole purpose, although they bear a considerable reason to go into a slipsheet program. I have broken down this comparison into two categories:

I. GENERAL COMPARISONS:

Pallets vs. Slipsheets, and

II: COST COMPARISONS:

Pallets vs. Slipsheets.

I. General Comparisons: Pallet vs. Slipsheets

1. Costs:

Wooden pallets range in cost from \$4.00 to \$13.00 depending upon availability of woods and geographical nature of use. Slipsheets range from 37¢ to 50¢; and a plastic slipsheets from \$1.75 to \$2.50 each.

2. Maintenance Costs:

Wooden pallets cost anywhere from \$2.20 per year for plywood (estimated 7 year life) to \$2.74 per year for board (estimated 4 year life). Currently most companies lost pallets with regularity and for other reasons, which will be covered in another section of this paper.

3. Storage:

Taking into account the value of storage space, for every pallet stored, 50 to 100 slipsheets (depending upon thickness-caliper) can be stored in the same space.

4. Space Savings:

As shown in the comparison, 10% additional storage space can be gained.

5. Freight Costs:

Wood pallets weigh approximately 65 pounds. Assuming a 40 unit load of low cube pallets were shipped.

This would mean that 2,600 pounds of pallets have to be paid for in freight. If the cost per hundred weight were \$1.00, the freight cost does not include the pallets is \$26.00. This freight cost does not include the pallet back haul expense. Slipsheets weigh about 3 pounds a piece; translated to the same freight rate that would be 120 pounds at \$1.00 per hundred weight, only making it \$1.20 extra per the slipsheets.

6. Payload:

It is feasible to measure your payload space 10% on rail cars, trucks, and on containers.

7. Safety:

Wood pallets weighing about 65 pounds can cause back injury, splinters, foot injury, and completely recyclable, and offer the characteristics of being a salable item.

8. Disposal:

Wood pallets are not recyclable, but are repairable. Slipsheets are completely recyclable and offer the characteristic of being a salable item.

9. Damage to product:

In the handling and storage of products, damage must be considered. Wooden pallets cause damage. Loose nails and splinters gouge and tear cartons. Loads can settle

Slipsheets vs. Pallets

Once this basic data has been collected, the final analysis begins. These are specific formulas that collected data is then put through as you can see by visual material. The economic justification of a program of this scope is no different than any other economic justification that you go through, albeit, machinery, lift trucks, etc.

How the program is presented to management is also an important factor. No matter how good the numbers may be, programs still have to be sold. Only you can be the judge of that.

9. **Damage to product *cont.*:**

and become deformed through overhang and broken or mission deckboards. Second tier pallets can partially crunch lower pallets of product. Slipsheets do not cause damage if properly handled. Slipsheets offer still another advantage.

10. **Return Program:**

The elimination reduction of wooden pallets greatly reduces the cost in pallet return programs.

These costs include:

- Pallets returned are inferior to those shipped
- Return shipping costs
- Storage space for consolidated shipments
- Bookkeeping of pallet exchange
- Lost pallets
- Storing of pallets

Other considerations in the conversion to slipsheet handling should include:

- Fire insurance cost for pallets
- Sanitation – infestation of pallets

What must also be considered is the economics of converting into a program of this magnitude.

II. **General Comparisons: Pallet vs. Slipsheets**

In the course of performing this analysis, there is both pallet system – data and slipsheet system – data required.

Pallet system – data required

1. Number of units shipped
2. Cost per pallet
3. Number of pallets owned
4. Average pallet life
5. Cost of money in percent
6. Average weight of outbound freight
7. Weight of pallets
8. Cost of pallet return freight
9. Total pallet repair cost annually
10. Time required to store and remove loads from storage
11. Time required to stage and load with pallets
12. Labor rates
13. Time to unload and return pallets, inspect, sort, and administrate

II. General Comparisons:

Pallet vs. Slipsheets *cont.*

Slipsheet system – data required

1. Number of loads
2. Cost of slipsheets
3. Cost of slipsheet dispenser
4. Slipsheet dispenser average life
5. Slipsheet dispenser number of units required
6. Cost of load push/pull
7. Load push/pull average life
8. Load Push/pull number of units required
9. Time to store and remove load from storage on captive pallet
10. Time to stage and load with slipsheets
11. Labor rates
12. Cost of captive pallet
13. Number of captive pallets
14. Average life of captive pallets
15. Cost of money
16. Pallet repair of captive pallets

REQUIREMENT FOR DEVELOPING A SUCCESSFUL SLIPSHEET PROGRAM

(Palletless Handling System)

1. Top management approval
2. Sales and marketing impact
3. Customer education
4. Traffic involvement
5. Distribution engineering & development
6. Manufacturing planning
7. Hourly personnel training
8. Implementation
9. Follow-up
10. Audit savings

I. TOP MANAGEMENT APPROVAL

1. Explanation:
Slipsheets vs. pallets
2. Economics & advantages
3. Impact this will have on business units
4. Industry trends in the 1980's
5. Progress & Communications on program

II. SALES & MARKETING IMPACT

1. Advantages to company
2. Advantages to customer
3. Advantages to carrier
4. Solicit assistance in selling program to customers
5. Industry trends in 1980's

III. CUSTOMER EDUCATION – DATA BASE

1. Impact on customers operations
 - 1.1 Material handling equipment
 - 1.2 Product handling
 - 1.3 Slipsheet capacity
 - 1.4 Storage & staging
 - 1.5 Order selection
 - 1.6 Dock configuration
 - 1.7 Work rules for carrier drop off
2. Advantages of slipsheet program
3. Pallet problems

IV. TRAFFIC INVOLVEMENT

1. Customer coordination
2. Carrier responsibility
3. Product liability
 - 3.1 In house carrier
 - 3.2 Outside carrier
4. Slipsheet program indoctrination
5. Rate analysis & revision

V. DISTRIBUTION ENGINEERING & DEVELOPMENT

1. Slipsheet indoctrination
 - 1.1 Customers
 - 1.2 Carriers
 - 1.3 Management & other company personnel
2. Material handling equipment testing
3. Slipsheet testing
4. Stretch wrap machinery and film testing
5. Customer analysis – physical facilities & equipment
6. Distribution center analysis
7. Systems planning
8. Pallet tiering & carton analysis (compac) (manufacturing)
9. Justification and cost savings analysis
10. Equipment purchase or lease
11. Personnel training
12. Program implementation
13. Program follow-up
14. Savings audit

VI. MANUFACTURING PLANNING

1. Revise automatic palletizing equipment
2. Revise pallet tiering heights
3. Adapt material handling equipment

Slipsheets vs. Pallets

HANDLING METHOD— SHIPPING MODE

INTERNATIONAL SHIPMENTS

- plant to warehouse
- warehouse to warehouse

	PALLET	SLIPSHEET	DEADPILED
RAIL	40%	55%	5%
TRUCK	90%	10%	

OUTBOUND SHIPMENTS:

- plant to customer
- warehouse to customer

	PALLET	SLIPSHEET	DEADPILED
RAIL	25%	70%	5%
TRUCK	60%	5%	35%

PERCENT OF CASE SHIPMENTS

Rail	16%
Common carrier	50%
Contract carrier	9%
Company fleet	17%
Backhaul	8%
TOTAL	100%
Pallet	38%
Slipsheet	22%
Deadpile	40%
TOTAL	100%

SLIPSHEET COST ANALYSIS

INITIAL PURCHASE COST (EACH)

Annual usage/cost

Cost per pallet x number pallets owned + avg. lift

8.00 x 10,000 + 2 years =

Repair costs (avg. 25% of orig. cost)

(25% x 8.00 x 10,000)

Storage

Warehouse cube loss

Special handling equipment

Pallet forks: 400 + 5 yr. life

Push/Pull: 10,000 + 5 yr. life

Administration expenses

(ordering, recordkeeping, pallet expediting, claims and returns)

Tare weight freight cost

(\$1.50 cwt) Pallets at 50 lbs.

\$1.50 cwt x 50# x 30,000 slipsheets at 3 lbs

Pallet return freight cost

Transportation cube loss

Empty pallet handling (receiving, storing, sorting, retrieval)

Labor costs (loading, warehousing, unloading, staging)

TOTAL ANNUAL COST

Total unit loads shipped annually

Cost per unit load

	PALLETS	SLIPSHEETS
INITIAL PURCHASE COST (EACH)	\$ 8.00	\$.80
Annual usage/cost		
Cost per pallet x number pallets owned + avg. lift		
8.00 x 10,000 + 2 years =	40,000	24,000
Repair costs (avg. 25% of orig. cost)		
(25% x 8.00 x 10,000)	20,000	-0-
Storage	*	Insig.
Warehouse cube loss	*	Insig.
Special handling equipment		
Pallet forks: 400 + 5 yr. life	80	
Push/Pull: 10,000 + 5 yr. life		2,000
Administration expenses		
(ordering, recordkeeping, pallet expediting, claims and returns)	*	Insig.
Tare weight freight cost		
(\$1.50 cwt) Pallets at 50 lbs.		
\$1.50 cwt x 50# x 30,000 slipsheets at 3 lbs	22,500	1,350
Pallet return freight cost	*	-0-
Transportation cube loss	*	Insig.
Empty pallet handling (receiving, storing, sorting, retrieval)	*	Insig.
Labor costs (loading, warehousing, unloading, staging)	*	Insig.
TOTAL ANNUAL COST	\$ 82,580	\$ 27,350
Total unit loads shipped annually	\$ 30,000	\$ 30,000
Cost per unit load	\$ 2.75	\$.91

**Additional costs to be considered*

PUSH/PULL & SLIPSHEET HANDLING MANUAL

Case Histories & Industry Utilization

SLIPSHEETING THE WORLD— APPLE COMPUTERS

OBJECTIVES

1. Reduce loading and unloading labor.
2. Eliminate expensive wooden pallet costs.
3. Reduce transportation cost by better utilization of the Transporting Equipment Spec. (trailer/container).

ANNUAL VOLUME OF UNIT LOADS

Annual unit load volume of over 160,000.

TOTAL INVESTMENT

Equipment and start-up slipsheet cost of \$200,000.

REQUIREMENTS FOR SUCCESS

1. High quality slipsheet.
2. High quality push/pull attachments.
3. Design of specifications for quality of unit loads.
4. Extensive operator training program.
5. Identification of the Implementation and Support Team.
6. Dedicated team for strong internal and external communications.

RESULTS

1. 78% reduction in pallet cost. Annual savings in excess of \$500,000.
2. 75% reduction in unloading labor. Annual savings in excess of \$500,000.
3. 20% reduction in transportation costs. Annual savings in excess of \$1,000,000.

Total annual savings forecasted to be in excess of \$2.5 million in the first year of full implementation.

IMPLEMENTATION

Progress up to date:

- 85% of unit loads handled on slipsheets in one year from the start of program.
- Additional 5% will be implemented by August 88.
- 10% of unit loads will be less than container/trailer loads and will continue to be shipped on wooden pallets.

HIGHLIGHTS OF THE PROGRAM

- Apple is the first Electronics Corporation to implement this material handling method worldwide.
- The flow of slipsheeted unit loads start from Manufacturing to Distribution and end at freight carriers.

- Apple has the capability of shipping and receiving slipsheeted loads worldwide (except 3 European locations —implementation targeted for July 88).
- Establishment of a high quality Slipsheet Standard for Electronics Industry.
- Use of Cascade push/pull equipment worldwide.

**Apple Slipsheet Program
Overview – May 19, 1988**

CASCADE PLAYS KEY ROLE IN WORLDWIDE DISTRIBUTION PROGRAM FOR APPLE COMPUTER

More often than managers realize, the existence of an effective major account program is absolutely essential to obtaining major new business. The story below tells how the marketing staff of Cascade Corporation was able to participate in the Apple Computer distribution team that revolutionized the way Apple handles and ships its products. Moreover, Apple's success in the switch from wooden pallets to unit loads on slipsheets has implications for the entire electronics industry. It's a classic case history of national account marketing in action.

We change the way people think," says Dale Spenner, manager of distribution engineering for Apple Computer at Apple's headquarters in Cupertino, California. "We've changed the way people think about personal computers. Now we have a chance to change the way the electronics industry thinks about materials handling in shipments from suppliers and to customers. It's an important development we can all benefit from.

Dale Spenner is talking about an 18-month program at Apple for changing its entire supply train to unit-loads on slipsheets, which eliminate the cost of wooden pallets and make better use of available space in trucks, railcars, and ships. The company has already passed its initial goal of 90 percent utilization of slipsheeting throughout the Apple system and believes it will

reach 95 percent compliance from suppliers. What's more, the slipsheet concept is expanding beyond delivery of finished components from OEM suppliers to incoming piece goods and to Apple's own shipments to computer buyers. Sony Corporation, which manufactures monitors for Apple, is investigating slipsheeting for its distribution network. It seems that the folks at Cascade who played a key role in Apple's program may have touched off a small revolution in the electronics business.

Benefits. What are the benefits of slipsheeting, exactly? Well, in a word, they're impressive. Apple saved \$2.5 million in distribution costs during the first year of full implementation on an investment of \$200,000 in equipment and startup costs. In figuring these amounts, Dale Spenner says he made "the costs high and the savings low to get a very conservative measure of benefits.

Apple's savings come mainly from the elimination of wooden pallets, which accrue repair and disposal expenses in addition to their initial cost, and better use of transit vehicle space. With slipsheet handling, the pallet is replaced by a corrugated, solid fiber, or plastic sheet. A "load push/pull" attached to the front of a fork lift grips the edge of the sheet and pulls the load onto the truck's platens, which serve as the load base during transport.

"Savings involve cost avoidance because you don't have to handle product on a piece by piece basis," Spenner points out. "We don't ever expect to go back to pallets so these savings are permanent."

SPOC. Spenner says that another factor in the success of slipsheeting is a new Apple unitload system called SPOC: Shipping, Planning, Operations Control. Instead of picking a series of individual components to fill an order—1 monitor, 1 CPU, 1 printer—Apple's system will call for, say, 15 unit loads of printers, 30 of CPUs and 30 of monitors. The SPOC system then provides shipping labels with instructions for sorting the unit loads correctly to fill individual orders.

But who does the sorting? For that, Apple sought assistance from truckers. "We negotiated with the freight forwarders to have them break down and sort the unit loads in their warehouses," Spenner explains. "The forward thinking carriers realized it would be to their advantage to know how to handle slipsheeting when working with other customers. Those carriers that cooperated with our program are getting additional business from other companies that use slipsheeting."

Simple, but. . . Apple's program may sound simple, and it is—until you consider what's involved in modifying a worldwide distribution system from pallets to slipsheets; a system stretching from Singapore to Europe to Silicon Valley, USA. Here's where Cascade's major account program proved to be essential. Cascade's David Spencer tells the story.

"Apple had looked at slipsheeting in 1984 and decided it was the way to go, though the company wasn't ready for implementation. Then in 1987 Apple decided to make the change. Its distribution people believed it was a prerequisite to work with a supplier that could be

a member of the Apple team during implementation. And Cascade had the right kind of organization.

“There were at least 10 of our people heavily involved,” Spencer continues. “Myself, Andy Anderson, Mark Sonda in Japan and his sales manager, our European representative, and the local Cascade person at each of the locations where slipsheeting was implemented.

“Initially Apple suppliers looked at slipsheeting with skepticism. They asked, ‘if it’s such a good idea, why hasn’t it been done before?’ A number of objections had to be overcome. It was only through education, patience, and a lot of enthusiasm that Apple succeeded.”

Dale Spenner offers his view of Cascade’s contribution: “Cascade was like one of our partners. Obviously Cascade has an interest in making it work, but many times their people went the extra mile for us—making presentations, making contacts for us, talking with folks in order to get the program onboard.”

Evangelize. Spenner told the NAMA Journal that as a pioneer in slipsheeting in the electronics industry Apple wants to “evangelize the industry.” Early in 1989, probably in February, Apple will hold an open symposium for the computer industry to share its experience with slipsheeting.

But why give a leg up to the competition? In Dale Spenner’s words, “we want to do this because the missing link in slipsheeting is how our customers receive goods; so it is to our advantage to promote slipsheeting; as more electronics companies use it, more customers will accept deliveries on slipsheets.”

Executive of the year. For the National Account Marketing Association, Cascade’s ability to successfully assist Apple in a global distribution program has extra meaning: Robert C. Warren chairman of Cascade Corporation, was selected in 1988 as NAMA Marketing Executive of the Year.

In his acceptance speech Mr. Warren underscored the problems of selling auxiliary products to independent lift truck dealers.

“Without an intensive and ongoing major account activity, the only influence we would have with them would be the normal factory of design, price, delivery, parts and service. The final ingredient needed to assure real success was to create end-user demand. We have highly qualified representatives who work *closely and continuously* with an ever expanding group of companies and industries”

And that’s what national account marketing is all about.

**A NAMA case study
CASCADE/APPLE**

SLIPSHEETS GENERATE HYPER-SAVINGS AT APPLE COMPUTER

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ABSTRACT

Over the last 20 years, the food industry has shifted increasing proportions of unit loads from wooden pallets to slipsheets— and enjoyed correspondingly increasing cost savings. Other industries, however, have been slow to embrace this technology. Apple Computer has pioneered the use of slipsheets in the electronics industry.

The authors recap the advantages of slipsheets over wooden pallets and describe the specific cost savings achieved at Apple in the first year after conversion. Critical success factors are identified along with a checklist for those considering the use of slipsheets.

INTRODUCTION

In 1987, Apple Computer implemented an innovative slipsheeting program that has saved over \$2.5 million in its first year. The object of this paper is to communicate the potential competitive advantage slipsheeting offers the electronics industry, and the competitive edge it has already given Apple.

Industrial engineers have long realized the advantages of handling products in unit loads, i.e. material handling units made up of numerous individual items or cases that are moved and stored as a unit.^[1] There are two objectives in optimizing unitization. One is putting uniform boxes together and the other

is keeping them together.^[2] The ability to both receive and ship by unit loads was critical in the success of slipsheeting at Apple. While uniform boxes can be assembled upon receipt into unit loads on slipsheets, the best place to do this is at the point of origin—factories and Original Equipment Manufacturers (OEMs). At the same time slipsheeting was being introduced to Apple's vendors and factories, their warehouses had just implemented a unitizing system for shipping called Shipment Planning and Operating Control (SPOC) which also proved significant in Apple's success with the slipsheeting program.

BACKGROUND

Slipsheets are thin (0.35 to .15 inches)^[3] fiberboard, corrugated board, or plastic sheets that are used instead of pallets to handle unit loads of product. When a unit load is held together by strapping or stretch-wrapping, the slipsheet provides a stable load base without the bulk, weight, or cost of a conventional pallet. The sheets have tabs at two adjacent edges. A forklift attachment, called a push/pull, grasps a tab and pulls the unit load onto two thin highly-polished steel plates called platens. The load is released by lowering it to the ground and pushing the load off the platens. The push/pull attachment can be used for handling pallets as well as slipsheets.

Slipsheets have been used successfully in other industries for many years. Adolph Coors was one of the first companies to adopt a slipsheet handling system. Coors began their slipsheet program in 1970 after discovering the potential savings in

maximizing the utilized cube space in railroad cars. Early attempts ended in disappointment when slipsheets deteriorated in refrigerated cars during transport. However, a review of the program's merits convinced them that it was a worthwhile project to pursue. Plastic slipsheets proved to be the optimal solution. Coors manufactured their own plastic slipsheets at a cost of \$.60 each. The pallets they used cost between \$8 and \$10 each.^[3]

BENEFITS

The major benefits of slipsheeting are threefold: savings on freight, savings on labor, and savings on pallet cost. Of the three, the freight savings is the most significant at Apple. A 20% reduction in freight cost translated to over \$1,000,000 in annual savings. An unloading labor reduction of 75% saved Apple over \$500,000. A 78% reduction in pallet costs again saved Apple over \$500,000. Total savings for Apple in the first year have been over \$2 million, and we project savings in fiscal 1989 of over \$3 million. These figures do not include additional savings experienced by Apple's vendors.

Apple realized freight savings by loading containers and trailers more efficiently. Space was saved when slipsheets replaced pallets. Because they could put more product in trailers, they needed fewer trailer loads per year — at least 250 fewer in 1988. In addition, they planned the use of the space better. They optimized cube utilization of sea containers by "configuring" the unit load in terms of unit load dimensions, carton position, and container pattern. In some cases they even redesigned the packaging

that didn't conform well to container and trailer dimensions. Labor savings were realized in unloading ocean freight containers. Some overseas OEM vendors were floor loading containers by hand, which meant hand unloading on Apple's docks. It took approximately 6 worker hours to unload a hand loaded ocean container. The use of slipsheets has reduced the time to less than 30 minutes—a twelvefold increase in productivity.

Pallets are expensive. The average pallet at Apple costs \$5.50. The average slipsheet is only \$1.10. In the Far East the savings are even more dramatic. There cots range from \$15 to \$28 per pallet. Conservation is another issue with the use of pallets. In 1979 pallets used 50% of the hardwood and 15% of all wood produced in the United States,^[4] Slipsheeting could significantly reduce the use of this natural resource.

Some other benefits of slipsheeting include improved utilization of warehouse dock doors, faster throughput, and improved warehouse space utilization. Space is saved because product can be stacked more efficiently, and pallet storage can be reduced. About 100 slipsheets can be stored in the space of one pallet.

SLIPSHEETING THE APPLE WORLD

Like Coors, Apple also encountered difficulties in its first attempt at using slipsheets six years ago. The first sheets tore when grasped by the push/pull attachment, and the program was not promoted well enough to gain the support needed to succeed.

