



SAFE

STOWAGE

A GUIDE FOR EXPORTERS



THE CANADIAN
TRADE COMMISSIONER
SERVICE



Department of Foreign Affairs
and International Trade

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et du Commerce international

Canada

SAFE STOWAGE
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The Department of Foreign Affairs and International Trade (DFAIT) commissioned this guide for Canadian shippers and exporters to help facilitate their international cargo movements. Safe, efficient and effective stowage will increase Canada's international competitiveness and will promote better customer relations and repeat orders.

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This booklet has been prepared to assist and encourage Canadian industry in its export mission. It demonstrates, in basic terms, proper freight stowage in sea containers and trailers, and is based on the fundamental premise that:

the finest products in the world are useless if, on delivery, they are found to be damaged.

According to the Canadian Board of Marine Underwriters Association:

approximately 83% of all cargo losses are preventable.

approximately 45% of preventable losses are due to poor handling and stowage.

This booklet provides guides and check lists that can be used by all personnel involved in export moves, to ensure that initial preventive steps are taken to protect their products or goods.

Because:

- ▶ **Nobody needs or will accept damaged goods.**
- ▶ **Nobody will repeat order from a company that cannot guarantee to deliver the goods in an undamaged condition.**
- ▶ **No business can thrive without satisfied customers.**
- ▶ **No company can build its reputation, or plan for the future, on customer claims for damage.**
- ▶ **No company can compete effectively in the international marketplace by demonstrating a lack of knowledge of the rudiments of safe stowage.**

CAUSES OF LOSS

The prudent shipper recognizes that efforts in properly preparing, packing and marking shipments have a great influence on successful delivery of the goods.

Attention to the basic principles and techniques of export packing will help reduce the loss of cargo due to casual or organized pilferage, minimize damage from improper or inexperienced handling/storage and protect against water damage.

Customer satisfaction and repeat orders are only two of the benefits that stem from a professional approach to cargo shipment. Reductions of time and money spent in tracing, locating and making claims on lost, damaged or pilfered goods contribute to a better bottom line.

THEFT

While one cannot prevent determined theft of a complete unit, proper attention to door condition, hinges, seals and locks by the shipper can materially reduce casual pilferage.

HANDLING AND STOWAGE

Virtually all of this loss group is preventable by the shipper.

WATER DAMAGE

Proper selection of container or trailer for cargoes that are prone to sweating, and/or protection of packages from container sweat or minor leaks, results in major reductions in water damage.

FORTUITOUS LOSS

There is little the shipper can do in this area which includes sinkings, strandings, fire, collisions and weather. However, by selecting reputable carriers, the risk of incident can be considerably reduced.

CHAPTER 1

How the Average Cargo Move Takes Place and Who is Normally Involved



Regardless of which terms of sale have been agreed for the actual goods in the container, whether it be on a F.O.B. (Free on Board) or C.I.F. (Cost, Insurance and Freight) basis, or any of the many variations of these terms, the actual physical movement of the container and its contents is the same.

The container, during the move from point of origin to point of destination, will pass through several completely different transport modes both within Canada and the country of destination.

This move, whereby goods are stowed (stuffed) into a single container at the point of origin and the container is not opened or emptied (de-stuffed) until final destination, and where the container is transported by completely different types or modes of transport, is referred to as an “intermodal move.” It may also be referred to as a “multi-modal move.”

An international intermodal move using a sea container requires a somewhat different approach to that of a truck or rail car move within North America.

Canadian or North American continental moves typically involve between 1500 - 3500 km by either a single trucking company or an individual railroad. Alternatively, it could be a combination of both transport modes. However, truck and trailer would both travel over fairly uniform highways or railroads.



By comparison, an intermodal move to an international destination could involve distances of 12 000 - 16 000 km or more. All modes (rail, truck and sea) may well be involved, and six to ten different handlings may occur.

The following is an example of a possible move that a sea container might make from any manufacturing site or plant or anywhere in Canada.