In February of 1987 the Distribution Engineering Department at Apple met to brainstorm solutions to receiving problems. Apple was incurring unacceptable expenses and processing delays in manually unloading ocean containers from Far East suppliers. The team agreed that the use of unit loads was the solution to the unloading problem, and that slipsheets, rather than pallets, made sense as the unit load technique. Although Apple had already tried the concept, they thought that it would work if four issues were addressed:

1. Apple needed a slipsheet design that would withstand the tearing problem encountered in their previous tests. This was accomplished through close work with leading slipsheet vendors.
2. An education program was required to get buy-in from Apple management.
3. Material handlers needed to be trained on the use of the push/pull attachment prior to any implementation of slipsheeting. Distribution engineering in partnership with their equipment vendor provided that training. This time the training program was extended to all the Apple Distribution Support Centers.
4. The slipsheeting program would take a global approach, embracing a total material handling solution that included suppliers, freight carriers, and customers. The Apple team spirit that rises above departmental boundaries was essential in making this happen.

The ultimate solution transcended the local container unloading problems and has revolutionized material handling at Apple.

VENDOR PARTNERSHIPS

A key element in the success of the program was starting at vendors and manufacturing plants. Apple was the first electronics company to receive product, components and sub-assemblies on slipsheets from the Far East. Close work with the apple OEM Purchasing Group was instrumental in achieving this program milestone. Purchasing contacted, coordinated, and negotiated with suppliers on slipsheeting implementation issues.

Industrial Engineers from the Distribution Engineering Department visited Apple's OEM vendors and Apple manufacturing sites. They discussed the cost savings, training and special equipment involved in beginning to ship on slipsheets. They assisted by preparing specific cost and savings data by product, supplying the initial slipsheets, and arranging the rental of push/pull attachments until purchased attachments arrived.

At first, Far East vendors expressed reluctance to change the way they did business with Apple. Although these firms excelled in cost effective manufacturing, little attention seemed to be given to making the distribution of those products more efficient. It took several trips to the Far East and a great deal of support to get suppliers started. Now that they are realizing the cost benefits (pallets cost as much as \$28 a piece in the Far East) some suppliers have become slipsheet disciples who are starting their own programs to switch their distribution to slipsheets.

SPOC

Once a growing program was under-way to maximize the proportion of product arriving in unit loads on slipsheets, Apple needed to keep these unit loads intact as long as possible. SPOC (Shipping Planning and Operation Control), Apple's computer-aided warehouse management system, was already in place to assist in unitization. Under the previous system, order picking was driven by individual customer order. SPOC replaced this with "wave picking", a system of pulling product by unit loads.^[5] SPOC then allocates these unit loads to customers and generates unit labels for shipment. Since not all orders are unit loads, the system can also generate labels for individual boxes composing the unit load. The essential idea behind SPOC is to eliminate the need to breakdown the unit load into individual cartons at the warehouse. A forwarder accepts the unit load with its individual labels to different customers. The forwarder takes responsibility for breaking down the unit load after it leaves Apple. This system means that Apple seldom handles single cartons throughout its entire distribution channel. Developing a close partnership with their forwarders was instrumental in making SPOC work.

CHALLENGES

Now 94% of Apple's products arrive at their distribution centers on slipsheets. Apple Manufacturing is also receiving slipsheeted unit loads of sub-assemblies and components. All United States warehouses were receiving unit loads on slipsheets by March 1988, and European warehouses will be receiving by January 1989.

Apple does have some customers who receive product in unit load quantities, but who are equipped only for palletized loads. Thus, the next challenge is to develop a win-win partnership with those Apple customers who can benefit from receiving on slipsheets.

In addition, Apple is working with slipsheet vendors to develop an even better slipsheet. Occasionally a tab still tears or is crushed. Apple wants a slipsheet with an absolutely tear-proof tab. A superior slipsheet will be a key factor in the accelerated implementation by other electronic manufacturers of the slipsheet concept over the next few years.

IMPLEMENTING A SLIPSHEET PROGRAM

Based upon their experience, Apple recommends the following issues be addressed for successful implementation of a slipsheeting program:

1. **Top management commitment**— although slipsheet economics are often the most powerful arguments, industry trends and effects on other programs must also be addressed. Once a go-ahead is received, it is also important to report regularly on progress.
2. **Sales and Marketing impact**— these departments are interested in anything that affects relationships with customers. They need to see the advantages to customers, as well as to the company, so they can contribute to a strongly supportive environment.

3. **Education of all people impacted by the change (vendors, manufacturing carriers, customers, etc.)**— especially as the changes impact material handling equipment and techniques. Be certain that these people have someone to whom they can communicate problems as they are encountered.
4. **Transportation Department involvement**— your company's transportation or traffic department can be especially valuable in assessing the impact on carrier relations, liability issues, rate analysis, and load limitations.
5. **Industrial Engineering leadership**— Distribution Engineering was the catalyst within Apple, and as such was involved in every facet of the slipsheet program.
6. **Manufacturing planning**— in addition to material processing and handling equipment, stacking heights may need modification.
7. **Implementation**— should be staged with clear milestones and measurement criteria.
8. **Follow-up at each stage**— minor glitches which hardly affect existing systems can easily undermine new programs.
9. **Audit savings**— especially where major savings are expected, early reporting of interim results can help keep pioneers motivated when faced with inevitable problems.

10. **Team spirit**— The size of the slipsheeting team will grow with the project. Team work is essential to the successful implementation of the program, so it is important to keep communication open and flowing between team members.

CONCLUSION

The success of the Slipsheeting Program hinged on many factors.

- Global strategy was a basic goal requirement.
- Implementation extended from vendors to Apple's distribution centers to their out-bound carriers.
- Slipsheeting is a simple process, however it requires extensive communication, support, training, follow-up, and patience.

However, the essential element that made it possible was the commitment and dedication of each person involved in the effort. The Slipsheeting Team included people inside and outside of Apple working to do what's best for Apple and what's best for the industry.

To quote one of Apple's Distribution Engineers, "The slipsheet unit load concept will save any company in material costs, transportation expenses, and handling labor. The overall savings will only vary by company depending on their receiving and shipping volumes."

Acknowledgements

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Thank you Cascade Corporation, manufacturer of forklift truck attachments, for supplying so many fine articles on slipsheeting and material handling, and for outstanding support of the Slipsheet Program.

Thank you to all the Apple suppliers and customers who ship and receive on slipsheets. Thank you to all those in apple's Distribution Support Centers, Warehouse Operations, Manufacturing, Distribution Support Operations, Distribution Engineering, Pacific Logistics, Transportation, and OEM Purchasing, who have worked so hard to make the Slipsheet Program a success.

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“YOU MUST USE SLIP-SHEETS.” – HOME DEPOT

Home Depot's suppliers got the letter of the law. Now they must deliver on its spirit.

By Tom Andel,
Associate Editor

“We encourage you to begin testing slipsheets for all compatible merchandise that is shipped to our stores on regional LTL carriers, full truckload carriers, or your own trucks. After a five month conversion period, all product shipped in this manner must arrive on slipsheets. We will not accept palletized freight after January 1, 1995”.

Thus began a change of life for 5,000 Home Depot suppliers earlier this year. For many of these companies, slipsheet usage is a new—even intimidating—proposition. But the thought of losing Home Depot's business was even scarier, so most of them are now starting to make a go of it. Judging by the experience of suppliers to this chain's Northeast stores during the first regional trial period, the change might be just what the doctor ordered.

“We found out quickly that our damage decreased by 30% by going to slipsheets,” says Terry O'Hara, traffic and warehouse manager for Custom Building Products. “This happened in three or four months. With slipsheets, a lift truck operator has to be just a little more careful. No damage must go to Home Depot.”

But for Home Depot, damage wasn't even the primary

reason for converting to slipsheets. The number one reason was the cost – financial and environmental – to dispose of pallets in a landfill. The cost of new wooden pallets also factored in. But why slipsheets? It certainly wasn't a case of love at first sight for Home Depot.

“After a brief period of time considering slipsheets, we said, ‘Wow, this looks complicated. Let's find another way to solve this problem,’” recalls Pete Cleveland, vice president traffic and distribution for Home Depot. “Then we looked at pallet exchange, pallet rental, and re-using pallets throughout the system. We even looked at sending our pallets to a mulcher, where we would bag the mulch and sell it back to our stores. After modeling or testing these alternatives, we determined none of them would do anything near what slipsheets would do for us.”

They were convinced of this after seeing what slipsheets did for Apple Computer. Apple had a similar on again/off again introduction to slip-

“We found out quickly that our damage decreased by 30% by going to slipsheets.”

–Terry O'Hara, Custom Building Products.

sheets a few years ago – mainly because of the difficulty of getting their suppliers to cooperate.

“Then Apple said, ‘wait, this isn't the Apple way, the Apple way is to run through the walls,’” Cleveland remembers. “Then I realized, that's the Home Depot way too. We're not going to let the walls stop us.”

Still, Cleveland doesn't think slipsheets would have been practical for Home Depot five years ago. He's convinced slipsheets are a solution for the 90s. First, companies



Some Home Depot vendors move slipsheeted unit loads through their warehouses on slave pallets. By keeping pallets on their premises, they save the expense of shipping and losing pallets.

weren't feeling the regulatory heat of environmental agencies in the 80s. There weren't the criminal sanctions for pollution there are today. Second, he feels today's technology and equipment – including the push/pull attachments and the lift trucks they attach to – make slipsheets an easier alternative.

MIXED REVIEWS

Vendor reaction to Home Depot's mandate varies greatly. Two-hundred fifty suppliers committed to the program right away. Another 200 are recalcitrant non-believers. In the middle are the "wait and see" people. Some in this latter

group are the ITL carriers.

"They were a problem early on," says Cleveland. "But our regional carriers came on pretty quickly, and every one of them put equipment into their terminals. Most of them had some experience with slipsheets, but nobody made the investment for their entire system before."

One Home Depot supplier, Lakewood Engineering, had the privilege of riding that learning curve with the carriers. This manufacturer of heaters and fans slipsheeted product right off the assembly line, five years before Home Depot made it a policy. But Lakewood was asked to comply

with another request from Home Depot: direct-to-store deliveries.

"We'll ship five or six different models to one store during the fan season, but if the order quantities don't come across in our basic SKU quantities we must break the loads down and rebuild them," says Roy O'Brien, distribution manager. "The biggest problem was getting carrier compliance with the program."

Lakewood's loads would go out slipsheeted and wrapped and arrive at the Home Depot stores loose, according to O'Brien. Apparently the carriers liked to use Lakewood's shipments as top-freight because products came in individual cartons. This helped carriers maintain cube in their trailers.

"This was a common problem with the long haul regionals," O'Brien says. "Most of them haven't invested in the push/pull equipment. Finally the carriers started using platens, which stopped them from breaking loads down. We started seeing our freight come through at the other end on slipsheets. The problem is you cannot double stack in a trailer with platens. If a carrier tells you they can, they'll increase damage claims. We try to maintain the cube for the carrier to one destination so they don't have to split the freight down."

Maintaining trailer cube is especially important with lightweight freight. Deflect-O-Corporation manufacturers plastic injection-molded products – again, top-freight bait for carriers. Tim Wells, director of transportation and distribution, says when they palletized this product for shipment, doublestacking became perilous.

"If there are stringers missing, you

Bare Bones Vehicles To The Rescue

Home Depot's slipsheet program was almost finished before it started. Their pilot program began two-and-a-half years ago in the Northeast section of the country. Each store receiving dock was supplied with a quick-fork-mount push/pull attachment to put on their lift trucks for handling slipsheeted loads.

The problem: every time a load of slipsheeted goods came in, receiving personnel would have to find a forklift, then attach the slipsheet mechanism. If the forklift was busy pulling an order for a customer, workers had to wait for the vehicle to be freed up. This meant receiving delays, angry truckers, and vendors hit with back charges for the waiting time.

"It got to the point where our receiving people in the stores wouldn't hook these devices up," says Matt Pitts, equipment manager for Home Depot. "The program was pretty close to dying. That's when we called in Raymond [the lift truck suppliers] and Cascade [the attachment suppliers] to design a new concept."

The solution lay in designing a vehicle that would be dedicated solely to handling slipsheeted loads. They started with a standard Raymond lift truck and modified it to make it more cost effective. The original truck was overqualified for a receiving dock job where high speed and high lift were not requirements.

"Home Depot did not want all that versatility," says Michael Romano, director of national accounts for Raymond. "They wanted a design that would preclude it from being useful on the sales floor. That's why they limited lift height to 66 inches. Because we didn't have to outfit the vehicle with all the safety equipment used on the store equipment, that automatically makes it off-limits to workers on the sales floor. It also took cost out of the unit."

"Now what we have the support of receiving, this program is much easier," Pitts concludes.



introduce all types of problems if you try to double stack in the trailer," he says. "With a slipsheet you always have a nice solid bottom and you don't have to worry about a pallet being busted. So as long as your loads are fairly uniform, they can still cube out the trailer."

Deflect-O-Corporation now ships on slipsheets to 10 customers. Wells says it paid off quickly.

"If your product works well on slip-sheets you can cut transportation costs and pallets," he says. At \$5 a pallet, you can spend a pretty good penny. Although a push/pull

mechanism can go for \$5,000, the return on your money is fairly quick. When I got wind that Home Depot was going to require its vendors to use slipsheets, the timing was right for us because we were ready to purchase a couple new lift trucks anyway. I had the vendor add the attachment."

Carrier Cooperation Crucial

Slipsheets aren't new to carriers, but once Home Depot's January 1995 slipsheet compliance deadline kicks in, it may take some time for the LTL carriers to get used to the volume they'll handle.

"As Home Depot gears up their vendor community we are also equipping ourselves with whatever is necessary to make handling of slipsheeted shipments easier," says Bill Graham, v.p. of transportation and operations services for Yellow Freight.

"There are techniques for properly handling and stacking slipsheeted shipments. We're in the process of educating our dock workers in these techniques."

The participating LTL carriers agree, training is critical to this program's success. Roadway Express is working with Home Depot in developing training materials—both for Roadway personnel and for Home Depot's vendors.

"Our sales force will be an extension of Home Depot as they go into Home Depot's vendors and talk to them about what it will take to be successful," says Bob Obee, Roadway's vice president of operations, planning, and engineering. "By the time we take Home Depot's vendors through our engineered approach, they'll see the benefit and come on board."

That engineered approach entails careful examination of slipsheet specifications. With the additional pushing and pulling slipsheets get in the LTL environment, Obee believes they'll need more durable specimens than are typically used in the truck-load environment. They're also looking for better ways to secure unit loads.



"With palletized product you can wrap the stretch film around the wooden corners to secure product to the base," Obee explains.

"You have a harder time doing that with a slipsheet. Some of the slipsheet manufacturers have shown us models with interlocking corners. On initial test

they look like they'll be much better able to be locked in for unitization. We're also looking at how many wraps are necessary on loads of this type. But such an engineered approach will work or not work based on the effectiveness of the training."

Yellow's Bill Graham agrees, noting that LTL carriers are constantly educating themselves and their customers on what it takes to meet higher service levels.

Our business is becoming much more service sensitive," says Graham. "Slipsheets are just another element in an already complex process."

Graham is factoring in a learning curve in his assessment of Home Depot's slipsheet program.

"We're training to avoid as many snags as we can, but this is a dynamic business and every trailer ends up with a different mix of freight. Slipsheets add another piece to that puzzle."

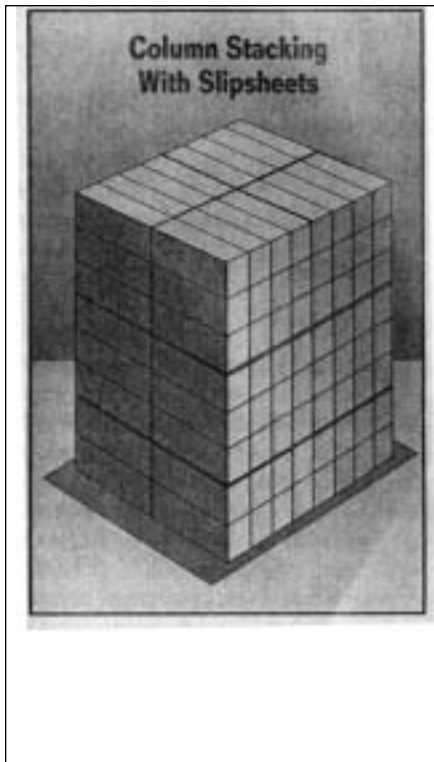
RETURN ON INVESTMENT

Different vendors have different pay-back formulas, depending on their product lines. Super Millwork Inc. provides Home Depot with pre-hung interior doors, which are hard to palletize, let alone slipsheet. Although vice president Doug MacMillan didn't think it could be done, they gave slipsheets a try. They designed a cardboard bin in which ten doors can nest. The slipsheet goes under the bin. This solution works, but is also costly.

"We had to invest \$15,000 in a stretch wrap machine, plus the people to run it" says MacMillan. "We also had to invest in the slipsheets, bins, and two attachments. But it has significantly reduced truck loading time. It used to take 2-1/2 hours to load a truck by hand. Now it takes a half hour. I would say we run dead even, comparing the cost of the previous method with what we're doing today. I could have gotten out of this, but we view our relationship with Home Depot as a partnership."

Besides, the other pre-hung door manufacturers aren't doing it. This gives Super Millwork a competitive edge with Home Depot.

Another challenge that needs addressing before more vendors buy into slipsheets is how to keep product on them. Flotec, manufacturers of pumps and water tanks, is



Slipsheets Add Stability

Slipsheets aren't always used to replace pallets. The two can work together in forming a stable unit load.

There is a continuing push toward packing more than one thing on a pallet. You may add three or four tiers of one product to three or four of another. But a corrugated box is strongest as its corners and weakest in the middle. That's why, if a box in the bottom layer is supporting one above it with its middle section, you don't have the strongest load you can have.

Putting a slipsheet between such layers helps distribute the load so the bottom boxes can better support the upper tiers. Slipsheets can also tie the tiers of a load together, adding stability.

For example, if you column stack, keep in mind what we said about boxes being strongest at their corners. Column stacking is the most economical way to ship the most product in one unit load. Using slipsheets between tiers maximizes the stability of such a load.

Information provided by Steve Beshore, program manager for packaging systems research and development at International Paper's Packaging Innovation Center, Middletown, NY.

still trying to perfect a way to stack these items on a slipsheet then stretch wrap them. Tandy Caudill, distribution manager, says they're looking at adhesives.

"Some products aren't made for slipsheets," he adds. "It must be a standardized product. With our type of products you can't stack one load atop another [in a truck]. That means we can't cube out the trailer. But in our warehouse the slipsheets work better because loads come in from manufacturing palletized on slipsheets. We just take them off the truck and stack them in the warehouse. When guys pull orders they just take them off the slipsheets, and you don't have the expense of another pallet. That's why I think you'll see more companies go to slipsheets."

Lakewood Engineering's Roy O'Brien agrees. He ran the numbers on what it would cost his company to ship on pallets. His company moves 60,000 SKUs a year. Even with less costly pallets, at \$4.50 each, that would mean an annual outlay of \$270,000. With plastic slipsheets, at 86¢ each, the cost is \$51,600. Corrugated fiberboard is even less – 56¢ each, or \$33,600. His company uses both types of slipsheets to ship to customers, although Home Depot requires plastic only.

"We were using 200 lb test corrugated slipsheets," he says. "These are very easy to dispose of but if you don't catch the lip right there's a possibility of tearing it. We were getting two to three turns on the corrugated slipsheets we kept in our own warehouse. The plastic ones have a longer lifetime. We haven't pursued shipping on plastic to other retailers – not because of

cost but because they have to be equipped to handle the scrap."

One of Pete Cleveland's big selling points to vendors is the cost comparison between slipsheets and pallets. He tells them if they're shipping a truckload of slipsheeted product to Home Depot they're saving about \$100.

"Once the equipment is paid for, you get pure savings," he says. "We're told the equipment should last from five to seven years. But I've seen push/pull attachments that have been used for well over ten."

LESSONS LEARNED

The slipsheets delivered to Home Depot stores are put in a stack, banded, then backhauled to the chain's DC. There they're sorted into reusable or recycle. Those deemed reusable will be put to work in the DC.

"We started with fiber slipsheets, but we realized they wouldn't work in our environment because of the number of uses the slipsheet got," says Cleveland. "Our New Jersey DC has been doing this the longest and

"The pallet's been around for over 50 years, and I'm not sure there are many inventions that have a useful life above that. I tell my people if they've been doing something for five years it's probably wrong now."

–Pete Cleveland, Home Depot

they think they're getting four to five turns on the plastic slipsheets. With fiber we were having failure with one turn in many cases. In an ETL environment it could get handled three times between the ven-

dor and our store. With that constant re-use the tabs would pull off. And if there was any moisture at all in any of the trucks along the way it tended to weaken the fiber.”

One of the biggest surprises to Home Depot involved the poor acceptance of equipment – by their own stores. The chain uses quick-fork-mount push/pulls attached to sit-down counterbalanced lift trucks. These weren't well received at the stores because the workers weren't used to maneuvering lift trucks in and out of the relatively close quarters of their store rooms. Electric pallet jacks were their tools of choice.

“We worked with Cascade and Raymond Corp. to come up with a vehicle that was more user friendly to our receiving department,” says Cleveland. “Once we put that equipment in, our stores turned around completely on slipsheeting. They went from hating it to loving it.”

As for carriers, Cleveland pleads guilty to naiveté for expecting carriers to welcome this concept with open arms. It took the success of its regional carriers in the Northeast to convince the other carriers this could be done.

“Once our regionals saw the success TNT Redstar was having, they agreed to support what we were doing.”

As of January 1st, Home Depot's slipsheet mandate will be in full force across the country. Pete Cleveland feels their regional trial periods helped put them a step ahead of the competition in chopping away at their pallet problems.

“The pallet's been around for over 50 years, and I'm not sure there are many inventions that have a

useful life above that,” he argues. “I tell my people if they've been doing something for five years it's probably wrong now.”

Home Depot's philosophy of competition will continue to drive their slipsheet program. It's built upon a smoother, faster-flowing, less costly supply chain. After all, Cleveland concludes, “It's not us against our competitor; it's our supply chain against our competitors.” T&D

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**Integrated Warehousing &
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LIFT TRUCK ATTACHMENT ELIMINATES PALLET USE – QUAKER STATE OIL

*By Richard Rix,
Assistant Editor*

A curious dilemma exists in one area of materials handling. If you use pallets, you face problems of having to store them and maintain some degree of inventory control. If you don't use them, such operations as loading trucks and railcars can prove costly and laborious.

Pallet handling was one of the key areas in which Quaker State Oil Refining Co. of Canada Ltd. focused attention when it moved to a new 40,000-sq. ft. plant at Burlington, Ont., recently.

This company had completely updated its production facilities and now looked for a more efficient way of handling one of its most popular product lines: Motor oil in 1-qt. cans packed 24 to a carton. What it required was a method of handling that could be fully integrated with pallet use but which

could be fully automated where it was unnecessary to use pallets. The method it finally chose was to use Load Push/Pull lift truck attachments from Cascade Hydraulics (Canada) Ltd., Mississauga, Ont.

Basically, the Load Push/Pull unit is mounted on the front of a suitable lift truck and handles loads on paper slipsheets. (The method can be called palletless handling or unitized-load handling). Simply described, the unit consists of a face plate that extends and retracts by means of a pantograph mechanism; a gripper bar and jaw to engage the lip of the slipsheet; and two oversize forks called platens.

PUSHES ON, PULLS OFF

In operation, the face plate provides a forward action to push a slipsheeted load off the platens onto the floor (or pallet) or onto another load. Its pulling action, on the other hand, is accomplished by the gripper bar closing over the protruding lip of the slipsheet, automatically pulling the load onto the platens when the face plate is retracted. Since the day when it went into operation, the Load Push/Pull unit has proven to be extremely efficient and reliable – the ideal complement, in fact, to Quaker State Oil's new production facility.

PLANT BLENDS, PACKAGES OIL

The facility itself is responsible for blending and packaging motor oils and lubricants and shipping them by truck and rail to the whole Canadian market.

Recently introduced to an oil blending and packaging plant, this lift truck attachment enables handling operators to match production capabilities.



At the beginning of the process, the refined product arrives at the plant from the parent company's Pennsylvania refineries in tank cars. From these cars it is piped into tank storage, blended according to specifications and packaged, all fully automatic. The packages which the Load Push/Pull attachments will handle come off the production line in such a way that four layers of ten cases on a slipsheet comprise a load. Each load measures about 50 cu. ft. and weighs more than 2,400 lb.

Two of the lift trucks operating at the plant are fitted with the attachment and each operates in the same way: It pulls a load onto its platens, transfers the load to the storage area and offloads into stacks up to four loads high. Then, when they're called for, these same lift trucks transfer the loads to trucks and railcars for shipment.

SAVES TIME LOADING TRUCKS

Not only can all these operations be achieved without using pallets,

but transferring the loads into trucks and railcars can be accomplished in a fraction of the time it takes to handle them manually.

"Speed of operation is the main reason we chose the Load Push/Pull method," acknowledges Pat Irvine, plant manager of Quaker State Oil. "Before, it would take four men one hour to load a truck manually, removing containers from a conveyor in the truck. Now it takes one man just 20 minutes to load a truck using a forklift fitted with the attachment and we've eliminated the use of that conveyor. If the customer still wants pallets – and many of them do because of their own materials handling methods – we'll just place the slipsheeted loads on the pallets."

The cost factor has also been an important consideration. The slipsheets cost just 85 cents each whereas the cost of a pallet is somewhere in the region of \$10. Multiply this twentyfold (the average truck load consists of 800 cases and it takes 20 slipsheets to accommodate them) and you have costs of \$17 versus \$200. Of course, the slipsheet is non-returnable whereas the pallet deposit is refundable, but the higher degree of efficiency that accompanies the slipsheet's use more than compensates for this higher cost factor.

REDUCES PALLET INVENTORY PROBLEMS

The company also finds it's been freed from the vagaries of having to

Stacking . .



After stacking the slipsheeted load, the lift truck operator reverses his truck while at the same time extending the Push/Pull attachment. In this way, the face plate holds the load in place while the platens are retracted.

maintain some degree of inventory control over its pallets. Explains Irvine, "Generally speaking, you'd get your pallets back – eventually. But say a distributor is purchasing on a monthly basis. He may hold the pallets until he's got a full load several months later and then ship them back all at once because it's cheaper for him.

"Then again, he may get \$12 each elsewhere so you wouldn't get them back at all. There's really no way of maintaining an efficient inventory control.

"Take as an example the figures relating to pallets we still use. Some-where in the region of 2,000 pallets went out in the first quarter of this year so you'd expect somewhere near the same figure to be returned in the second quarter. In fact, I doubt if we've had 500 returned. I even had to buy 700 or 800 more. Now I'm just hoping I won't get 1,200 pallets returned in the next three or four months because I'll have a plant full of pallets."

SLIPSHEETS NEED LESS ROOM

This raises another important point: The physical size of pallets compared with slipsheets. The area it takes to store pallets is significant, costs money and reduces plant efficiency. Slipsheets, on the other hand, take up very little space.

Even in use, the comparatively insignificant thickness of slipsheets can be an important consideration. When several are used in a stack,

To unstack, the attachment's face plate engages squarely against the load with the edge of the slipsheet in the gripper jaws. Then, as the attachment retracts, the gripper closes and the load is pulled onto the platens.

for example, the uppermost layer is that much lower in the heat-rise area, and there is less risk of obstructing a sprinkler system. In transit, too, if the customer doesn't want his load palletized, slipsheets can help protect it without contributing significantly to its height.

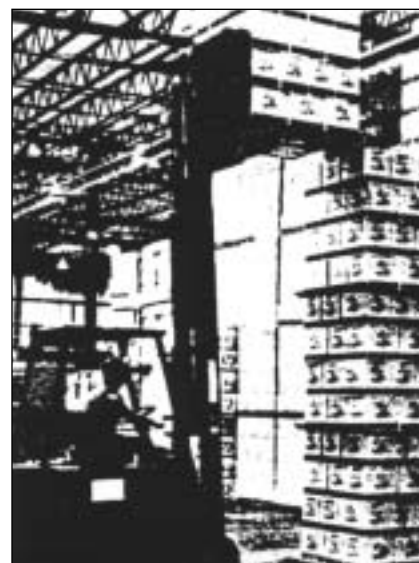
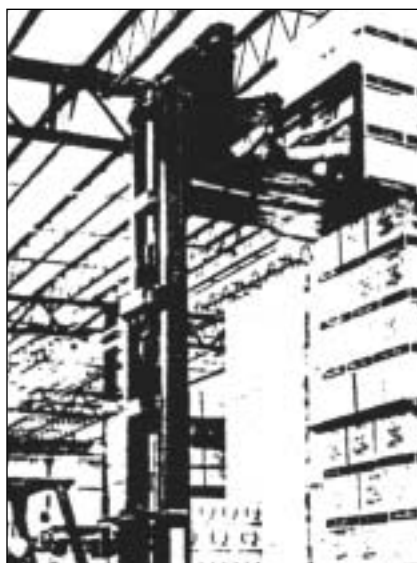
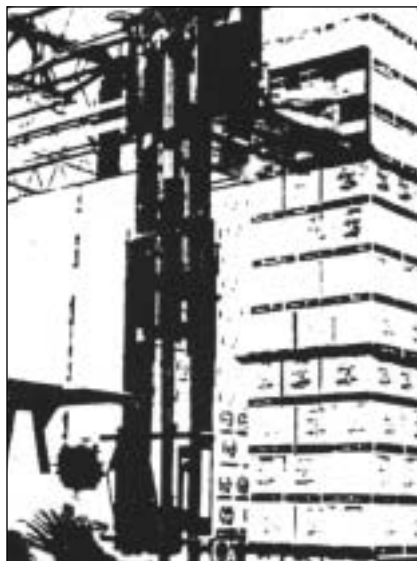
The slipsheets Quaker State Oil uses are supplied by Abitibi Paper Co. Ltd., Toronto, and Canadian International Paper Co., Burlington, Ont.

WEEK'S TRAINING NEEDED

Any competent forklift truck operator can safely and efficiently operate a truck fitted with the Load Push/Pull attachment after a week's constant driving, according to Irvine, "He may think he can do it right off the bat, but he's got to pick up additional skills.

"Especially critical is an exact judgement of height when stacking," continues Irvine. "The front corner of a load being stacked up high is blind and the operator must

...Unstacking





A significant chunk of floor space is required to store pallets (left) whereas the hundreds of slipsheets shown below take up little room.



coordinate his judgement of height with being able to push the load off and pull away at the same time. Don't forget, too, he always has the weight of the load on the platens whereas with a straight forklift, once he lowers the load he just pulls out."

Stacking at Quaker State Oil's plant is restricted to four loads high, but this is not due to any limitations on the part of the trucks or attachments. Rather it's mainly because of the weight on the bottom layer.

STRAIGHTFORWARD CONSTRUCTION

The construction of the Load Push/Pull unit is quite straightforward. It consists of a base frame assembly in which is mounted a pair of double-acting hydraulic cylinders whose circuitry is connected to the lift truck's hydraulic system through a valve assembly.

The hydraulic cylinder rods are attached to the pantograph arms by heavy-duty linkage, and the arms, in turn, are linked to the load face

plate. When hydraulic pressure is applied, the arms open (stretch out), pushing the face plate forward to the outer end of the platens.

Conversely, when pressure is applied to the opposite end of each cylinder, the arms close and pull the face plate back against the frame assembly. The gripper bar, at the same time, has closed over the protruding lip of the slipsheet and pulls the load onto the platens as it retracts.

PLATENS COME IN VARIOUS SIZES

The platen arms consist of two polished and tapered platens, 48 in. long and 15 to 20 in. wide, depending on model and capacity. Multiple-fork versions are available that have been specially designed for the food industry but which are used for other operations. Both models can be supplied with side-shifting capabilities.

Several versions of the Load Push/Pull units are available, both in the 4,000-lb. capacity Quaker State Oil operates and in the higher 6,000-

lb. category. In this way, different types of lift trucks with various capacities can be accommodated. Various modifications and accessories also exist, such as a tilting face plate for handling sensitive loads and an attachment for retrieving slipsheets from loads after stacking. There are even cams which can be mounted at the end of the cylinder rods to prevent the forks from protruding beyond the edge of the load and damaging loads already stacked, an important consideration with loads of varying depths.

REQUIRES LITTLE MAINTENANCE

From the maintenance point of view, the Load Push/Pull unit requires very little servicing, according to Irvine. "It's very maintenance free, though like any other piece of equipment, you have to have a good maintenance program to keep it that way."

At the end of each day, the plant's own maintenance man carries out a

10-minute inspection on each of the Load Push/Pull attachments. Mainly he concentrates on the hydraulic hoses and checks that the gripping mechanism hasn't been twisted. Ironically for Quaker State Oil, the attachment requires no major lubrication.

Once a month, a technician from J.H. Ryder Machinery Ltd., Toronto, (who supplied the lift truck and Load Push/Pull attachment complete) visits the plant and checks over the equipment. He's also on call should any problems arise that Quaker State Oil's maintenance man cannot solve.

FULLY INTERCHANGEABLE

All told, the plant uses four lift trucks – the two fitted with the Load Push/Pull attachment and two which operate as standard lift trucks. All the lift trucks are identical (Model EC 500-40 from Clark Equipment of Canada) and are fitted with the hydraulic control lever required to maneuver the attachment, so the attachments are completely interchangeable. This operation is carried out in ten minutes, the attachment being connected by just two quickchange mounting hoods and the hydraulic hose coupling.

Needless to say, using a Load Push/Pull attachment does impose a greater battery drain than just operating a standard forklift truck. When powering the attachment, the battery is directly responsible for its forward and retracting motion as well as the other functions of a standard truck.

Even so, by using the largest battery possible in its lift trucks, Quaker State Oil finds that, on a 24-hour

charge, it's generally able to complete an 8-hour shift operating the attachment. If it's really pushed, according to Irvine, the company rotates the attachments among its lift trucks, because a battery which is too low to power a Load Push/Pull unit will still run a standard lift truck reasonably well.

Irvine points out, too, that there are products for which his company will continue to use pallets, because of their greater stability in handling such loads as Quaker State Oil's 46-gal. drums, 35-lb. pails and 120-lb. kegs. But for moving loads packed in cartons, Irvine is convinced the Load Push/Pull unit is the best attachment there is. "To my knowledge, nothing is more efficient in this area," he says. "It's certainly superior to forklift and pallets for our purposes."

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PRIOR TO SLIPSHEETS

*United Fruit & Vegetable
Association Committee Meeting
Washington, D.C. –
September 26, 1977*

Speech delivered by Jim Chase, President of Jewel Foods, Inc., Chicago, IL.

I would like to personally thank all of you for allowing me to spend a short time with you at your annual meeting and share with you our thoughts in the distribution area at Jewel Food Stores regarding the use of slipsheets in receiving and shipping.

First, perhaps a little informational background about Jewel Food Stores as one of your customers. We operate approximately 186 stores in the Chicagoland area in addition to super-markets in Iowa, Indiana, Michigan and Wisconsin.

Our primary market, of course, is Chicagoland and suburbs where we have the largest share of the food market – 30 to 35% depending on which Chicago newspaper you read.

So much for information on us and let's, for a few minutes, discuss our feelings and perceptions at Jewel Food Stores on slipsheeting.

We at Jewel, for the last year, have been pursuing vigorously with growers and packers, particularly in the Florida citrus area, the slipsheeting concept and completed a tour of the citrus packing plants in central Florida discussing this issue and arranging for test loads with the different citrus packers.

We now have in our produce distribution center, two slipsheet machines and an additional two are

on order for 1978 delivery. Now let's take a look at the different aspects and pickups of going into slipsheet material handling from three different perspectives in the total distribution process. These are the grower, carrier and the receivers. Then I will address some opportunities that need to be thought about and concentrated on.

I will close my remarks with some blue sky projections we have at Jewel for product flow concepts relative to shipping the product to our stores and ultimately the consumer.

FIRST, THE SLIPSHEET ADVANTAGES FOR THE GROWER-SHIPPER

1. **There are large labor savings** to be captured at the grower, packer ends of the business as exhibited in the Florida citrus packers conversion to slipsheet handling. As wages get higher and higher for labor to perform the dock and loading function at the packing house level, this area is prime for improved material handling through the use of slipsheeting.

The use of automatic palletizing machines onto slipsheets to further eliminate labor are common and one or two slipsheet fork truck operators are common in running an entire packing house dock and loading operation. Labor is also saved in loading a magazine of slipsheets versus loading a palletizer magazine with pallets. One magazine of slipsheets may hold as many as 100. A strapping device can also be incorporated into the automatic palletizer to secure the product.

2. **There are no storage problem of pallets** when in a slipsheet operation – slipsheeting at packer level greatly increases packer plant utilization of space when you do not have to store pallets. Estimates are 15-20% space saving in a plant using slipsheets versus pallets.

3. **Sanitation** problems throughout the distribution system are greatly reduced by not having pallets which decrease the USDA by RDA risk at plant level. It is foreseen that in our industry that the standards and interfaced with these governmental agencies will continue to increase in the future, so the sanitation pickups with slipsheeting are a real operating benefit and concern. As it is commonly known that the wood pallet is one of the greatest vehicles of rodent and insect infestation in the distribution centers. There is significantly less dollar investment throughout the total distribution system by the use of slipsheets freight handling compared to the \$5 -6 wood pallet.

4. **There is improved in-plant safety** in handling slipsheeted product versus pallets with wood splinters and exposed nails, which can convert to dollar savings in absence and disability claims against the plant.

Less in-plant building and equipment damage will occur moving your product around on slipsheets. Damage to walls, machinery, doors, conduit, etc.

5. **Trailer weight cub utilization** can be increased by the pallet weight of 1400-1500 lbs. of additional freight if slipsheeted versus pallets. Actual gross weight pickup can be higher figuring space picked up timers case weight; if it still falls into legal truck transit weights.

Additionally, as is well known, truckers prefer unitized loads, slipsheets or pallets versus floor loads and in time of motor carrier shortages, the plants that are unitized generally get preference by the driver in accepting their freight.

6. **Reduced product damage** has been noted by our experience in slipsheets versus pallets particularly in the loading and unloading process, due to pallet abrasion against cases.

7. **Reduced capital investment** – Currently Jewel Food Stores is spending almost one million dollars per year on wood pallet replacement due to a variety of reasons such as receiving pallets in poor repair, stolen at the store level and having our good pallets exchanged with direct delivery vendors for their bad pallets at the store level. Obviously with slipsheets, the massive dollar investment and continued replacement of wood pallets would be significantly reduced. There are much less labor dollars expended in receiving and storing slipsheets versus pallets.

There are some of the significant advantages for a grower-shipper to convert to slipsheet operations.

Now let's look at the advantages on our side of the business – the receiving warehouse. A number of your stated advantages also apply to us as your receiving warehouse customers.

RECEIVING WAREHOUSE ADVANTAGES

1. It is suggested to secure the freight in transit and secure a suitable slipsheet unloading operation that the slipsheet product be taped or bound or in some cases, with the use of glue.
2. As mentioned in your pickups, we also share the improved safety aspects of handling slipsheets versus pallets – less employee accidents and reduced absence and disability costs and minimized OSHA risk violations. Broken and unsafe pallets constitute an OSHA violation.
3. Reduced product damage from abrasion on the side of the cartons in the unloading process.
4. Some increased dock space utilization with a reduced amount of excess pallets in the area. Increased warehouse space utilization if products are stored on slipsheets and are able to be double stacked.
5. Many warehouses have outside unloading services (lumpers) which are in many cases, unreliable and their employees are a safety and liability risk. Getting freight off of the floor onto slipsheets will reduce our dependency on them and ultimately reduce or eliminate the need for this service. Being too

dependent on lumpers for unloading can put a warehouse in serious jeopardy regarding dock turnover if the lumber service becomes unreliable or disappears.

6. In our first few railcars of slipsheeted produce, we found significant labor savings there versus the former floor loaded railcars – example, a large floor load rail car would take a man eight hours to unload and when we received it slipsheeted, it took 3-31/2 hours.

OTHER VERY PERTINENT INFORMATION ON WAREHOUSE RECEIVING – OF SLIPSHEETING VERSUS CURRENT NON 48" X 40" GMA PALLETS IS AS FOLLOWS:

In 1976, we received approximately **10,000 non 48" x 40"** pallets at an approximate cost to us the customer, and ultimately the consumer of **\$50,000**.

Granted, the material handling advantages in receiving and dock turnover are received from non 48" x 40" pallets, but they present tremendous costs to us on our end of the distribution cycle:

SOME OF THESE DISADVANTAGES ARE:

1. Tremendous increased costs to our business because we consider non 48" x 40" pallets one trip throw-aways and they are not compatible with the grocery industry standard as would your product being received on a 48" x 40" slipsheet.
2. We now unload and stack no 48" x 40" pallets onto a 48" x 40" pallet wherever possible

but under numerous circumstances it creates an unsafe condition throughout the material handling process particularly if double stacking or using metal reserve storage racks leaving the receiving warehouse vulnerable to accident and disability risk as well as OSHA violation.

3. Our labor is approaching \$9 per hour—expended daily to sort, transfer, stack, store and hopefully finally get rid of these non 48" x 40" pallets.
4. Within the last two years we have had increasing difficulty in getting rid of them. Currently we give them away for free. At times we could not get rid of them at all and we feel eventually we will have to pay to get rid of them. We feel the future is in slipsheeting on a sheet compatible with the 48" x 40" grocery industry or in some cases, a conversion to the newly approved grocery pallet council softwood 48" x 40" pallet for areas where hard wood is unavailable.
5. Our pallet repair—sorting facility costs have increased 4 times since 1972. In 1972 we had 4 nailer-sorters—today we have 12 nailer-sorters to keep up with all types of pallet repair, sorting and expediting of non-usable pallets. We applauded in the past, your conversion from floor load products to the non 48" - 40" pallet, but we encourage you to look at slipsheeting and how does it fit into the total food distribution cycle from field to customer.

SOME ADDITIONAL CHALLENGES AND INFORMATION FOR ALL OF US TO WORK ON TOGETHER.

1. Numerous produce case sizes and configurations do not conform to the 48" x 40" grocery pallet or slipsheet design so as to be compatible with the major food distribution pallet system. To be compatible with our system and our slipsheet forks, we need to have a 40"-48" slipsheet. It is our opinion that the retail industry can adjust, order and sell any container size you convert to if it is compatible to a 48" x 40" slipsheet. Example I believe in some commodities the gross case weight has remained un-changed for many years. Yet, in most labor environments including our own, it costs us the same to handle a 25 lb. case versus a 50 lb. case—we should move to larger case weight sizes. I, understanding objectives in this area. I suggest you examine your shipments and you probably will find the largest share of your product goes to the large volume retailer who uses the 48" - 40" dimension shipment mode.
2. In looking at future packaging in light of handling and damage reduction further study should be conducted on the feasibility that would lend the cases to interlocking tier stacking to promote stability of frights on the slipsheet in transit and in the unloading process without damaging the contents, or additional manual labor at the warehouse will be needed to straighten the load

before we could unload it. Taping of the top tier of freight is recommended or strapping or glue.

3. Caution should be used in the selection of the proper slipsheet on its size and lip size and caution should be used in the selection of the proper slipsheet on its size and lip size and additionally, how cooler temperature, moisture and humidity will affect it in the distribution cycle.