START

1. Loaded container lifted from ground onto trailer in shipper's yard (move and placement)
2. Trailer from shipper's door to railhead (15-30 km)
3. Lift from trailer to ground in rail yard by straddle carrier or top pick (storage and move)
4. Lift from ground by straddle carrier or top pick onto rail car (move and placement)
5. Rail move to port (800-2400 km)
6. Lift from rail car and move by straddle carrier or top pick to place of rest on the quay (storage, move and placement)

Schematic of an Intermodal Move



7. Straddle carrier move from place of rest to crane to be lifted onto the ocean vessel (move, lift and placement)
8. Ocean voyage 9-14 days (5600-9600 km)
9. Lift by crane from ship to ground transfer to forklift truck and move to first place of rest in storage on quay (lift, move, plus placement)
10. Lift by top pick or forklift truck onto trailer for move to rail yard or a direct move onto rail car (lift, move, and either local road trip or rail)
11. In some ports, the lift from the vessel may be direct onto a barge alongside for a move inland (160-800 km)
12. Final lift and placement into the receiver's yard (lift and grounding)



WHO HAS ACTUALLY HANDLED THE CONTAINER AND ITS CONTENTS?

ORIGIN

- ▶ **Packers**
- ▶ **Forklift drivers**
- ▶ **Truckers**
- ▶ **Top pick operator/straddle carrier operator**
- ▶ **Rail crew**

- ▶ **Straddle carrier operator**
- ▶ **Marine crane operator**
- ▶ **Ship's crew**

DESTINATION

- ▶ **Marine crane operator**
- ▶ **Forklift truck or straddle or top pick operator.**
- ▶ **Rail crew or trucker**
- ▶ **Forklift driver**
- ▶ **Unpacker**

BOTTOM LINE: WHAT HAS THE TYPICAL CONTAINER AND ITS CONTENTS JUST GONE THROUGH?

- ▶ **At least 12 different physical moves**
- ▶ **Eight separate placement procedures**
- ▶ **Nine individual groundings**
- ▶ **Probably several temperature and humidity changes**
- ▶ **Nine different types of lifts**
- ▶ **Travelled a distance of between 6400 and 12 000 km**
- ▶ **Goods have been in transit 30-45 days or more from the time of loading into the container to receipt by the purchaser**
- ▶ **Modes involved: truck – rail – marine**

ENTITIES INVOLVED IN AN EXPORT MOVE

THE SHIPPER

You, the shipper, will wish to ensure the best possible service at the best price. In order to achieve this, you will undoubtedly need to involve, either directly or indirectly, the following organizations.

THE FREIGHT FORWARDER

Most exporters usually have good ongoing relationships with a qualified and experienced freight forwarding company. The freight forwarder can, in many cases, look after all the customers' needs from the exporter's door to the importer's point of receiving.

A professional freight forwarding company will, for example, take care of all the shipper's documentation and handle all of the arrangements required to transport the goods. They would look after:

- ▶ **inland carriers,**
- ▶ **forwarding requirements,**
- ▶ **port terminal operators,**
- ▶ **steamship company,**
- ▶ **customs brokers at the port of discharge,**
- ▶ **agents for the final delivery to the receiver's required delivery point.**

MARINE INSURANCE UNDERWRITER

It is important that in the very early, preplanning stages the shipper should discuss insurance requirements not only with a freight forwarder, but also with a qualified and experienced insurance agent, broker, or underwriter.

Careful, structured insurance coverage for both the cargo and the exporter's liability, in accordance with the terms of sale or letter of credit, are as important as the physical requirements of the move.



THE TRUCKING COMPANY / INLAND CARRIER

The trucking company is responsible for the pick up and delivery of the shipper's container to the local rail yard for the first move to the marine port. Alternatively, it may take the shipper's container directly to the port or the ship's side.

It is very important that a shipper first ensure that the trucking company has a good working relationship with the freight forwarding company and the next ongoing carrier. The trucking company can assist the shipper in the early stages by providing preplanning advice. Positioning of the shipper's cargo in the trailer or container can be planned. Bracing requirements or other precautions that may be required for the intended trip can be assessed and prepared along with the stowage plan.

THE RAILROAD COMPANY / INLAND CARRIER

Many railroad companies offer both trucking and freight forwarding services. The traditional strengths of a railroad company is its capacity to provide long-haul transportation quickly, reliably and with timely delivery to sea ports.

The prudent shipper would be wise to contact the railroad well in advance of the shipment date to discuss stowage. Railroads have both experienced staff and stowage manuals that can greatly assist a shipper in preparing the products for export stowage.

THE SHIPPING LINE

The ocean voyage is often regarded as the "toughest leg of the journey."