In our experiences recently with the Florida citrus slipsheet receipts, we are discovering a large amount of deterioration of the slipsheet due to the above reasons. We are now working with them on testing moisture retardant plastic coated sheets or full plastic sheets. Be careful you test sheets properly before committing to a mass purchase. Wherever possible, these sheets should be recyclable either to make more slipsheets or mixed with corrugated for recycling.

4. We suggest from experience, before you buy a particular slipsheet machine or a conversion kit of an existing fork truck, that you test several brands before you purchase. Some work better than others. Find out what works best for you and your products. A recent bid we had to convert an existing for truck to a slipsheet attachment was \$5,700.00.
5. As a point of information to give an example of the food industry's interest and shift

from pallets to slipsheet, we were recently served notice by one of the nation's largest manufacturers that within 2-3 months they would be out of pallet deliveries and into full slipsheeting in our area.

In conclusion, we at Jewel would be happy to work with any of you in test shipment loads. We will provide documentation on the condition of the receipt and if you want, even pictures.

We, at Jewel, are seriously looking in the future to design stores and receiving docks in a manner which promotes the end of the pallet as a major device to ship groceries to the store on and will be looking at conducting tests in slipsheet receiving at store level. The future, we believe, is definitely slipsheeting and other forms of unitization.

We think for a number of reasons, in time the sanitation, safety, space utilization of trailers, warehouse and store back room and huge dollar investments in pallets, that the wood pallet use as we know it, will be greatly digressed in the total distribution system.

Thank you very much for this opportunity to speak with you and if you are in Chicago, we extend an invitation to tour our warehouse distribution facilities. Thank You.

*Plain sheets in volume 50 – 90¢
depending on strength*

*Plastic sheets \$2.00 - \$3.00 –
must be recyclable*

UNITIZING 30-LB CANS SAVES 75% LABOR — PIK'D RITE, INC.

Slipsheet shipment of net-wrapped loads eliminates pallet interchange, lessens damage.

Anthony J. Grich,
President

Larry Grich,
General Manager,
Pik'd Rite, Inc.

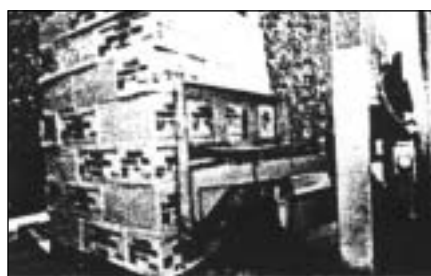
Karl Robe,
Editor-West

NEW SOLUTIONS TO PLANT PROBLEMS

Problem: Pik'd Rite, Inc., Escalon, CA, wanted to mechanize and unitize all handling and shipping of frozen fruit products in retail-size cases and 30-lb cans. Particularly tough to handle were the 30-lb tins of frozen berries. When stacked in the rail cars or trucks, loads would shift in transit and covers would sometimes come off. Stacks were unstable, and injuries from handling fallen stacks at the receiving end could not always be avoided.

Solution: Pik'd Rite stacks unit loads of both cased goods and cans on slipsheets placed on their captive 48" x 40" pallets; unitizes the load by wrapping it in polypropylene netting; and stores the unit-load 4-high in the freezer. At shipping time, a push/pull attachment is put on one of the fork trucks (a matter of 10-15 min).

For shipment, the net-wrapped unit-load is pulled off the pallet onto the forks, taken into the van or car, and pushed into place. At the receiving end, fork trucks



Polypropylene netting unitizes 80 cans. Load is removed by gripping the slipsheet, and is placed in car in less than a minute

with push/pull attachments unload the shipment.

Results: Compared to manual loading of 30-lb cans, labor savings are about 75%. Shipping damage, from load shifting and loosened lids, has practically been eliminated. Unit-loads can be stacked 4-high without aids such as corner posts or ties, plus extra labor. The expense of returning pallets and of damage and loss during shipment has been eliminated. Major receivers likewise benefit in lower labor and damage costs.

Push/Pull® attachment for fork trucks is described in literature available from Cascade Corp., P.O. Box 20187, Portland, OR 97220

"Tension-Net" polypropylene netting for unitizing loads of cans, cases, trays, pails, or drums is furnished by Conwed Corp., Plastics Div., 770-29th Ave. SE, Minneapolis, MN 55414.

Sidewinder II® system, which can be programmed in any desired pattern for unitizing loads with film or netting, is described in literature available from Infra Pak (Dallas), Inc., 4911 Cash Rd., Dallas, TX 75247.

Reprinted from April 1980
Food Processing

ON-THE-JOB APPLICATION REPORT

Caldwell, Idaho

SHIPMENTS INCREASE TWO MILLION POUNDS WEEKLY

J.R. Simplot Company, one of the world's largest processors of frozen and dehydrated potatoes, ships as much as two million pounds of products daily. Speed, reduction of product damage and labor are significant requirements when handling such large volumes of product. That's why Simplot has installed the food industry's most modern palletized operations at their Heyburn and Caldwell, Idaho plants.

The company's palletizing system was first installed at Heyburn in 1970 and it resulted in dramatic improvement in product handling. Production through the warehouse increased up to two million pounds per week and product damage was reduced approximately 75%. Consequently, the same system has been installed at Caldwell.

An integral and vital part of Simplot's palletizing operations has been the use of Cascade's Load Push/Pull lift truck attachments. They are used exclusively in product handling at both plants.

PALLET COSTS CUT IN HALF

Volume handling of Simplot products starts when cases are moved by conveyors from the processing plant to a palletizing center. The cases are fed into an automatic palletizer which stacks a double cube load on a wooden pallet nine cases to a tier, twelve tiers high. A double cube load starts with a solid, reusable fiber slipsheet placed on the

CASCADE LOAD PUSH/PULL INCREASES PRODUCTION



pallet for a stack of three tiers then another slip-sheet and three more tiers, etc.

A lift truck equipped with Cascade's Load Push/Pull attachment picks up the load on a wooden pallet and moves it to frozen storage. The complete double cube stacking and lift truck loading operation takes less than two minutes. By using reusable slipsheets instead of wooden pallets for the cube load, Simplot estimates their total pallet costs have been cut in half.

The double cube is delivered on the wooden pallet to frozen storage by the Push/Pull equipped lift truck and is carefully maneuvered into position. The face-plate of the Load Push/Pull is then extended and pushes the load off the platens as the lift truck backs away. With the use of corner angle stacking aids, Simplot can stack the double cube

The task of efficiently handling up to 60,000 cases per day of Simplot products is capably handled by Cascade's Load Push/Pull.

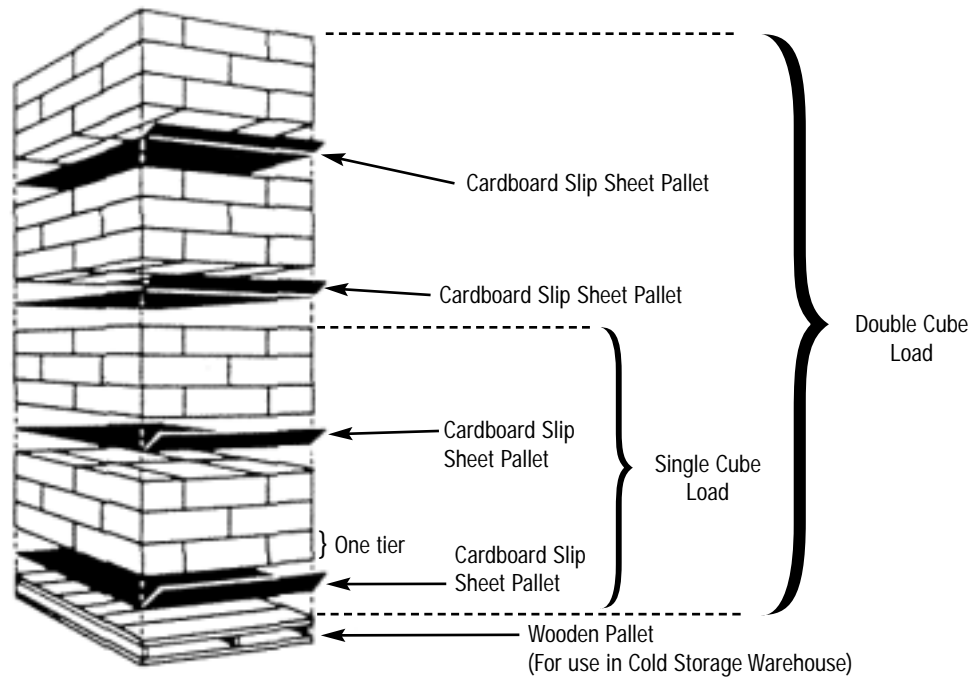
loads two high in storage – a total of 24 tiers.

**SIMPLOT
PALLETIZING
OPERATION &
CASCADE'S
LOAD PUSH/PULL
REDUCE PRODUCT
DAMAGE 75%**

Simplot



J.R. Simplot Company automatically palletizes double cube loads of 108 cases for frozen storage. Cascade's Load Push/Pull hauls them away from the palletizing center.





With the addition of corner angle stacking aids for protection against crushing, Simplot can stack double cube loads two high in storage.



Cascade's Load Push/Pull stacks double cubes two high in frozen storage.

CASCADE LOAD PUSH/PULL ELIMINATES TWO MEN

At shipping time, the double cube load is picked up on the wooden pallet from frozen storage and driven to the rail or truck loading dock. At this point, the platen arms are removed from the wooden pallet and the push plate is extended. The Load Push/Pull is then raised so the attachment's gripper bar located at the bottom of the face plate can seize the leading edge of the slipsheet. After the gripper bar has firmly clamped the slipsheet, the load is pulled back onto the platens and driven directly into the railcar or van. The use of the Load Push/Pull for these operations reduces the risk of damage which often occurs when running chisel forks underneath the load.

When loading a railcar, the double cube load is placed in the car two cubes high. For truck loading, one and one-half cubes or nine tiers are removed from the twelve tier double cube load and positioned in the truck.

This entire procedure, including car loading, requires only one man – the lift truck operator. Previously three men were required to perform these same functions – a driver and two people to stack and unstack.

The old hand-stacking method of loading a railcar took 1.5 days (12 man hours). Now, with a Load Push/Pull equipped lift truck, Simplot can load a rail car in less than a day (7.5 man hours). Another advantage of mechanical loading is the reduction of product damage in transit. This is due to the tighter packing in rail cars or vans which in turn reduces the amount of carton movement.

Simplot



Here's how they used to do it! It took three men to load a car or van, plus others to operate a fork lift or conveyor. With the Cascade Load Push/Pull, it takes only one man.



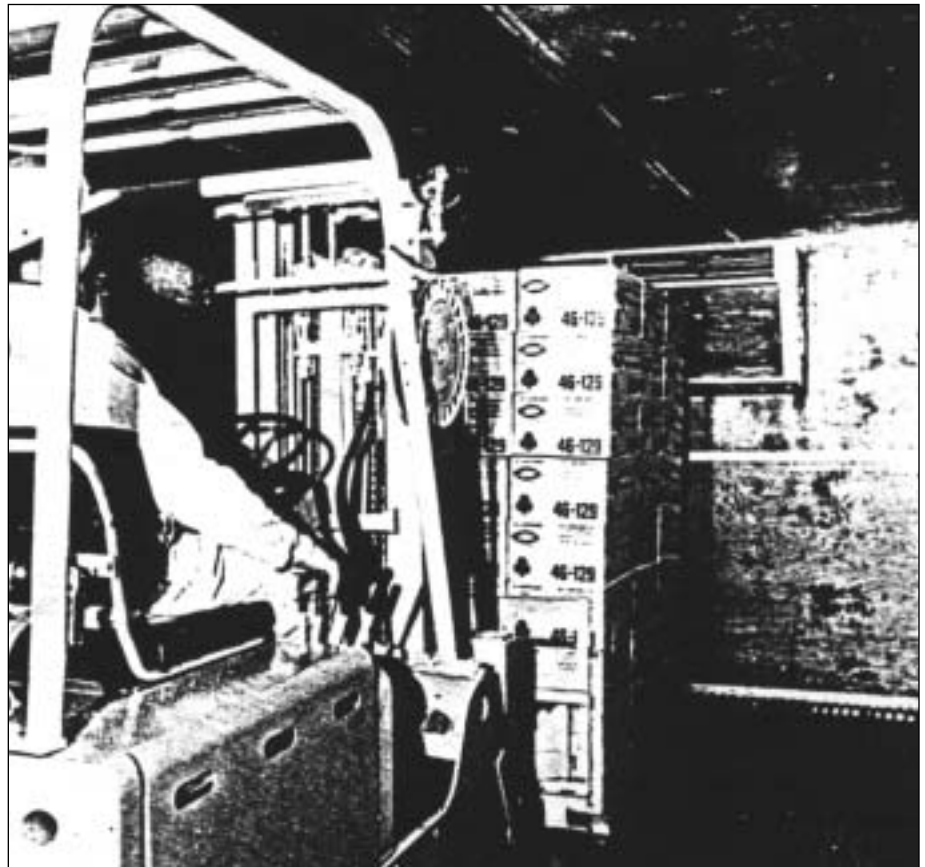
With a firm grip, the Load Push/Pull pulls a stack of cases onto the platen arms for delivery to loading docks.

SIMPLOT CUSTOMER REDUCE COSTS TOO

According to R.S. Farish, vice president of Simplot sales and marketing, the palletizing system has been enthusiastically received by Simplot customers. Their enthusiasm is due to:

- 1) Increased unloading speed. This faster handling virtually eliminates danger of thawing during unloading of shipments and helps prevent demurrage charges.
- 2) Labor is cut to a bare minimum.
- 3) "No return" slipsheets enable customers to use them in their own storage operations.
- 4) Handling of frozen fries in cube loads greatly reduces damage to this brittle product which is usually incurred when cases are handled individually. Avoiding this damage provides maximum servings per pound of product.

**For additional information on
Cascade Load Push/Pull
Attachments go to:
www.cascorp.com**



It takes less time and two less men to load a railcar or truck with a Load Push/Pull. Here you see the lift truck operator using the Load Push/Pull face plate to tighten the load in a railcar.



P.O. Box 20187
Portland, Oregon 97220
800 CASCADE (227-2233)
www.cascorp.com

ON-THE-JOB APPLICATION REPORT

Wenatchee, Washington

A few years ago Northern Fruit Company, Inc., a cold storage and fruit processing facility located in East Wenatchee, Washington, was confronted with the need to optimize their production and handling systems. Several areas to look at were how to increase their dock and storage capacities, how to increase product flow through the dock and how to minimize the fruit handling and resultant product damage. Their products, consisting of apples and pears, are delicate to handle and perishable.

The three and one half (3.5) hours it took to manually load or unload a standard 40' truck van was a major time consumer. Lengthy truck turn around time for the driver was also a problem. Pallet storage, pallet repair costs and space consumed during shipment and storage were additional factors.

To Northern Fruit the obvious solution was the implementation of slipsheets into their handling, storage and shipping system. This method uses a 40" x 48" slipsheet which is automatically placed on a pallet by a slipsheet feeder machine after the fruit is boxed and ready for stacking. The boxes are stacked seven (7) per layer and seven (7) layers high on the slipsheeted pallet in an interlocking pattern. The 'unitized' load is then strapped and wooden corner-posts installed. This then is the storage unit, averaging about 2,100 pounds.

Before shipment the corner-posts are removed. The wooden pallet remains at the warehouse while the



Cascade's Load Push/Pull... helping to boost production and profits at Northern Fruit Co.

product is handled and shipped on the slipsheets.

To handle these unit loads from the palletizer through the storage operation and shipping, a cushion tired lift truck is used. This truck operates on LP gas and is equipped with a Cascade "Load Push/Pull" attachment. The push/pull is equipped with 15" wide platens which also allows handling of product on wooden pallets as well as on slipsheets.

A sideshifting feature on the Cascade Push/Pull allows easy maneuvering during the pick up and placement of the load, which minimizes the drivers need to reposition the lift truck.

Northern Fruit has put into process a unique combination of conventional pallets and slipsheets. The slipsheet method allows them to increase their handling capacity and speed up production, particularly beneficial during the peak season. They have increased production from 2,000 boxes a day, a few short years ago, to 7,000 boxes this past season. A production increase of 250%!

Truck turn around time at the dock is minimized. One 40' van can be loaded by one lift truck in thirty (30) minutes. Two lift trucks can be used to further reduce loading time. Warehouse capacity is also increased by this method. Previously loads were only stacked 15 boxes high, by the new method described they are now stacking 21 layers high. A storage capacity increase of 40%.

Implementation of the slipsheet method in conjunction with the Cascade Load Push/Pull attachment has streamlined the Northern Fruit operation. Improved production efficiency has minimized produce handling while increasing storage and shipping capacities.

Northern Fruit Company is yet another example of a progressive organization realizing increased production and profits' by applying new material handling techniques.

For additional information and specifications on the complete line of Cascade Load Push/Pull attachments contact: **Cascade Corporation**— see end of Article 8.

INDUSTRIES USING PUSH/PULLS

FOOD PROCESSING

Cadbury
 California Packing Corporation
 Campbell Soup
 Carnation
 Carnation
 Cargil
 Coast Oyster Co.
 Colonial Sugar
 Contadina
 David Processing
 Del Monte
 Domino Sugar
 Frito-Lay
 General Mills
 General Mills
 Green Giant
 Hunt-Wesson Foods
 Hormel
 H.J. Heinz
 H.J. Heinz
 Hills
 Hunt-Wesson
 J.R. Simplot
 J.R. Simplot
 J.R. Simplot
 Kal-Kan
 Keebler Cookies
 Kellogg Company
 Kraft Foods
 Kraft Foods
 Kraft Foods
 Kraft Foods
 Libby, McNeill & Libby
 Maple Leaf
 Nabisco
 Nabisco
 Nabisco
 Nestle
 Nestle
 Nestle Germany
 Ralston Purina
 Ralston Purina
 Rodger Cannery
 Senca

Lecmceister, U.K.

 Sacramento, CA
 Los Angeles, CA
 Jefferson, WI
 Amsterdam Holland
 South Bend, WA
 Grammercy, LA
 Riverbank, CA
 Walla Walla, WA
 Alameda, CA
 New Orleans, LA
 Bakersfield, CA
 Lodi, CA
 Chicago, IL
 Minneapolis, MN
 White Plains, NY
 Stockton, CA
 Tracy, CA
 Stockton, CA
 Richmond, Indiana
 Hayward, CA
 Burley, ID
 Caldwell, ID
 Harburn, ID
 Columbus, OH
 Chicago, IL
 Battle Creek, MI
 Chicago, IL
 San, CA
 Clifton, NJ
 Laselle, Que, Canada
 Chicago, IL
 Montreal, Canada
 East Hanover, NJ
 Portland, OR
 Montreal, Canada
 Aubigny, France
 Gorinchen, Holland
 Hamburg
 Battle Creek, MI
 Cincinnati, OH
 Walla Walla, WA
 Janesville, WI

Distribution

Cannery & Distribution Center
 Corporate Headquarters
 W/H and Distribution
 Grain
 Cannery
 Sugar Refinery
 Cannery
 Fruit Processor
 Processing & Distribution Center
 Sugar Refinery
 W/H and Distribution
 Dry Case Goods & Distribution
 Distribution

 Food Processing & Distribution
 Cannery & Distribution Center
 Cannery
 Cannery & Distribution Center
 Pet Food
 Processing & Distribution Center
 Potato Processor
 Potato Processor
 Potato Processor
 Cannery (Pet Food)
 Food Processor
 Food Processing & Distribution
 Distribution
 Distribution
 Distribution
 Distribution
 Cannery & Processor
 Flour Mill
 Food Processor
 W/H and Distribution
 W/H and Distribution
 W/H and Distribution
 W/H and Distribution
 W/H and Distribution
 Dry Case Goods
 Mill and Distribution Center
 Cannery
 Distribution

FOOD PROCESSING CONTINUED

Stokely-Van Camp
 Stokely-Van Camp
 Stokely-USA
 Tri-Valley Growers
 T.J. Lipton
 Bristol-Meyers
 Hunt-Wesson Foods
 Nestle Gluckslee
 Nestle
 Ogilvy Mills

Fairmont, MN
 Oakland, CA
 Poynette, WI
 Sacramento, CA
 Englewood Cliffs, NJ
 Hill Side, NJ
 Fullerton, CA
 Neustadt, Germany
 York
 Montreal, Canada

Cannery
 Cannery
 Cannery
 W/H and Distribution
 Dry Case Goods
 Dry Goods
 Food Processing & Distribution
 W/H and Distribution
 Distribution
 Flour Mill

FOOD FRESH

Alturus Packing
 Bordo Citrus Products
 Citrus World
 Diamond Fruit
 Florida Citrus Packers Assoc.
 Gracewood Fruit
 Gulf & Western
 HHLA
 Indian River Exchange
 Lakeland Packing
 Lake Hamilton Citrus
 Lykes Pasco
 Orange Co.
 Seald Sweet Sales Packing Co.
 Sunkist
 Texas Citrus & Vegetable

Connersville, FL

 Lake Wales, FL
 Hood River, OR
 Lakeland, FL
 Vero Beach, FL
 Fellsmere, FL
 Hamburg, Germany
 Vero Beach, FL
 Lakeland, FL
 Lake Hamilton, FL
 Dade City, FL
 Lake Hamilton, FL
 Tampa, FL
 Ontario, CA
 Harlingen, TX

Growers and Shippers
 Fruit (Citrus)

 Fruit (Citrus)
 Fruit (Apples, Peaches, Pears)
 Food - Fresh
 Fruit (Citrus)
 Fruit (Citrus)
 W/H & Distribution
 Fruit (Citrus)
 Fruit (Citrus)
 Fruit (Citrus)
 Fruit (Citrus) & Distribution Center
 Food - Fresh
 Food - Fresh
 Frozen and Fresh Fruit Processors
 Food - Fresh

FOOD DISTRIBUTION CENTERS

Alford's Cold Storage
 Big Bear
 California Cannery & Growers
 Carnation
 Distribution Centers, Inc.
 Empire Freezer
 Fernandes Supermarkets, Inc.
 Geneva Cold Storage
 Giant Foods
 Holman Transfer
 Inland Underground Warehouses
 Jewell T Company
 Kroger
 Livingston
 National Distribution Warehouse
 Penn-Central

Dallas, TX
 Columbus, OH
 Milipitas, CA
 Stockton, CA
 Cincinnati, OH
 Syracuse, NY
 Norton, MS
 Darien, WI
 Landover, MD
 Portland, OR
 Kansas City, MO
 Melrose Park, IL
 Columbus, OH
 Laval, Que. Canada
 Clearfield, UT
 Columbus, OH

Warehouse
 Warehouse
 Warehouse
 Warehouse (Public)

 Distribution Center
 W/H & Distribution
 Food Distribution Center
 Warehouse (Public)

 Food Distribution Center
 Warehouse
 Warehouse W/H & Distribution
 Warehouse (Public)
 Warehouse (Public)

FOOD DISTRIBUTION CENTERS CONTINUED

Perlman Rocque
RJR Foods
SIW Warehousing
Safeway
Safeway
Servmark
Terminal Ice & Cold Storage
Van de Water Raymond
Winn Dixie

FROZEN FOOD

Adams Packing Association, Inc.
B & W Frozen Foods, Inc.
Birdseye (General Foods)
Citrus World, Inc.
General Foods
Holly Hill Fruit Products
Lamb-Weston
Libby, McNeill & Libby
McLain's
Martin-Brower
Martin-Brower
Morton Frozen Food
Ore-Ida
Pik's Rite, Inc.
Plymouth Citrus Products

STONE, CLAY, GLASS

Baroid
Industrial Minerals
Riverside Cement

BEVERAGE

Allied Distilleries
Barton Guestier
Belgium Packhoed
Chauteavent
Chivis & Glenlivet
Coors
Coors
Drambuie
Heineken
Hough
Mumms

Lamont, IL
Winston-Salem, NC
Lachine, Que. Canada
Richmond, CA
Portland, OR
St. Bruno, Que. Canada
Woodburn, OR
Laval, Que. Canada

Auburndale, FL
Bradenton, FL
Woodburn, OR
Lake Wales, FL
Winterhaven, FL
Davenport, FL
Portland, OR
Darien, WI & Ocala, FL

DesPlaines, IL
Halthorpe, MD
Crozet, VA
Portland, OR

Plymouth, FL

New Orleans, LA
Florin, CA
Crestmore, CA

Dumbarton, Scotland
Blanqefort, France
Antwerp, Belgium
Bonneries, France
Paisley, Scotland
Tustin, CA
Golden, CO
Edinburgh
Den Bosch, Holland
Colorado
Reims, France

Distribution Center
Warehouse
W/H & Distribution
Warehouse
W/H & Distribution
W/H & Distribution
Cold Storage Warehouse
W/H & Distribution

Fresh Food Processors

Fresh Food Processors

Clay Mill (Bagged)
Clay Mill (Bagged)
Cement Plant (Bagged)

Distillery W/H & Distribution
Winery
Container Unloading-Spirits
Winery
Distillery W/H & Distribution
Distributor
Brewery
Distillery W/H & Distribution
Brewery
Distribution
Winery

BEVERAGE CONTINUED

Oregon Liquor Control
 Quebec Liquor Board
 R.D.S.
 Seagrams
 Seagrams
 United Distillery
 United Distillery
 WM Grant
 White Horse

Portland, OR
 Montreal, Canada
 California
 Lawrenceburg, IN
 LaSelle, Que. Canada
 Kilmarnock, Scotland
 Valleyfield, Que. Canada
 Bellshill, Scotland
 Glasgow, Scotland

Distribution Warehouse
 W/H & Distribution
 Distribution
 Distillery
 Distillery W/H & Distribution
 Distillery W/H & Distribution
 Distillery W/H & Distribution
 Distillery W/H & Distribution
 Distillery W/H & Distribution

AGRICULTURAL PRODUCTS

Albers Mills Co.
 Cities Services
 Citrus World
 Lake Hamilton Citrus
 Lykes Pasco

Portland, OR
 Tampa, FL
 Lake Wales, FL
 Lake Hamilton, FL
 Dade City, FL

Feed Mill (Bagged)
 Chem Fertilizer Plant (Bagged)
 Citrus Pulp (Cattle Feed)
 Citrus Pulp (Cattle Feed)
 Citrus PULP (Cattle Feed)

PAPER PRODUCTS

American Tissue
 Gaylord Container
 Mead Corporation
 Packaging Corp.
 Stone
 Waterway Terminal
 Weyerhaeuser

Tomahawk, WI
 Carol Stream, IL
 Cincinnati, OH
 Tomahawk, WI
 Salinas, CA
 Portland, OR
 Colton, CA
 New Orleans, LA

Pulp Bales*
 Corrugating Plant
 Corrugating Plant
 Pulp Bales*
 Corrugating Plant
 Pulp Bales*
 Corrugating Plant
 Corrugating Plant

**using pushers only*

BUILDING MATERIALS

Clorox
 Excell Dist.
 G.E. Lamp Division
 Home-Depot
 Johns-Manville
 Raymond Shake
 Weyerhaeuser (Shake Division)

Houston, TX
 Houston, TX
 Bridgeport, CT
 All Locations
 Waterville, OH
 Raymond, WA
 Raymond, WA

W/H & Distribution
 W/H & Distribution
 Building Materials
 Insulation
 Insulation
 Shake & Shingle Mill
 Shake & Shingle Mill

ELECTRONICS

Apple
 Apple
 Apple
 Apple
 Apple
 Bosch/Blaupunkt
 Cannon

Itasca, IL
 Les Ulis, France
 Apeldoorn, Holland
 Munchen, Germany
 Hemel Hempst.
 Cork
 Hildesheim, Germany
 Amsterdam, Holland

W/H & Distribution
 W/H & Distribution
 W/H & Distribution
 W/H & Distribution
 W/H & Distribution
 W/H & Distribution
 Mfg. W/H & Distribution
 W/H & Distribution

ELECTRONICS CONTINUED

Cannon
Cannon Europe
Compaq
Hewlett Packard
Hewlett Packard
Panasonic
Panasonic
Phillips
Sharp
Sony
Sony
Xerox
Yamaha

RETAIL

Home Depot
WalMart

CHEMICAL

Ciba Geigy
Hoechst
Hoechst
Kodak
Kodak
Procter & Gamble

OTHER

Amway
Becton Dickinson
Meyer Corp.
Nippon Denso
Quaker State Oil

Crawley, U.K.
Amstelveen
Gorkum
Corvallis, OR
Amersfoot
Cardit, South Wales, U.K.
Hamburg
Eidhoven, Holland
Wrexham, U.K.
South Wales, U.K.
Koln, Germany

Rellingen, Germany

Manchester, U.K.
Frankfurt, Germany
Oberhausen, Germany
Stuttgart
Hemel Hems, U.K.
Manchester, U.K.

Denver, CO.
Temse, Belgium
Benicia, CA
Weesp, Holland

W/H & Distribution
Mfg. W/H & Distribution
Mfg. W/H & Distribution
Mfg. W/H & Distribution
Mfg. W/H & Distribution
Mfg. W/H & Distribution
Mfg. W/H & Distribution
Mfg. W/H & Distribution
Mfg. W/H & Distribution
Mfg. W/H & Distribution
Mfg. W/H & Distribution

Mfg. W/H & Distribution

Distribution
Production & Shipping
Production & Shipping
Distribution
Distribution
Distribution

Distribution
Pharmaceutical
Importing
Auto Parts



P.O. Box 20187
Portland, Oregon 97220
800 CASCADE (227-2233)
www.cascorp.com

PUSH/PULL & SLIPSHEET HANDLING MANUAL

Converting to Slipsheets

SLIPSHEETING – FROM TEAM TO REALITY

Apple Computers

Why did we decide on the slip-sheet handling process?

Solution to receiving problem

- Project champion (*defined team responsibilities*)

Unit load handling benefits vs. standard wood pallet

- Variety of carton sizes
- Shipping equivalent of 250 truck loads of pallets a year

Why was slipsheeting the correct solution?

Labor requirements - reduced

Warehouse utilization/scheduling - improved

Material expenses - reduced

Transportation costs - reduced

Implementation strategy

Global logistics

- Apple distribution network

Dedicated team approach a must

- Slipsheet vendor qualification
- Equipment vendor qualification
- OEM vendors conversion
- Distribution warehouse support
- Manufacturing participation & support

- Carrier conversion
- Distributor director shipment support

Communications

Concept, process, benefits, objectives with:

- Distribution center
- Packaging engineering
- Manufacturing
- OEM procurement
- Transportation
- Vendors & distributors

Commitment – ongoing process support required

Packaging engineering

- Product changes
- New products

New vendors

Quality control program & support requests

Implementation plan outline:

Select core team members

(*inside & outside*)

- Project champion (*defined team responsibilities*)
- Committed team slipsheet vendor
- Committed team equipment (*attachment*) vendor

Develop slipsheet specification

- Custom slipsheet for electronics

Develop unit load configurations & specifications

Vendor win-win strategy

- Trail shipments

Phased program— implementation process

- Communications (*project overview*)
- Equipment procurement (*specifications*)
- Trial shipments (*video's*)
- Start-up training and checkout (*certify*)
- Follow-up support & quality control participation

Long term planning

- Two-year project from idea to 100% implementation

Training (*start-up & follow-up*)

Customer satisfaction

(*follow-up communications*)

Potential problems to implement slipsheeting

Process issues and concerns

Converting truck carriers

Can we succeed 100% FG or have some hand stacking?

Number of locations to convert (*extensive effort*)

- Company global buy – in and support

Required commitment from all groups

Benefits

Cost savings for apple and vendors

- Transportation
- Material
- Labor
- Reduced product damage
- Shorter receiving turn around or time to market
- Better cube utilization of warehouse facilities
- Better space utilization of warehouse facilities
- Cleaner and safer warehouse environment
- Have also implemented incoming vendor materials

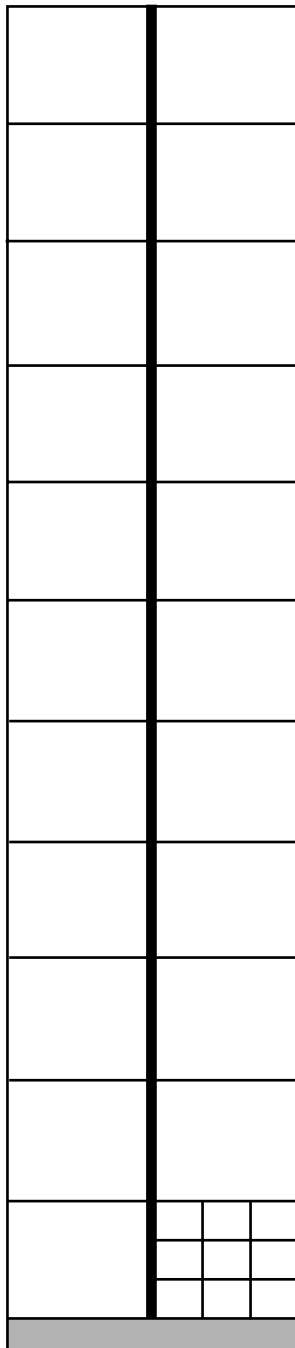
Summary

The first electronics corporation to implement the slipsheet process on a global basis

The results have exceeded our expectations

Slipsheeting – Making It A Success For Suppliers

*Key to success:
Win – Win*



Top View

Container Pattern Using Pallets

Total Cartons Per Container: 1,012

Example:

Part Number: 12345

Description: Computer Product

Vendor: Overseas Supplier

Container Size: 474" x 92" x 93.7"
(12040mm x 2337mm x 2380mm)

Unit Load Size: 48.3" x 44.7" x 36.4"
(1227mm x 818mm x 925mm)

Unit Load: 9 per level & 4 levels high

Carton Size: 16.1" x 14.9" x 9.1"
(409mm x 379mm x 230mm)

Number of Unit Loads: 44

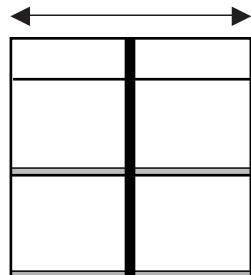
Number of Cartons Per Unit Load: 36

Total Cartons Per Container: 1,584

Carton Weight: 15 lbs.

Total Container Weight: 23,760 lbs.

Utilized Width:
89.4"



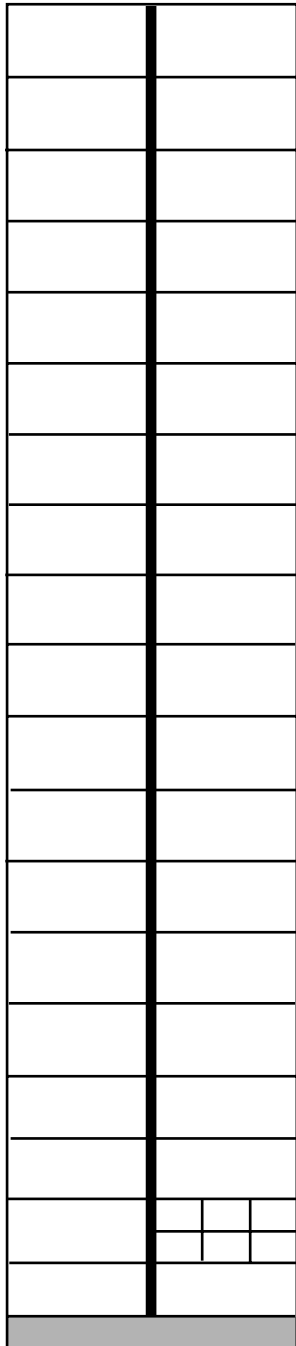
Utilized Height:
83.5"



End View

Slipsheeting – Making It A Success For Suppliers

*Key to success:
Win – Win*



Top View

Container Pattern Using Slipsheets

Example:

Part Number: 12345
Description: Computer Product
Vendor: Overseas Supplier

Container Size: 474" x 92" x 93.7"
 (12040mm x 2337mm x 2380mm)

Unit Load Size: 44.7" x 32.2" x 45.5"
 (1135mm x 818mm x 1156mm)

Unit Load: 6 per level & 5 levels high

Carton Size: 16.1" x 14.9" x 9.1"
 (409mm x 379mm x 230mm)

Number of Unit Loads: 68

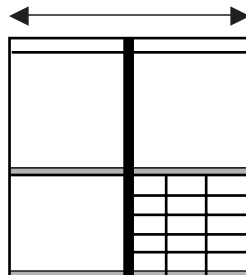
Number of Cartons Per Unit Load: 30

Total Cartons Per Container: 2,040

Carton Weight: 15 lbs.

Total Container Weight: 30,600 lbs.

Utilized Width:
89.4"



Utilized Height:
91"

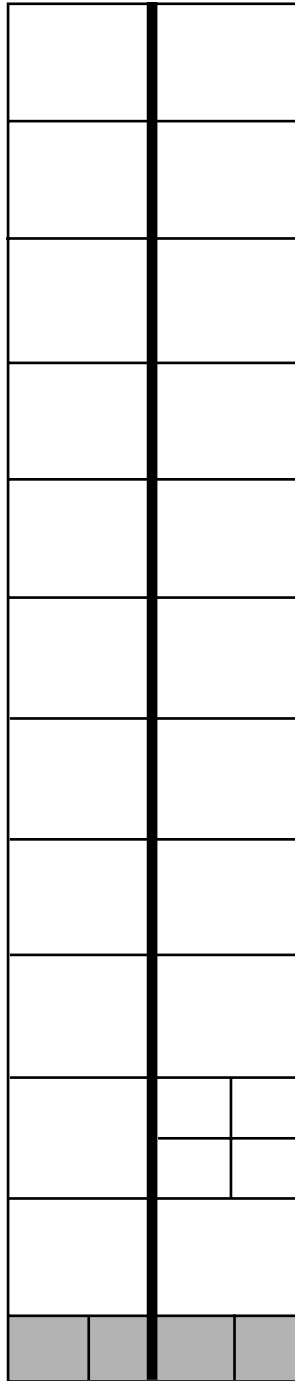


End View

"Old Box" Method

Slipsheeting – Making It A Success For Suppliers

*Key to success:
Win – Win*



Top View

Container Pattern Using "Old Box" Method

Example:

Part Number: 87926

Description: Another Computer Product

Vendor: Another Far East Supplier

Container Size: 474" x 92" x 93.7"
(12040mm x 2337mm x 2380mm)

Unit Load Size: 45" x 40" x 39.5"
(1143mm x 1016mm x 1003mm)

Unit Load: 4 per level & 5 levels high

Carton Size: 22.5" x 19.8" x 7.8"
(572mm x 503mm x 198mm)

Number of Unit Loads with 5 Layers: 22

Number of Cartons Per Unit Load: 20

Number of Unit Loads with 6 Layers: 22

Number of Cartons Per Unit Load: 24

Total Number of Unitized Cartons: 968

Number of Cartons Hand Stacked: 44

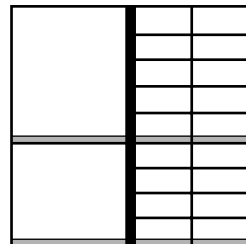
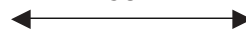
Total Cartons Per Container: 1,012

Carton Weight: 17 lbs.

Total Container Weight: 17,204 lbs.

Utilized Width:

90"



Utilized Height:
86.8"



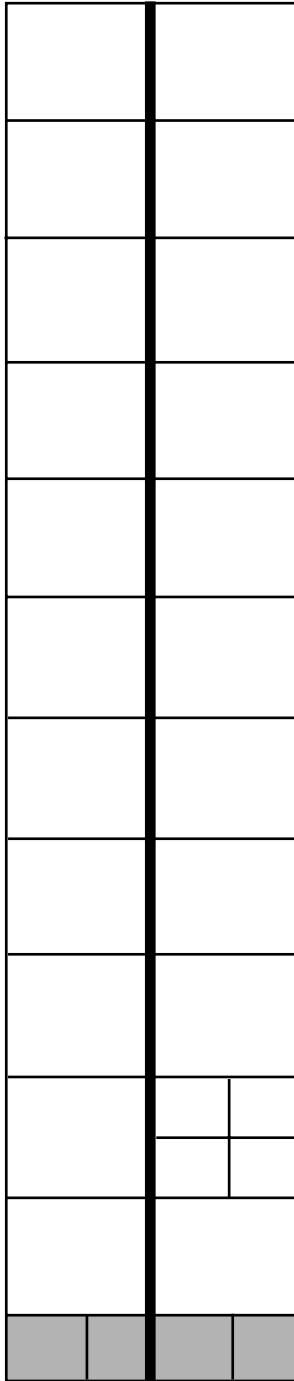
Slipsheet

**End View
Before Hand Stacking**

"New Box" Method

Slipsheeting – Making It A Success For Suppliers

*Key to success:
Win – Win*



Top View

Container Pattern Using "New Box" Method

Example:

Part Number: 87926

Description: Another Computer Product

Vendor: Another Far East Supplier

Container Size: 474" x 92" x 93.7"
(12040mm x 2337mm x 2380mm)

Unit Load Size: 45" x 40" x 44.4"
(1143mm x 1016mm x 1143mm)

Unit Load: 4 per level & 6 levels high

Carton Size: 22.5" x 19.8" x 7.4"
(572mm x 503mm x 188mm)

Number of Unit Loads: 44

Number of Cartons Per Unit Load: 24

Total Number of Unitized Cartons: 1,056

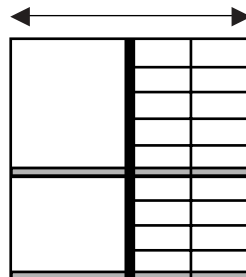
Number of Cartons Hand Stacked: 48

Total Cartons Per Container: 1,104

Carton Weight: 17 lbs.

Total Container Weight: 18,768 lbs.