The shipping line has the responsibility for the safe transference of the shipper's container via ocean transit. As with all the above, the earlier the shipper has consultation the better.

In many cases, the shipping line will supply the actual container. Therefore, it is important for them to have as many details as early and as accurately as possible, and to know a shipper's special needs, in order to provide the correct container for both stowage and transit.

Consultation is vital to avoiding damage.



Knowing How to Prevent Damage



WHERE/WHEN/HOW DAMAGE OCCURS

Cargo and container handling equipment and techniques in the various terminals, rail yards, storage facilities and seaports of the world range from highly sophisticated, professional operations to the very primitive.

The transit environment, which can include rough seas, substandard roads, stop and go traffic, and uneven track sections, subject your goods to every imaginable motion and impact. These conditions, whether considered alone or together, demand packing and the right stowage for the **toughest leg of the journey**.

It is important to be aware of all the potential motions and impacts that can take place during an intermodal move. Under examination, the weak spots begin to show themselves.

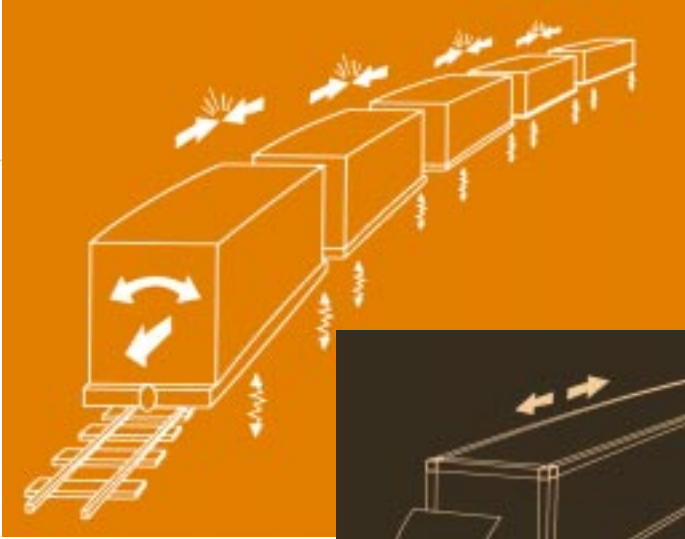
1. HANDLING AND STOWAGE

- ▶ **Improper forklift operations**
- ▶ **Pushing and dragging cargo when inadequate material handling equipment or inexperienced labour are used**
- ▶ **Weight of superimposed packages**
- ▶ **Failure to keep stacks plumb**
- ▶ **Long-term storage, resulting in crushing**

2. TRUCK

- ▶ **Braking and acceleration**
- ▶ **Coupling actions and impact against loading docks**
- ▶ **Shocks and vibrations**
- ▶ **Road and weather conditions**
- ▶ **Vehicular accidents (collisions and overturns)**
- ▶ **Swaying on curves or when overtaking or turning sharply**

Rail and Truck Motions



3. RAIL

- ▶ Acceleration and deceleration
- ▶ Coupling impact during car shunting operations
- ▶ Swaying on curves
- ▶ Shocks and vibrations
- ▶ Derailments

4. TERMINAL HANDLING

- ▶ High vertical acceleration (up and down movements)
- ▶ Braking and acceleration
- ▶ Shocks and vibrations
- ▶ Swaying and swinging
- ▶ Tipping

The containerisation of cargo does not automatically confer safe transport of your goods. Safety depends not only on how the container is stowed, but also on its structure, its integrity, and the quality of the carrier.

5. MARINE SEA VOYAGES

A ship is subject to:

- ▶ **Movement in six different directions: rolling, pitching, heaving, surging, swaying and yawing.**
- ▶ **Wave impact (water shipped over the bow impacting on deck-stowed cargo or containers during heavy weather)**
- ▶ **Temperature extremes (resulting in heat or freeze damage)**
- ▶ **Condensation (ship or cargo sweating)**
- ▶ **Flooding (cargo stored on inadequately drained surface)**
- ▶ **Navigation exposures, stranding and collisions**

The ocean leg of the voyage, can subject cargo to severe motion stresses. These forces can be considerably greater than during a highway or rail move. A container may travel as much as 25 metres with each complete roll of a vessel, often as much as 3-4 times per minute.