Utilized Width:
90"



Utilized Height:
89.8"

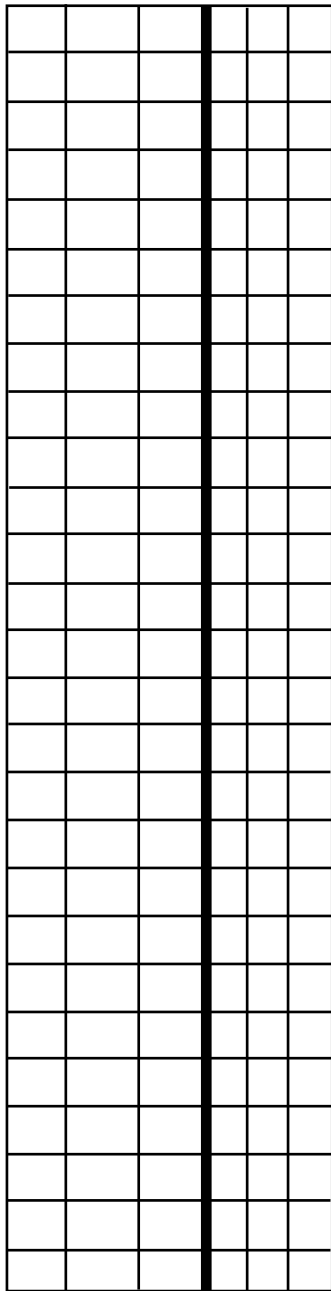
Slipsheet

**End View
Before Hand Stacking**

"Hand Stack" Method

Slipsheeting – Making It A Success For Suppliers

*Key to success:
Win – Win*



Top View

Container Pattern Using "The Hand Stack" Method

Example:

Part Number: 67890

Description: Another Computer Product

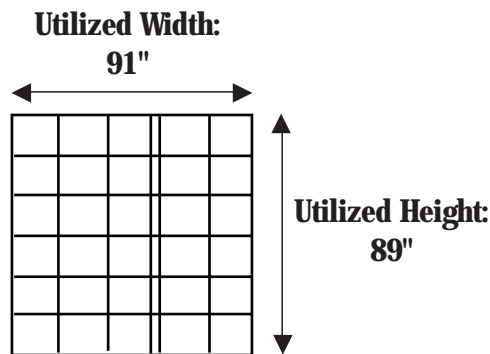
Vendor: Overseas Supplier #2

Container Size: 474" x 92" x 93.7"
(12040mm x 2337mm x 2380mm)

Carton Size: 19.4" x 17.2" x 14.8"
(493mm x 437mm x 376mm)

Total Cartons Per Container: 756

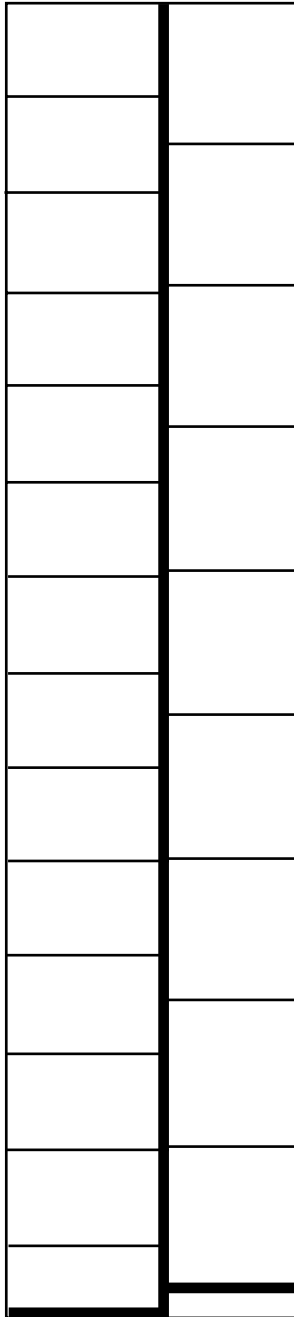
Total Container Weight: 20,412 lbs.



End View

Slipsheeting – Making It A Success For Suppliers

*Key to success:
Win – Win*



Top View

Container Pattern Using Slipsheets

Example:

Part Number: 67890

Description: Another Computer Product

Vendor: Overseas Supplier #2

Container Size: 474" x 92" x 93.7"
(12040mm x 2337mm x 2380mm)

Unit Load Size: 52" x 39" x 44.5"
(1321mm x 991mm x 1130mm)

Unit Load: 6 per level & 3 levels high

Carton Size: 19.4" x 17.2" x 14.8"
(493mm x 437mm x 376mm)

Number of Unit Loads: 42

Number of Cartons Per Unit Load: 18

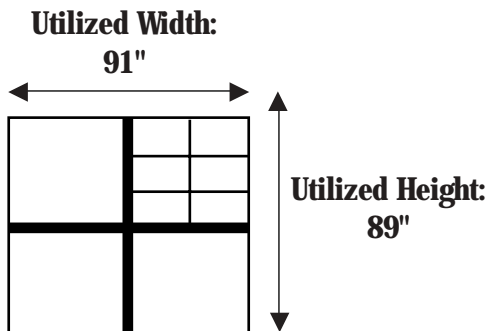
Total Number of Unitized Cartons: 756

Number of Cartons Hand Stacked: 0

Total Cartons Per Container: 756

Carton Weight: 27 lbs.

Total Container Weight: 20,412 lbs.



End View

Slipsheeting – Making It A Success For Suppliers

How are suppliers approached with regards to slipsheeting?

Present method of shipping and
why we want to change

How it is going to affect suppliers

Advantages to both suppliers
and Apple

“Preferred Vendor”

Assistance in implementation

Emphasis on “Win – Win”

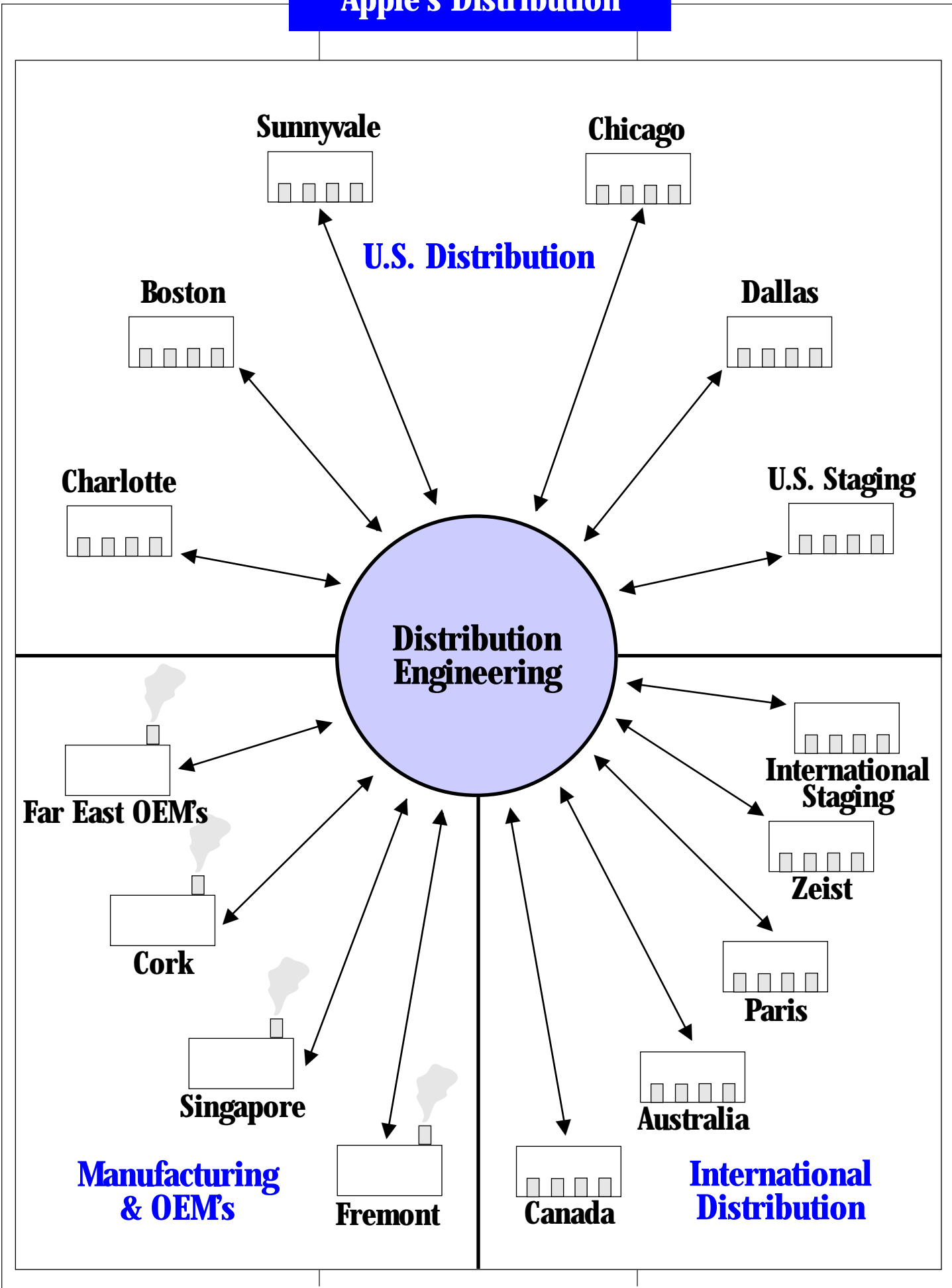
Why are suppliers important?

Accountable for configuration
of product

Responsible for ensuring load is
safe for transit

Responsible for proper utilization
of container/trailer

Apple's Distribution



Slipsheet Specifications

SLIPSHEET SPECIFICATION

*Quality of Slipsheet—
4 Key Issues*

🍏 Strength of the sheet

- Cardboard Perception
- WW Transportation
- Quality 4 Ply Sheet

🍏 Length of Pull Tab

- 6" Tab Story
- Scores Improve Tab Roll

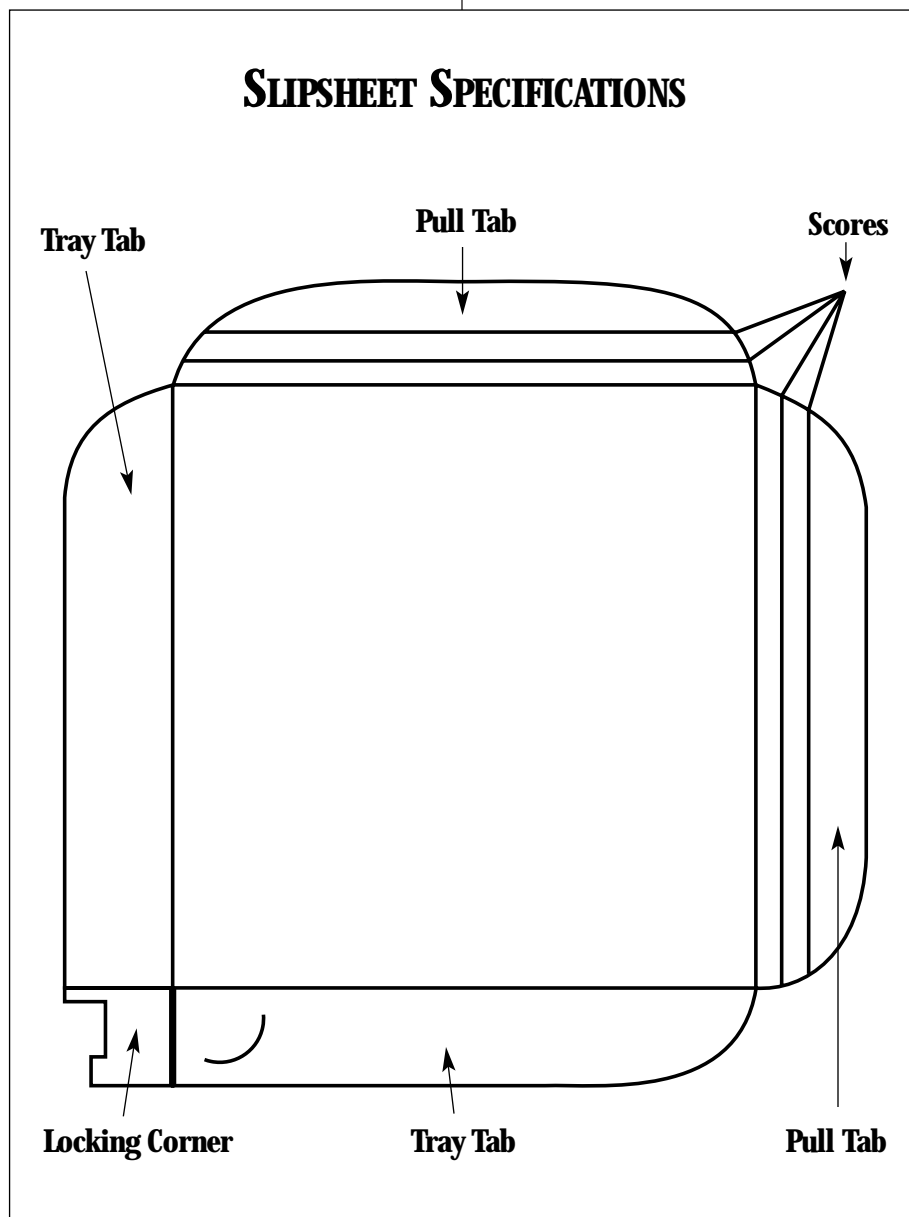
🍏 Unit Load Design

- Tray to Secure Unit Load
- Stretch Wrap Spec
- Many Product Sizes

🍏 Vendor Qualification

- Vendor Process
- Tooling Costs
- Order Quantities
- Support and Delivery

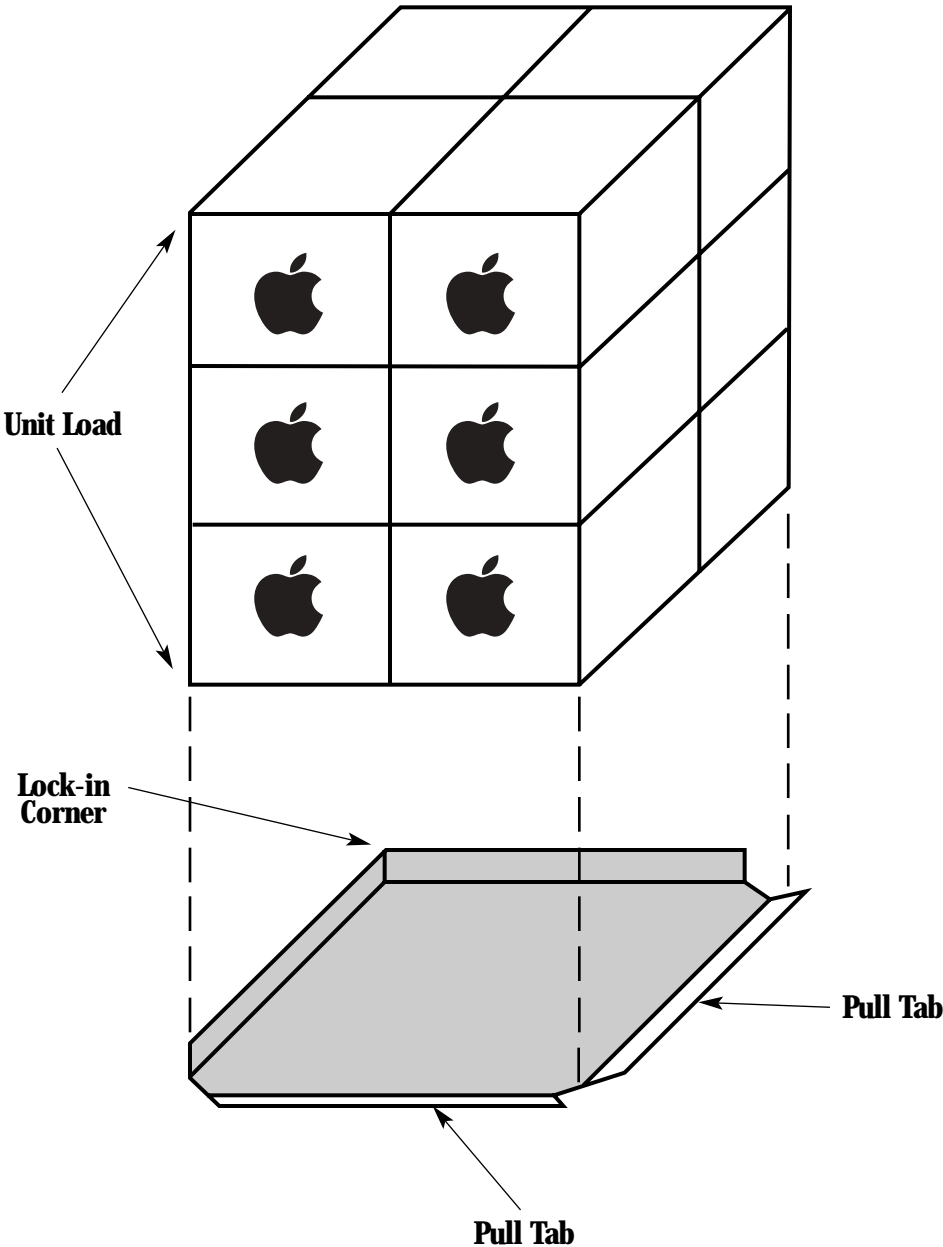
**Goal—To Provide The Best
Quality Slipsheet in the
Electronic Industry**



MATERIALS HANDLING SYMPOSIUM
MARCH 1, 1989
Santa Clara, CA

Slipsheet Specifications

SLIPSHEET WITH LOCK-IN CORNER

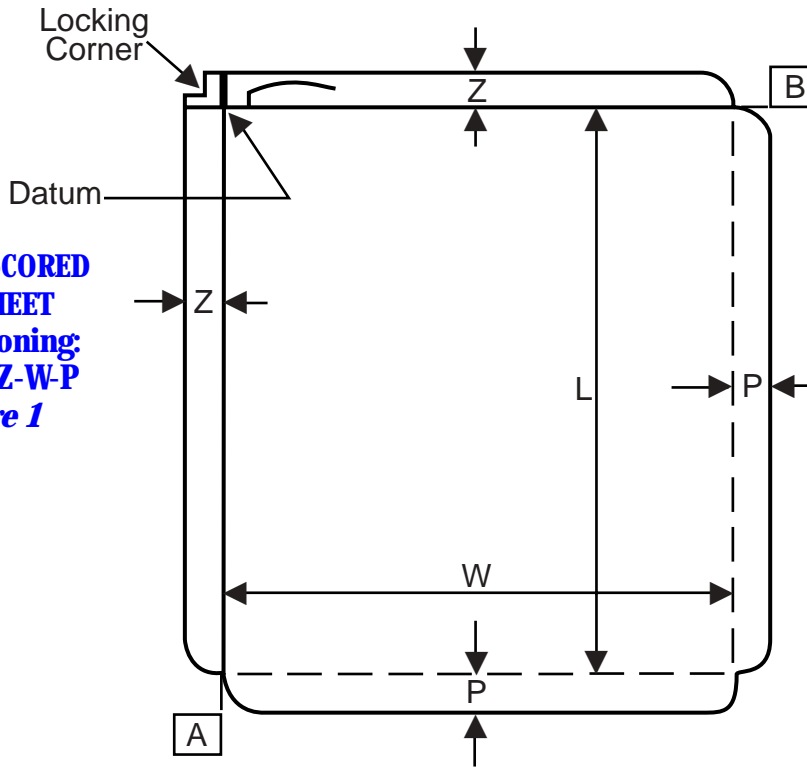


 **Apple
Computer, Inc.**

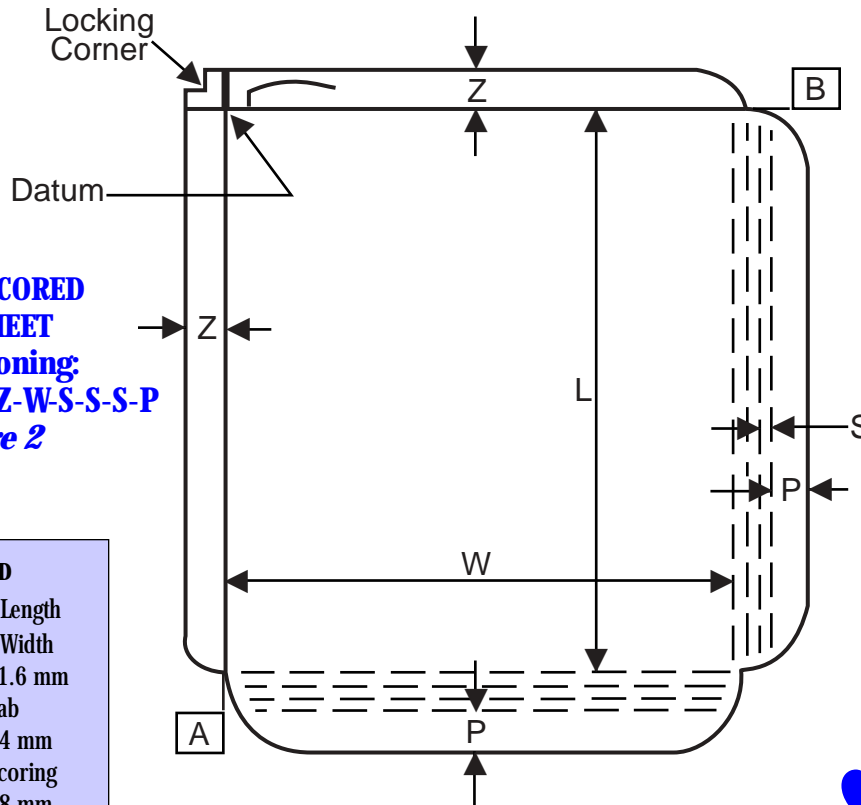
Slipsheet Specifications

SOLID FIBER SLIPSHEET

**SINGLE SCORED
SLIPSHEET**
Dimensioning:
Z-L-P x Z-W-P
Figure 1



**MULTI SCORED
SLIPSHEET**
Dimensioning:
Z-L-S-S-S-P x Z-W-S-S-S-P
Figure 2



LEGEND	
L	= Smallest Length
W	= Smallest Width
Z	= Fixed 101.6 mm [4.00] Tab
S	= MIN. 25.4 mm [1.00] Scoring
P	= MIN. 50.8 mm [2.00] Tab

 **Apple
Computer, Inc.**

Slipsheet Specifications

SOLID FIBER SLIPSHEET SPECIFICATIONS

Sheets are to be constructed from 100% ± Virgin Fourdrinier Kraft Linerboard, Laminated with waterproof adhesive. Must meet minimum specifications listed below.

Caliper: 1.17mm ± .076mm
[0.046 ± 0.003]

Ply: 4-Ply, 18.9 kg
[42.0 lbs.]

Average Tensile Strength:
MD 428 PSI
[30.2 kg/cm²],
CD 178 PSI
[12.5 kg/cm²]

Coating: Top side of sheets to be striped with Anti-Skid Coating to cover at least 50% of the sheet.

Scoring: See slipsheet drawing.

1. Tray Tabs (Z)

Scored at 101.6 mcm [4.00] from edge of slipsheet. Deep score in grain direction. Perforated score on the cross grain tab in increments of 6.4 mm [.25] perforation per 25.4 mm [1.00] length.

2. Pull Tabs (P)

Additional scoring on Pull Tab allows for unit load dimension increase up to 50.8 mm [2.00] in each of the overall length and width directions while still accommodating a minimum of 50.8 mm [2.00] pull tab for handling the unit load.

- Scores must be a minimum of 25.4 mm [1.00] apart.
- Pull tabs (P) are not to exceed 101.6 mm [4.00].

- Minimum pull tab exposed for handling the load is 50.8 mm [2.00].
- All scores to be parallel within allowable tolerance of ± 1.5 mm [.06] non-cumulative and measured from the datums -A- and -B-.

Dimensioning:

Unit load length and width is specified by a user according to unit load dimensions (*Figure 1*). The pattern is used to specify the exact dimensions of each required Slipsheet. The dimensions of the tray tabs and pull tabs are listed in the scoring section of this document. Refer to Figures 1 and 2 for the following dimensioning notation.

(Figure 1)

Z-L-P x Z-W-P

(Figure 2)

Z-L-S-S-S-P x Z-W-S-S-S-P

Locking Corner:

Designed to provide a permanent lock of the tray tabs at a 90° angle. (*See Figure 1 and 2*)

Corners:

All corners, other than the locking corner, are cut in a 101.6 mm [400] radius with the centers located 101.6 mm [4.00] from each corner on the **length & width** scores.

Printing: Print

APPLE COMPUTER, INC.
Size **L x W** in minimum of 19.1 mm [.75] letters down the center of the top side of the sheet.

Example:

APPLE COMPUTER, INC.
SIZE 12119.1 mm x
1066.8mm [48.0 x 42.00]

 **Apple
Computer, Inc.**

Slipsheet Specifications

Part No.	Vendor Size	Figure	Dimensions (Inches)									
			L	S	S	S		W	S	S	S	
942-1201	1	1	40.5	N/A	N/A	N/A	X		29.5	N/A	N/A	N/A
942-1202	2	1	40	1	N/A	N/A	X		34	N/A	N/A	N/A
942-1203	3	1	43	1	N/A	N/A	X		39.5	N/A	N/A	N/A
942-1204	4	1	43	1	1	N/A	X		40	2.5	N/A	N/A
942-1205	5	1	45	N/A	N/A	N/A	X		34	N/A	N/A	N/A
942-1206	6	2	45	2	1	N/A	X		39	1	2	N/A
942-1207	7	1	45	N/A	N/A	N/A	X		45	N/A	N/A	N/A
942-1208	8	1	46	N/A	N/A	N/A	X		31	N/A	N/A	N/A
942-1209	9	2	46	1.5	N/A	N/A	X		39	1.5	1	N/A
942-1210	10	1	47	N/A	N/A	N/A	X		44.5	N/A	N/A	N/A
942-1211	11	1	48	1	1	1	X		42	1	1	N/A
942-1212	12	1	49	N/A	N/A	N/A	X		37	N/A	N/A	N/A
942-1213	13	1	49	N/A	N/A	N/A	X		38	N/A	N/A	N/A
942-1214	14	1	50.5	3.5	N/A	N/A	X		35.5	1	N/A	N/A
942-1215	15	1	50.5	N/A	N/A	N/A	X		44	N/A	N/A	N/A
942-1216	16	1	51.5	N/A	N/A	N/A	X		43.5	N/A	N/A	N/A
942-1217	17	1	52	N/A	N/A	N/A	X		39	N/A	N/A	N/A
942-1218	18	1	54	N/A	N/A	N/A	X		37	N/A	N/A	N/A

Notes:

1. All "Z" tabs (Fig 1) measure 101.6 [4.0].
2. All "P" tabs (Fig 1) measure 50.8 [2.0].
3. Tensile strengths shown are minimum.


**Apple
Computer, Inc.**

DO'S & DON'TS OF CONVERTING TO SLIPSHEET HANDLING

By Lloyd C. Dick

*Manager, Manufacturing Services
Mead Paperboard Products*

INTRODUCTION

Companies contemplating a change to slipsheets must understand that it is a materials handling system which must be properly planned and executed to insure success and to obtain maximum benefits. They should also understand that there is neither reason for anyone to fail in his attempt to adopt the system nor is there reason for anyone to re-invent the wheel. Much has been accomplished during the past ten

years, or so, in a great variety of industries, which has proven that the slipsheet system can work extremely well if properly designed and installed.

We suggest that anyone planning to use slipsheets begin thinking of the slipsheet as a new materials handling system. Various parts of the system must work together properly for success. These most important ingredients can be summarized as follows:

1. A proper unit load for the product.
2. A proper slipsheet for the unit load, product and distribution system conditions (a wide variety is available).
3. Proper equipment and adequate training in its use.

4. Proper understanding of the slipsheet, how it is supposed to function and how it must properly match the material handling equipment to be used.
5. Proper consideration for the receiver's unloading and storage facilities.
6. Dedication to the new system by key individuals within the organization covering planning, purchasing, marketing and operations. Ideally, one individual within the company will assume responsibility for the system's success.

Check List For Establishing Proper Slipsheet Unit Load Handling Operation

“THE SLIPSHEET DO'S”

A. Is the slipsheet correct for the unit load?

- | | |
|---|---|
| 1. Size, Length-Width | Stacking surface same size as unit load—never larger |
| 2. Unit Load Weight
Light Weight Cases
Heavy Weight Cases | Corrugated or light caliper solid fiber
Heavy caliper solid fiber required to avoid tab tearing |
| 3. Stiffness For
Bagged Products | Heavy caliper solid fiber for stiffness so attachment can grasp tab properly. |
| 4. Moisture Exposure | Coating of outer liners with moisture barrier material and high sizing to resist moisture penetration that would weaken tab area. |
| 5. Tensile Strength | If only one use planned, sufficient tensile strength for 6 to 10 pulls without tab tearing. If sheet to be returned and reused, much greater tensile strength required. |
| 6. Tabs Required | 3" or 4" deep tab for each direction or pull. If side and end tab used, must relieve intersecting corner so tabs can fold independently of each other. May be need to consider “extra” tabs for use with stretch film to stabilize load in transit. |

“THE SLIPSHEET DO’S” (cont.)

B. Has the unit load been prepared properly?

- | | |
|--------------------------------------|--|
| 1. Overall Unit Load Size | Determine size to best fit cube of shipping container (trailer, car, etc.) consistent with capacities of shipping and receiving material handling equipment. This will minimize freight costs. |
| 2. Stacking Pattern | Determine stacking patterns for various case sizes to best fit overall unit load size selected. Turn and interlock cases on alternate layers for improved load stability. |
| 3. Placement of Production Slipsheet | Keep score lines and tabs completely free of product. Keep first cases 1/4" to 1/2" away from score lines. This will permit tabs to be folded up against unit load in transit and will minimize tab tearing. |
| 4. Load Stabilization Needs | Bottom cases must be prevented from shifting onto tab areas in transit. Use either palletizing adhesive on slipsheet or wrap unit load with stretch film, trapping tab in 90° up position. |
| 5. Breaking The Slipsheet Tab | Pre-breaking the tab on the score line will facilitate necessary up fold when loading and will minimize tab tearing when tab edges are hit by handling equipment. |

C. Have push/pull operators been trained properly?

1. Approaching The Unit Load
2. Picking Up The Unit Load
3. Decking The Unit Load
4. Undecking The Unit Load
5. Positioning Unit Load On Warehousing Pallet
6. Removing Unit Load From Warehousing Pallet
7. Placing Unit Load In Shipping Container
8. Removing Unit Load From Shipping Container
9. Maintenance of Push/Pull Equipment

D. Has the loading operation been performed properly?

*(Loading should **always** be performed with the **receiver** in mind)*

- | | |
|--|---|
| 1. Leave front tab readily accessible and in good condition for receiver | Push tab into 90° up position against each unit load. This will restrict movement of bottom cases onto tab area in transit. Tape front tabs in up position at trailer tailgate or before positioning bulkhead in railcar. |
| 2. Maintain straight vertical alignment of tired unit loads | Obtain straight alignment on dock against backstop prior to loading if equipment has capacity to lift two unit loads. Use sideshifter to obtain good vertical alignment. Use dunnage to fill void areas, as necessary. |

“THE SLIPSHEET DON'TS”

1. Don't place cases of product on the slipsheet tab area or score line. This will prevent tab from folding properly and cause tearing.
2. Don't push tab so it “crumples”. A bent or crumpled tab can damage other unit loads and tear when moving the unit load, unloading, etc.
3. Don't approach load at an angle. Approach unit loads squarely. Damage can occur to cases if a corner of the push/pull plate makes contact first.
4. Don't slam the push/pull faceplate into the unit load when squaring cases during loading. Hidden damage may result.
5. Don't attempt to pull a unit load from a stack with the mast tilted back. The platens may be pulled into contact with the unit load underneath the one being moved, causing damage.
6. Don't leave unit loads stacked so that one is out of line vertically with the other or damage will result. Use the sideshift to place one unit load squarely on top of another.
7. Don't use reverse gear to drive the truck from under the unit load or damage will result. Always use proper technique when pushing a unit load off platens.
8. Don't leave slipsheet tabs in positions where they can be easily damaged. Loose tabs can jam or get caught causing damage to cases during the following unit load moves. Tabs can be taped against unit loads to avoid such damage.

E. Will the slipsheet perform at all levels in the distribution cycle?

- | | |
|------------------------------------|--|
| 1. Receiver unloading equipment | Each receiver must have proper size and capacity equipment. Sideshift capability is recommended to avoid product damage. |
| 2. Receiver driver training | Each receiver Push/Pull operator must also receive training outlined in “C” above. |
| 3. Receiver warehousing facilities | If wood warehousing pallets are used, pallets must be properly constructed and sized to avoid damage to slipsheets and product. Fork tines can damage slipsheet tabs unless proper equipment and methods are used. |

RECOMMENDED GUIDELINES TO FOLLOW FOR SUCCESSFUL PUSH/PULL TEST

Load Preparation

- First load—pick a stable product easily handled.
- Weight—approximately 1500 to 2000 lbs.
- Interlock cases.
- 40" x 48" load base – 40" to 50" high.
- Stabilize top of load with band of tape, stretch wrap, etc.
- Dunnage—If load is susceptible to movement in transit, consider dunnage for last two unit loads over truck/trailer wheels to prevent movement.

Slipsheet

- Solid fiber, strong heavy duty slipsheet that can compensate for initial inexperienced lift truck driver.
- Test the use of break away glue between the load base and the slipsheet to determine if the glue is needed to prevent the load from walking or moving on the slipsheet in transit.

Lift truck

- Capacity—Without push/pull attachment, at least 1200 lbs. more than the maximum load weight to be carried.
- Mast—Free lift 50" to stack and de-stack inside truck/trailer. Overall mast lowered height 83" or less to enter through truck/trailer doorway.

Lift truck driver training

- Cascade 1/2 inch VHS video available to illustrate use of the push/pull.
- Driver training brochure (*Owner's & Operators Guide*) illustrating important driver techniques.
- Obtain sample slipsheet to enable drivers to practice with slipsheets prior to initial shipment of loads.
- Select one or two proficient drivers that are anxious to operate new equipment.
- Have driver practice picking up floor load plus stacking and de-stacking second tiered loads.
- If possible, the first slipsheet load should be sent to distribution center in time to allow the driver an opportunity to become familiar with slipsheet handling prior to sending observers to watch test loads.
- Ship test loads to Distribution Center of both difficult and easy to handle load.
- Have observers watch load.

Cascade Sales Aids

Cascade video tapes are available for purchase at a cost of \$40.00 net price. Prices include postage and handling. Format standard 1/2" VHS.

E-Series Push/Pull Features

Video #209207

Push/Pull Driver Training

Video #677557

Palletless Handling Program

Video #204320

- Palletless Handling

- Slipsheet Handling at Northern Fruit

- Receivers Your Day

- Slipsheet Handling at Bristol Meyers

HOME DEPOT'S CONVERSION SPURS INTEREST IN SLIPSHEETS

*the WERC sheet
Warehousing Education
& Research Council*

When Home Depot talks, vendors listen. And that's what happened last year when Home Depot, Inc., announced that it was converting from pallets to slipsheets and would not accept palletized freight after January 1, 1995.

Slipsheets—which for a time seemed to be the stepchildren of the material handling world—were dismissed by companies in most industries for many years.

Even before Home Depot's announcement, however, use of slipsheets had begun to spread beyond the traditional food industry application. Slipsheets are now being used to ship electronics (*including personal computers and laser printers*), chemicals, pharmaceuticals, liquor, and textiles such as apparel, linens and hosiery, says Cynthia Holloway, marketing manager for slipsheet manufacturer Lydall, Inc., Richmond, VA.

Substantially greater slipsheet use may be in the cards for many WERC members. Holloway reports that her company has seen strong interest from one major retailer carrying such a broad spectrum of products that its conversion to slipsheets could have an even greater impact than Home Depot's. If this retailer requires vendors to ship on slipsheets, Holloway predicts, "a whole group of people who have never been exposed to slipsheets before" might find themselves required to convert to their use.

THE HOME DEPOT STORY

Converting to slipsheets is a major undertaking that requires careful planning and preparation, as illustrated by Home Depot's experience.



Although converting from pallets to slipsheets is an involved process, many companies may be forced to make this transition in the future.

Citing potential cost savings and environmental benefits of slipsheets, Home Depot introduced its program in stages, beginning with its Northeast stores in 1993. In May of 1994, the company announced to its vendors:

- That it was expanding use of slipsheets to its other regions;
- That all stores would be equipped to receive product on slipsheets beginning August 1;
- That vendors were encouraged to test slipsheets for product shipped to its stores via regional LTL, truckload or private carriage trucks;
- That five months later vendors would be required to slipsheet all product shipped in that manner.

Recognizing that converting to palletless handling would be a major

change, the company provided plenty of support and training for its vendors, including one-day seminars and a slipsheet hotline that's been in place since August.

"We wanted to help our vendors come on line," recalls Home Depot's Travis Szwast, who mans the Company's slipsheet hotline in Atlanta, "not just force our policy on them." He fields questions with vendors who might be having problems with slipsheets or have questions such as where to get equipment or different types of slipsheets.

As a result, vendors are buying into the program, Szwast says. "We've had a very good response." Close to 300 vendors fully support the slipsheet program, he says.

The retailer also worked closely with its carriers. For example, Roadway Express and Home Depot tested shipments in the less-than-truckload (LTL) environment for a year and a half. "We began with relatively small scale tests," notes Bob Obee. Roadway's vice president of operations, planning and engineering,

“putting some 50 shipments through the system.”

Using ideas generated from analysis of results, Roadway and Home Depot tested specific proposals and different slipsheets by running some 70 shipments—perhaps 100 unit loads—through the network. Roadway carefully tracked the shipments, photographing them on both ends of the shipments and feeding data back to Home Depot, whose personnel in many cases was on-site.

The tests revealed important information. “We were able to confirm that there was a definite need,” Obee says, for a sturdier slip sheet than typically used in the truckload (TL) environment where slipsheets have traditionally been used. This finding held true for both plastic and corrugated slipsheets.

Home Depot and Roadway worked closely with slip sheet manufacturers, developing designs potentially more suitable for the LTL environment. A successful design involved adding two tabs, one on each side of the slip sheet. This change resulted in interlocking corners on the slip sheet. When the freight and slip sheet are shrink wrapped, Obee says, the slip sheet acts as a tray for the freight, making for a more stable load. And the additional two tabs make it possible to approach the slip sheet from any side with a push/pull attachment.

TRAINING IS KEY

Converting from pallets to slipsheets requires a major change in work methods, materials and equipment. Roadway, for example, is introducing two types of equipment: at lighter volume facilities, wide platens which slip over forklift tines; at heavier volume facilities, hydraulic push/pull attachments.

Slipsheets 101

Slipsheets are available in three materials: corrugated, fiberboard, and plastic. Corrugated slipsheets are made by sandwiching corrugated (fluted) material between a top and bottom liner. Fiberboard slipsheets are made of three plies of kraft liner board laminated together.

The material used in corrugated and fiberboard slipsheets weakens when it gets wet. Plastic slipsheets, the most expensive, are frequently used in moisture-laden or wet environments. While Home Depot is encouraging use of plastic slipsheets by its vendors, fiberboard slipsheets are used most widely throughout industry.

Many slipsheets are custom-designed, according to Randy Wise, National Sales Manager for Shippers Paper Products Company, Lancaster, Pa. A variety of slip sheet designs and weights are available from slip sheet manufacturers, depending upon the size of the footprint of the load, and the number of tabs or lips required.

Slipsheets are described in terms of their thickness, or “caliper”. Caliper measures one-thousandths of an inch, or a “point”. A .060 caliper board may be referred to as a 60 point board.

Thickness of the sheet does not correlate necessarily with the strength of a sheet. Tensile strength, rather than thickness, is the primary determinant of which slip sheet is right for your application, Wise says. Some users specify recycled material, but the use of recycled paper instead of first run Kraft paper, for example, can result in

loss of tensile strength as the recycled fibers get chopped into shorter and shorter pieces.

Reusability of slipsheets depends on the situation and the durability of the slip sheet. A toy manufacturer that uses and reuses slipsheets for interplant shipment of product specifies a fairly substantial slip sheet, with a specially reinforced tab. “Most users without a closed loop distribution system don’t reuse slipsheets,” explains Rick Diermeier, sales and marketing manager for Menasha Corporation.

“When selecting a slip sheet for a specific application, several factors must be taken into consideration,” Diermeier says: “number of times the unitized load is handled by push/pull equipment; unit load weight, composition and stability; moisture exposure; operator experience; receiver requirements; case size, product characteristics and packaging or type of container.”

“Specifying a slip sheet that’s too flimsy and weak is a false economy. Test a variety of slipsheets to determine performance,” advises Diana Twede, assistant professor in the School of Packaging, Michigan State University, reporting that companies like Apple Computer have the school test slipsheets and develop performance specifications based on tensile strength and coefficient of friction.

Some loads may have a tendency to slide off a slip sheet. This can be avoided by using an adhesive, shrink or stretch-wrapping the slip sheet to the product, or using a four-sided slip sheet.

Training employees in the use of the new equipment is critical to the success of the slipsheet program. A training program was developed for Roadway, Home Depot, and vendors' employees. The program is presented in two half-hour modules.

Safety is a key component in the training program, which combines video and written materials.

Operators are shown how to install and remove equipment safely, how to prepare the surface to ensure that it's level, and how to handle freight properly.

Included in the training is a clear explanation of why Home Depot and Roadway are converting to slipsheets. Explaining the whys and wherefores of the change, says Roadway training and development specialist Patti Powell, helped employees—and Home Depot vendors—understand the environmental and financial benefits of doing so. Employees have bought into the change, rather than resisted it. Now, Powell says, employees are enthusiastic about the conversion.

WEIGH THE TRADE-OFFS

"Slipsheets are a load-base alternative that should be considered when adopting a system to handle unit costs," according to David Spencer, Corporate Manager Materials Handling, Jefferson-Smurfit Co., a slipsheet user and manufacturer located in Alton, IL.

"They're not for everyone, but they offer a growing opportunity to save money and space and ultimately have a more cost-effective end user product. Companies should evaluate whether use of slipsheets," he continues, "can make their product more competitive for the end user,"

But, he says, companies should also be sure they're fully aware of the requirements necessary to implement a slipsheet system successfully.

Converting to slipsheets, like any system-wide change, requires careful consideration and analysis of benefits and trade-offs. Here's a round-up of information to help you do so.

- Slipsheets cost less than pallets, ranging from under a dollar to \$5 each. Pallets may cost \$6-9 each.
- Many slipsheets can be used just once; plastic slipsheets may be reused a limited number of times. Pallets can be reused many times. So calculate per-trip cost as well as cost per item.
- Slipsheets are maintenance-free, without the problems of extruding nails or broken boards.
- Use of slipsheets frees up as much as 10% additional space in a truck trailer or container. "If you're shipping a light density product," observes Don Allison, "That saving goes straight to the bottom line. And 10% of a freight bill is a huge number." Allison heads up Computerized Packaging Consultants in Greenwood, Ontario.

The space saving achieved through use of slipsheets is meaningless, however, if trailers weigh out before they cube out.

- Slipsheets create less waste and are easier to dispose of—they can be included in your corrugated recycling

program. Pallets are recyclable, but sortation and storage can be an issue.

- If slipsheets get wet, they lose their strength. Wet corrugated slipsheets in particular will tear immediately. "This can be mitigated with special coating," notes consultant Robert B. Silverman, partner, Gross & Associates, Woodbridge, N.J., "but then the price of the slipsheet goes up, and it still won't have the same strength as the pallet."
- Slipsheets require far less room than pallets to store, but, unlike pallets, can't be stored outside.
- Slipsheets don't store in pallet racks easily. "You have to deck the pallet racks with a type of decking that the slipsheet won't get caught on," Silverman says.
- Use of slipsheets limits the height to which you can floor-stack product. "It's tough to access a slipsheet 16 feet in the air from the ground," Silverman explains. "A pallet gives the lift truck operator a four inch hole to aim for with the fork. With a slipsheet, there's no margin for error, and the required depth perception is tough to master."
- Slipsheets may not be appropriate for products that require air circulation, compared to pallets, which create a four inch gap underneath the load.
- Use of slipsheets requires special push/pull lift truck attachments or equipment that's more costly than the fork lift

truck. Many distribution centers currently don't have such attachments or equipment.