Ship Motions

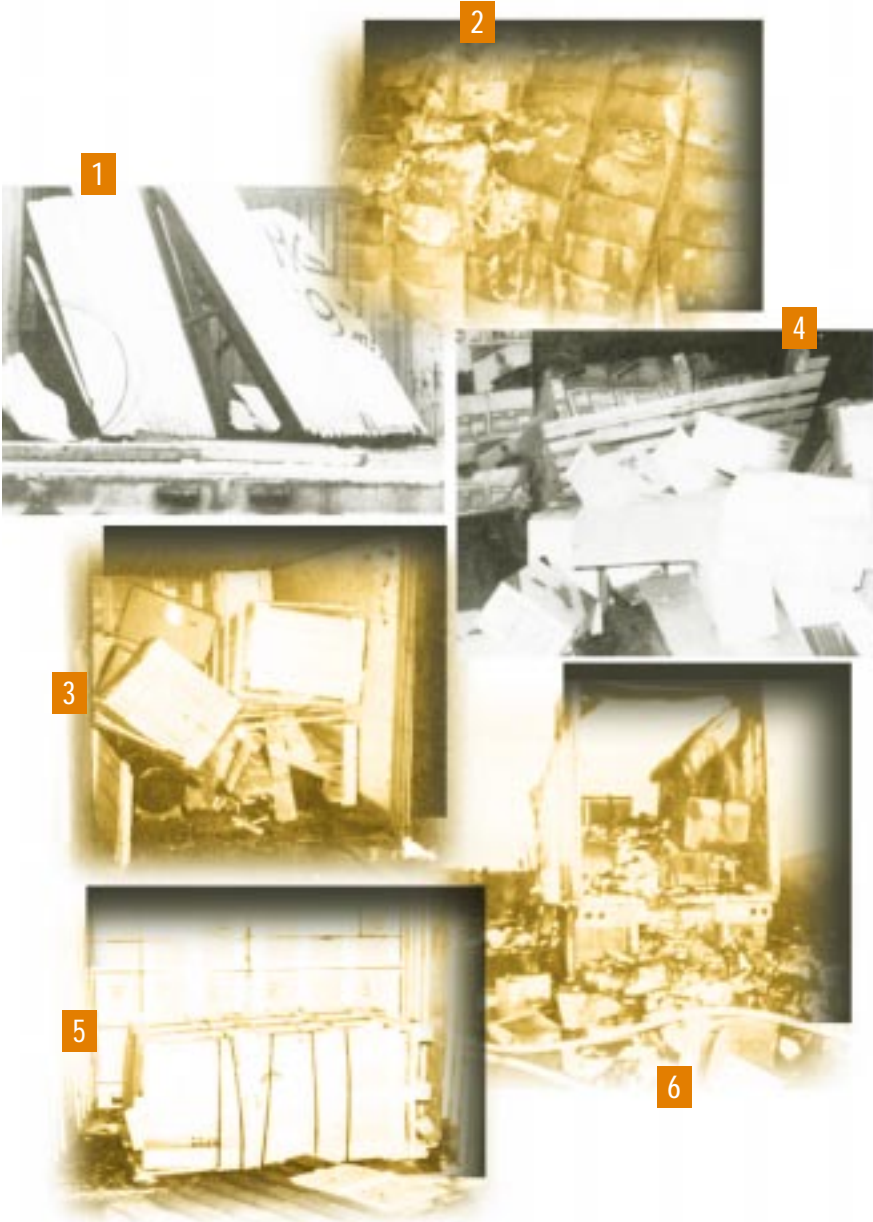


Results of Improper Stowage

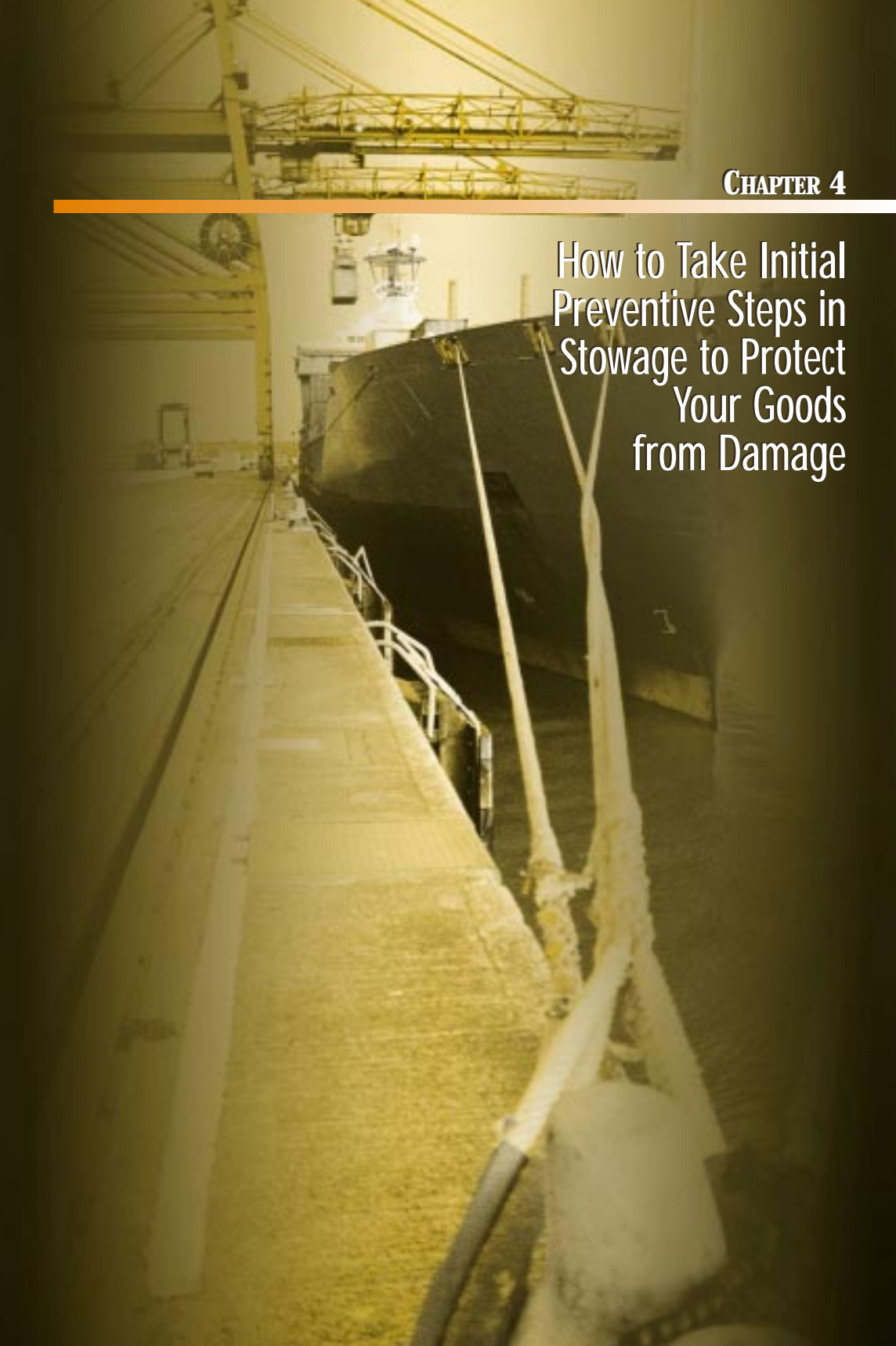


The following are examples of the results of poorly stowed cargo. With a little more attention, or preplanning, many of these incidents could have been reduced or completely avoided.

1. No bracing supports or strapping.
2. Too tight a stow, no separations, container leaked causing water damage.
3. Heavy loads on top.
4. No cargo separations, no proper layering or bracing.
5. No bracing.
6. Explosion from friction due to loose cargo.



How to Take Initial
Preventive Steps in
Stowage to Protect
Your Goods
from Damage



The use of intermodal containers for the transport of a great variety of cargo has become increasingly popular. Development of specialized containers with a wide range of types, sizes and configuration permits containerisation of most cargo. This facilitates prompt door-to-door movement of the complete shipment, with significant reduction in the risk of damage. The following steps will help you minimize damage.