- Customers and/or vendors may not have the equipment required to handle slipsheets, thus may be forced to purchase such equipment, handstack product or unload it by hand.
- Lift truck operators must be trained in using push/pull equipment, which requires "a higher skill level for the operator," Silverman says, "More training is required; more experience is required for proficiency." Operations that use temporary labor or have high turnover may incur excessive training costs.
- While productivity with slipsheets over time can get close to what it is with pallets, the consultant continues, it doesn't equal productivity that's achievable with pallets because of the greater number of handling steps involved.
- Slipsheets may require wider aisles in storage. "The lift truck must turn a full 90 degrees to access a slipsheet," Silverman explains, compared to the 60-70 degree turn required to access pallets.

ARE SLIPSHEETS RIGHT FOR YOU?

When considering the use of slipsheets in your operation, carefully evaluate the cost of storage and handling to ensure that the use of slipsheets doesn't actually add more cost because of increased handling. Consider the amount of handling you do internally, advises consultant Silverman, versus the number of unit

loads that you ship and receive.

In addition to material and space savings, calculate the cost of storage and handling equipment, training, the difference in productivity, and any effect the conversion might have on your operation (*such as widening the aisles or adding deck racking*). Factor in what effect the use of slipsheets might have on your transportation rates, if any. Then examine your organization's payback criteria to determine whether it's worth making a change to part or all of your operation.

"Slipsheets aren't necessarily an all-or-nothing proposition," explains Silverman. "They might be applicable to a certain portion of your operation." Some companies' plants, for example, ship to distribution centers on slipsheets to increase trailer utilization, while the DC makes out-bound shipments on pallets.

Also consider the impact a conversion might have on vendor and customer relations. "System-wide implications are important," explains Diana Twede, Assistant Professor in the School of Packaging at Michigan State University. "If your conversion to slipsheets means that 100 of your customers will have to purchase special materials handling equipment, the cost will probably outweigh the benefits."

"Shippers and consignee's gain separate economic benefits from a slipsheet system," Twede continues. "Cost and benefit have to be shared equitably among both parties in the relationship."

Be prepared to take full advantage of the benefits offered by slipsheets. "Space is dollars," notes packaging consultant Don Allison, so if you do switch to slipsheets, be sure to re-

design your packages so that you can take advantage of the additional space. Allison redesigned pretzel packages for Snyders of Hanover when it converted. The result: more than \$350,000 savings annually.

Certainly slipsheets are not right for every operation or for every product. But if your product is compatible with slipsheets and you haven't considered them lately, industry experts suggest you revisit the topic.

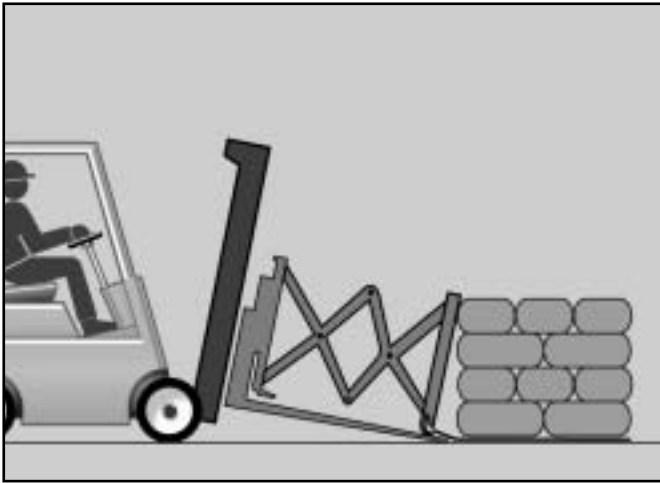
"Slipsheets fall in between a palletized load and handstacked load," explains Bob Silverman. "Slipsheeted loads allow you to approach the container/trailer utilization of a handstacked load, while approaching the productivity of a palletized load. In the right situations, slipsheets can help you come close to achieving the best of each of those options."

For More Information

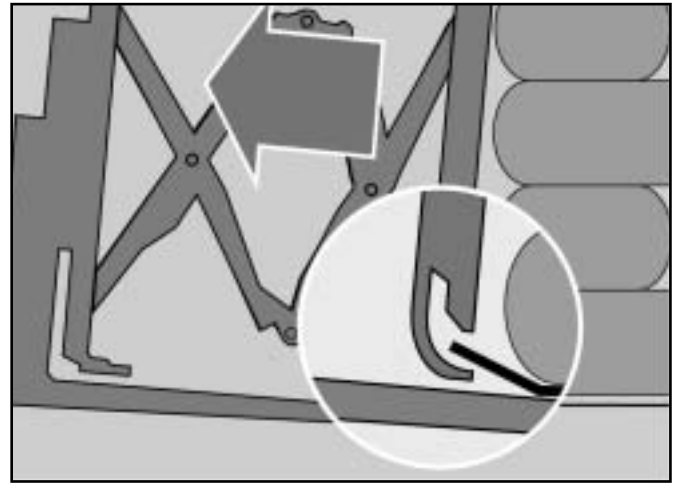
- Home Depot's Slipsheet Hotline: 404-801-5710 (can be used by all companies, not just Home Depot vendors).
- "Fiberboard Slipsheet Manual" by American Paper Institute, available from Menasha Corporation (414-751-1511) and other slipsheet manufacturers and distributors.
- National Wooden Pallet and Container Association, (703-527-7667). Request Technical Information Sheet—*Slipsheets or Pallets?*

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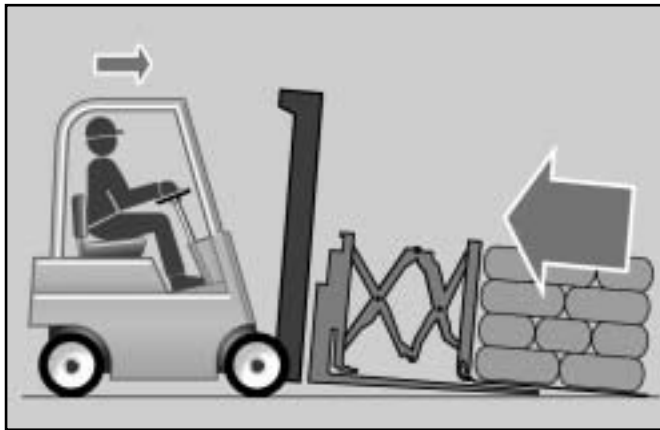
How Push/Pulls Work



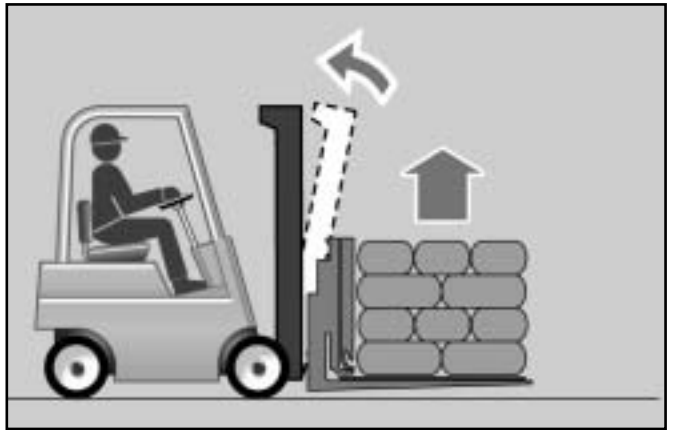
1. Extend the pusher plate so that the slipsheet lip fits into the gripper channel opening



2. Retract the pusher plate. The gripper bar will automatically clamp the slipsheet lip.



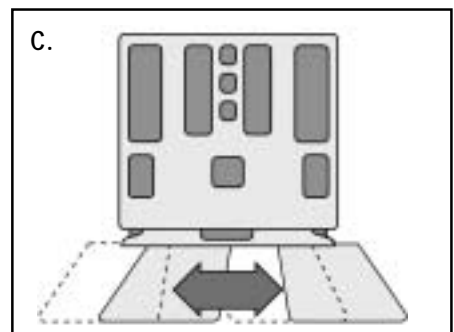
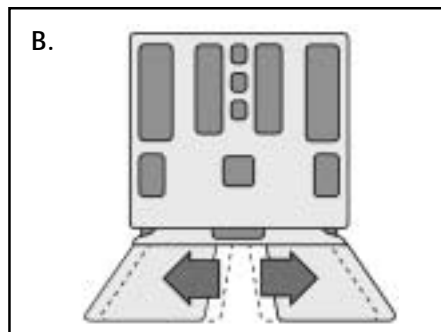
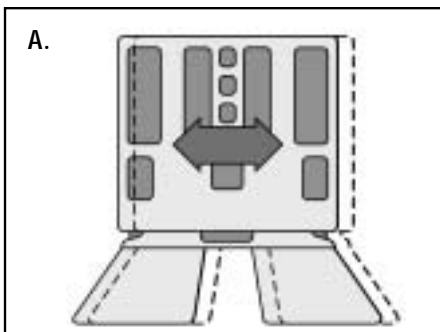
3. Move forward slowly as the load is being pulled onto the platens.



4. Raise the carriage about one inch. Slowly tilt the mast to a vertical position as you scoop up the load.

Types of Push/Pulls

- A.** Sideshifting standard on all carriage mount push/pulls.
- B.** Hydraulically adjustable platens.
 - For applications requiring extensive pallet handling.
 - Allows driver to adjust the platen spread from his seat.
- C.** Sideshifting platens.
 - Works like basic sideshift except the frame doesn't move.
 - For narrow or restricted applications.
 - 8" sideshift capacity.
- D.** Load Push
 - Does not have gripper mechanism to pull slipsheet.
 - For loads that are "scooped" onto the platens.
- E.** Mark 55 push/pull (pg. 125)
 - Platens open for slipsheet handling and close for pallet handling.
- E.** Sheet Sav.[®] (pg. 126)
 - Allows the driver to retain the slipsheet when the load is pushed off.
- G.** Inverta Push[™] (pg. 127)
 - Return your pallets in-house, and reduce your total pallet inventory.



35E & 45E Push/Pulls



35E & 45E Carriage Mount Push/Pulls

All E-Series carriage mount push/pulls are equipped with Cascade's SIDESHIFTING feature (see A.) for unbeatable maneuverability and with Q.D. hooks for convenience. The 35E model is rated for maximum load capacity of 3,500 and 45E for 4,500 lbs. Other differences include:

The 35E is designed for short wheel-based, counter-balanced trucks in the 2,500 to 4,500 lbs. capacity range. The small truck 35E combination provides maximum net load handling capacity, short overall length and excellent maneuverability. It is ideal for truck trailer and rail car work, as well as for general slipsheet warehousing applications.

The 45E is a heavy duty push/pull, well suited for double load stacking applications, as well as for rail car loading and unloading.



OPTIONS

- Quick-Change Hydraulic Couplers
- Hydraulic Flow Control Valve
- Extended Height and Width Faceplates
- Faceplate Stop Group
- Attachment Mounted Solenoid Adaption Group
- Optional Platen Sizes
- Forks and Multiple Fork Groups

(Quick Fork Mount)



2. Connect quick-change hydraulic couplers



3. Engage lower hooks

Mounts directly on the lift truck's forks in one minute.

APPLICATIONS

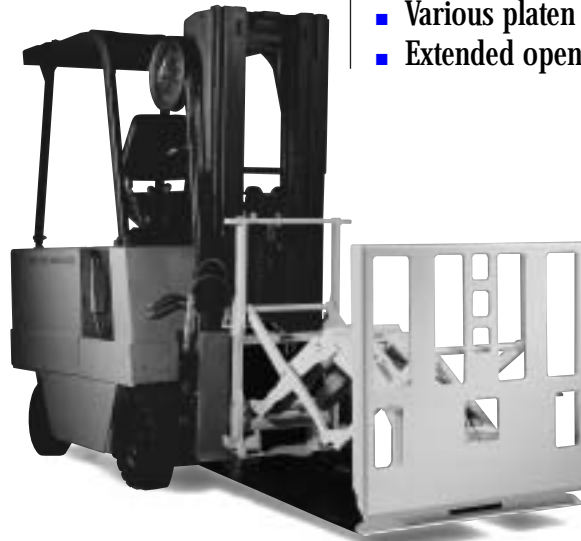
QFM Push/Pulls are ideal for applications requiring quick and convenient removal and installation of a push/pull attachment. The rugged Cascade QFM can be installed or removed in less than one minute and does not require removal of the lift truck forks. Typical applications are those requiring an attachment for slipsheets on an intermittent or irregular basis.

FEATURES

Protects both products and slipsheets from damage

High production slipsheet handling capabilities

Strength and durability to work in demanding applications



OPTIONS

- Quick-change hydraulic couplers
- Special faceplate heights and widths
- Faceplate stop group
- Truck mounted solenoid adaption group
- Class III mounting
- Various platen sizes
- Extended opening ranges

Mark 55 Push/Pull offers flexibility to handle slipsheeted and palletized product

Platens open for slipsheet handling and close for pallet handling.

APPLICATIONS

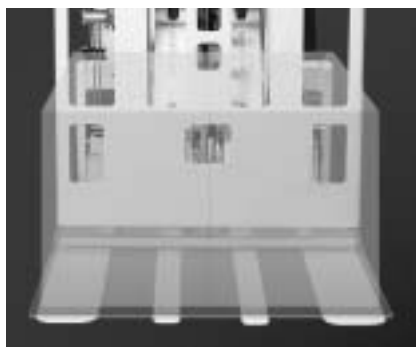
The Cascade Mark 55 Push/Pull is the solution for operations that must handle both slipsheeted and palletized product. Hydraulically positionable outer platens are easily opened for conventional slipsheet handling, and closed to allow pallet handling. In addition, the Mark 55 Push/Pull allows four-way handling of the popular Mark 55 block pallet.

FEATURES

- Hydraulically adjustable outer platens
- Sideshifting capability standard
- Class II mounting standard
- High visibility pantograph, gripper jaw and faceplate
- 4° tilting faceplate
- Protected hydraulics
- "Cushion" cylinders

OPTIONS

- 3,500 and 4,500 lb. capacity models available
- Quick-Change hydraulic couplers
- Hydraulic flow control valve
- Extended height and width faceplates
- Faceplate stop group
- Optional platen sizes
- Truck-mounted solenoid adaption group
- Hydraulic load cushion
- Quick Disconnect and Class III mountings



Sheet-Sav™ Push/Pull

Save your slip sheets using a Sheet-Sav™ Push/Pull.

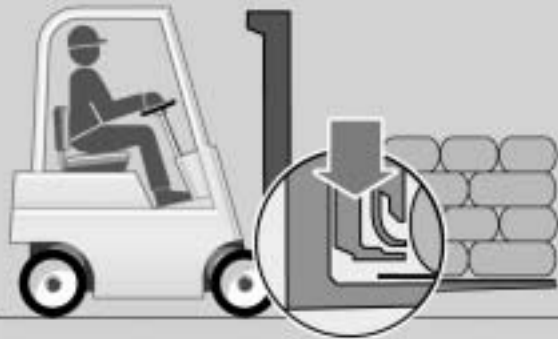
- ① Grip slipsheet and pull load onto platens. Transport load to desired location.



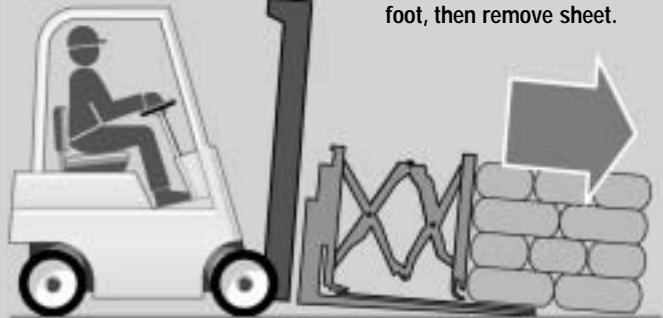
- ② Press Sheet-Sav™ knob button and activate lever to raise foot.



- ③ Press Sheet-Sav™ knob button and activate lever to lower foot.



- ④ Push load off platens while retaining slipsheet.



- ⑤ Press Sheet-Sav™ knob button and activate lever to raise foot, then remove sheet.

Slip sheet handling with the added ability to retain and reuse your slip sheets.

APPLICATIONS

Use the Cascade Sheet-Sav™ Push/Pull to keep your slip sheets in house. This is a popular attachment for manufacturers who handle product on slip sheets within their operation and who transfer product without a slip sheet onto a pallet, into a container, or onto a flatbed truck. Popular for bagged cement, bagged seed and grain, packaged food, dairy products, fruit and produce and corrugated box blank handling.

FEATURES

High production slipsheet handling capabilities

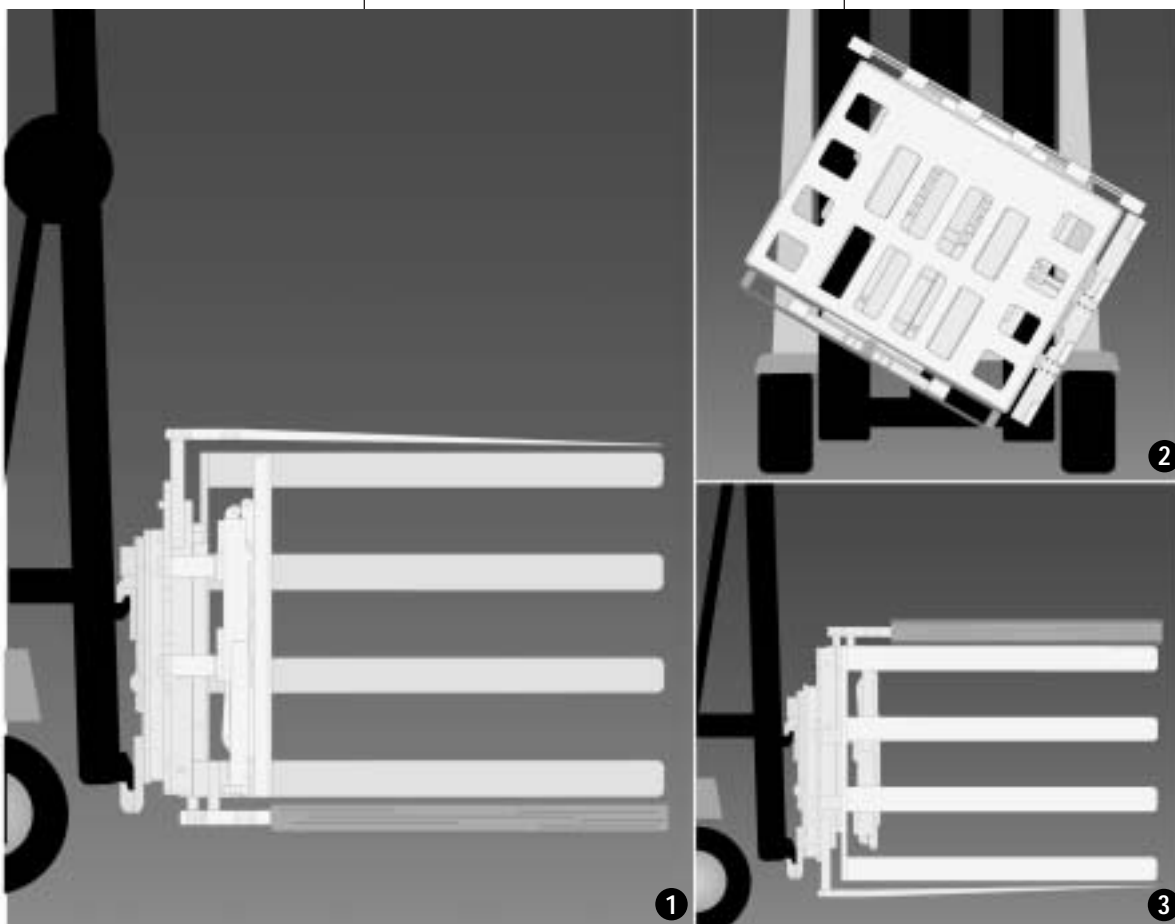
- High visibility pantograph, gripper jaw and faceplate
- Adjustable platens
- 4° tilting faceplate
- Chamfered platen corners and gripper jaw design protects the slipsheet
- QFM models: Frame mounts between forks (20" wide) for minimum effective thickness (lost load)

Strength and durability in demanding applications

OPTIONS

- Quick-change hydraulic couplers
- Hydraulic flow control valve
- Extended height and width faceplates
- Extended push strokes
- Faceplate stop group
- Optional platen sizes
- Forks and multiple fork groups
- Class III mounting (45E only)





Retain your pallets in-house, and reduce your total pallet inventory.

APPLICATIONS

Cascade's Inverta Push may be used in nearly every operation that ships unit loads of bags or cartons, such as fertilizer, grain, cement, mail, sugar, canned goods, boxed goods, glass and plastic.

Retrieving your pallets with an Inverta Push

The Inverta Push enables you to warehouse your products on in-house, 'captive' pallets. For shipping, the Inverta Push places the load on a slip-sheet, customer pallet or directly on the transit vehicle floor, then retrieves your pallet. Your pallets need never leave the warehouse.

Retaining your expensive pallets in-house eliminates the need to dead-head pallets after unloading at the destination.

The receiver has no return costs to pay and you can reduce your total pallet inventory.

The Inverta Push consists of two opposing sets of forks for clamping, an automatically sequenced stabilizer arm on the side with forks, an integral sideshifter, a rotator to invert or rotate the load and a push plate for push-off load deposit.

How it Works

- ① Bottom forks are inserted in pallet. Load is clamped against upper forks. Side stabilizer engages load to secure it for rotation.

- ② As truck moves to load-out point, Inverta Push turns 180° so pallet is on top of load. Slipsheet or customer pallet (if used) is now on bottom.
- ③ Forks lift pallet off load. Operator pushes off and backs away simultaneously.