- ▶ **Determine the cargo to be shipped: volume and characteristics.**
- ▶ **If not already palletised, goods should be stowed on pallets.**
- ▶ **Select the right container for the goods.**
- ▶ **Select the proper container service for the purpose.**
- ▶ **Make sure that the size of the container is matched to the cargo.**
- ▶ **Ensure that the carrier of your choice will handle it.**
- ▶ **Check that the weight to be loaded does not exceed the container's maximum permitted net weight.**
- ▶ **Inspect the container on arrival for damage.**
- ▶ **Inspect the container to ensure proper accommodation and protection of the cargo.**
- ▶ **Ensure that the doors can be closed and locked properly.**
- ▶ **Have the cargo and a definite plan of loading ready.**



- ▶ **Inspect goods prior to loading to ensure perfect condition, and that the initial packaging is suitable and intact.**
- ▶ **Load with a concept of balance, each way, in the container.**
- ▶ **Take photographs of the goods in stowage, half way through when loading a 20' container and twice in a 40' container (at one-third and two-thirds load).**
- ▶ **Stow, block, and lash the goods in the container in a manner that will prevent damage to the goods, container or transport vehicle.**
- ▶ **Ensure that drums and liquid containers are sealed tightly and not leaking.**
- ▶ **Whenever possible, use the lashing points attached to container walls and floors to secure your cargo.**
- ▶ **Ensure that container walls are not exposed to localized pressure from protruding cargo.**
- ▶ **Inspect all labels and directional arrows. Make sure they are visible.**
- ▶ **Load carefully and slowly.**
- ▶ **Fence off large void spaces in a container by means of wooden screens/bulkheads.**
- ▶ **Block and brace carefully.**
- ▶ **Place all hazardous materials at the rear doors of the container where they are accessible.**

CHOOSING EQUIPMENT

Plan both your shipment and carrier booking well ahead of time.

CHOOSE YOUR CARRIER

To find a carrier, look at advertising in transportation periodicals and in the yellow pages, or contact ports and appropriate transportation associations. The Department of Foreign Affairs and International Trade can provide you with a current listing.

BE PREPARED TO GIVE THE CARRIER ALL PERTINENT INFORMATION ABOUT THE SHIPMENT

Some essential information is:

- a) your location and type of access, loading dock, turning radius for vehicles, any restriction;
- b) weight and volume of shipment, type of packaging, palletisation and other specifics;
- c) any special consideration including if the cargo contains dangerous goods, awkward shapes, fragile items, oversize items, or requires temperature control;
- d) special material handling considerations, such as loading by crane required;
- e) destination of your shipment, address and type of unloading facilities.

The carrier must know these details so that it can provide you with the correct vehicle for your shipment from the wide variety that are available.

BEFORE YOU START LOADING

INSPECT THE FREIGHT

Sometimes, the shipment is all pre-staged on the shipping floor and in other cases it is loaded as it comes from production. In either case, it must be given a final physical check before being loaded.

Inspect the freight for signs of:

- ▶ **leaking or spills;**
- ▶ **punctures, holes, rips or tears;**
- ▶ **bulges;**
- ▶ **stains;**
- ▶ **strange noises or rattling;**
- ▶ **collapsed cartons;**
- ▶ **broken pallets or skids;**
- ▶ **protruding items;**
- ▶ **protruding nails in pallets;**
- ▶ **damaged shrink wrap or banding.**

COUNT THE PIECES

It costs everyone involved when you don't verify the piece count. Check when the actual piece count does not correspond to the paperwork.

INSPECT THE TRAILER OR CONTAINER

Always check the condition of the trailer or container on delivery and before loading.

If there are any problems or if for any reason the trailer or container doesn't seem to be the one you ordered, call your carrier or tell the truck driver.

It is a good idea to confirm with the driver, or the carrier's dispatch office, that the trailer or container provided will handle the weight of your shipment.

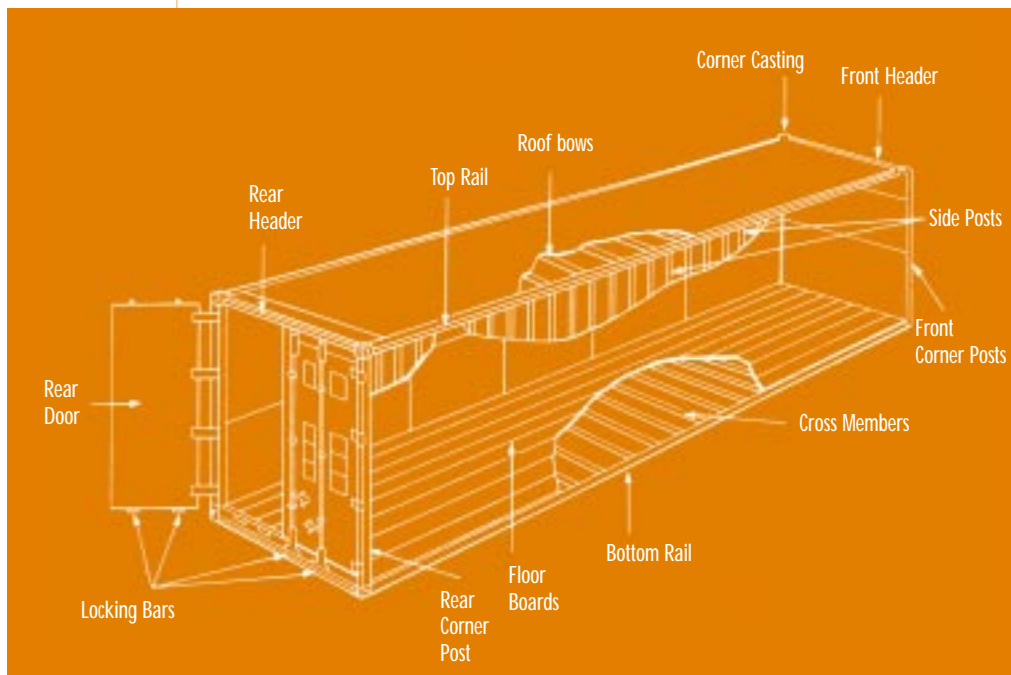
Containerisation has greatly reduced cargo damage. However, this is largely dependent on the structural integrity of the container itself.

CHECKLIST

The following checklist will assist you in inspecting the container or trailer to be sure it will properly protect your cargo. Containers or trailers that leak, have inherent defects that endanger the cargo, or pose a safety hazard to personnel, must be rejected.



While the diagram below, and the descriptions that follow, refer directly to a freight container, most of the features are the same as those of a trailer.



INTERIOR

The interior must be free from splinters, snags, dents or bulges; these may interfere with loading. Serious defects indicate the container is structurally unsound.

▶ LIGHT TESTS

Standing inside the closed container, look for light entry via the roof, side, door panels and deck. Also, previous patches and repairs must be checked to ensure they are watertight. Hose (water) or smoke tests are alternative methods of discovery.

▶ FITTINGS

Cargo tie-down cleats or rings should be in good condition and well-anchored. If ventilation openings are present, be sure that they have not been blocked off, and that they are equipped with baffles to prevent rain or sea water entry.

▶ CLEANLINESS

The container must be free of residue from previous cargo, particularly odours that may taint your goods.

EXTERIOR

Dents, bulges or other exterior damages may interfere with handling.

▶ DOORS

Be sure doors can be securely locked and sealed. Check that door gaskets are in good condition to ensure a watertight container. Inspect door hardware closely. If bolts or nuts can be easily removed from the outside with simple tools, it means that the container can be opened without breaking the seal or lock — an attractive invitation to the pilferer.

▶ FITTINGS

A quick look at the lifting fittings at each corner of the container will reveal those that are obviously damaged or unsafe. Check the fittings that secure the container to the trailer chassis; they should all be in working order and in use.

▶ COVERS/HATCH PANELS

With open-top containers, be sure that the fabric cover supplied with the container is in good condition and can be properly secured. Check hatch panels for close watertight fit.

TYPES OF DAMAGE

The following is a partial checklist of typical types of damage.

FRONT END PROBLEMS

Front Panel. Dented, torn, or punctured

Patches. Loose, not of same material as panel, not sealed or riveted with waterproof customs approved rivets, poor welds, not primed or painted

Top Rail. Bent, cut, crushed or fractured

If anything looks wrong, check further. Detection and correction of any of these problems before loading can save costly damage and problems in transit.

Corner Posts. Bent, broken, cut, gashed or distorted

Upper and Lower Corner Fittings and Attachments. Fractured or distorted fitting, cracked attachment welds

Rivets. Loose or missing

Welds. Improperly made, not primed or painted

RIGHT AND LEFT SIDES PROBLEMS

Panels. Dented, torn, or punctured

Corner Posts. Bent, broken, cut, gashed or distorted

Upper and Lower Corner Fittings and Attachments. Fractured or distorted fittings, cracked attachment welds

Door Holdbacks. Damaged or missing

Top, Bottom Rails. Bent, cut, crushed or fractured

REAR END PROBLEMS

Doors. Difficulty in opening and/or closing

Door Panels (metal or other). Torn, cut, or punctured

Door Locking Bars (Rods). Seized, bent, broken or twisted

Door Locking Bar Cams. Bent or broken

Door Handle and Retainers. Broken, bent or missing

Door Cam Lock Retainers (Keepers). Bent or broken

Door Hinges. Broken, torn, twisted, binding or seized

Door Seals (Gasket and attachments). Cut, torn or loose

Door Header. Cut, broken, distorted or dented

Door Sill. Cut, fractured or distorted

Anti-Rack Device (if any). Bent, cut, damaged or broken

Rain Gutter. Bent, broken or crushed

ROOF PROBLEMS

Panel. Punctured, dented or distorted

Upper Corner Fittings and Attachments. Fractured or distorted fittings, cracked attachment welds

Corner Protection Plate (where provided). Punctured, dented or distorted

UNDER STRUCTURE PROBLEMS

Cross Members and Attachments. Crushed, cut, bent, distorted or broken loose from bottom side rails or floor

Tunnel Recess (if any). Cut, dented, distorted or cracked weld attachments

Forklift Pockets (if any). Cut, dented, distorted, bottom straps broken or bent

INTERIOR PROBLEMS

Roof Sheet. Punctured, dented or distorted

Roof Bows (if any). Bent, cut or broken loose from roof

Floor. Torn, gouged, broken, shrunken, warped, stained excessively

Sides. Dented, torn, holed or punctured

Logistic Track (side walls or floor). Torn, loose, bent or missing

Cargo Securing Rings or Strips (floor or sides). Torn, punctured, gouged, pulled loose, excessively stained

Cleanliness. Debris, spillage

Odours. Objectionable, contaminable

Light Leaks.

CHASSIS PROBLEMS

Tires. Proper inflation, adequate tread depth, damages such as cuts, breaks or separated recap

Twist Locks. Twist lock and lock handles are in good operating order

Lights and Reflectors. Check for proper working order

Frame. Look for structural damages, most particularly around the pin area

PREPARING THE CARGO

An intermodal container is essentially a ship's hold on a reduced scale. While at sea, the cargo stowed in containers is subject to the same forces and damage hazards that affect cargo shipped in break bulk fashion.

Therefore, principles and techniques that govern export packing and cargo stowage of break bulk shipments are equally valid when preparing cargo for intermodal shipment.

PACK FOR THE TOUGHEST LEG OF THE JOURNEY

Be certain that goods cannot move within the fibreboard box, wood crate or other container in which it is packed. Immobilize the contents by blocking or bracing and/or providing adequate cushioning.

Cardboard or fibreboard boxes or wood crates must be able to withstand the weight of cargo stacked up to the roof (2.4-2.7m depending on the container). They must be able to survive lateral pressures exerted by adjacent cargo – up to 70 percent of the vertical stacking weight pressure. Adherence to these guidelines will help to prevent crushing as the container leans (up to 30°) during handling or at sea.

Heavy items, machinery and items not uniform in shape or dimension should be crated, boxed and/or provided with skids to permit ease of handling and compact stowage.



Where possible, cargo should be unitised or palletised. Cargo handlers are then required to use mechanical handling equipment to move cargo.

Provide adequate water damage protection. Use of desiccants (moisture absorbing materials), moisture or vapor-barrier paper, plastic wraps, sheets or shrouds will protect cargo from water leakage or condensation damage. Corrosion-susceptible machine parts should be coated with a preservative or rust inhibitor.

PLAN THE STOW

OBSERVE WEIGHT LIMITATIONS. Do not exceed the rated capacity of a container. Do not exceed permissible weight concentrations per square foot of floor load. Check highway weight axle limitations on both sides of the ocean voyage, because some containers have total capacities that exceed local permissible limits.

DISTRIBUTE WEIGHT EQUALLY. Avoid concentrating heavy weights at one side or one end. Stow heaviest items on the bottom. Heavy, dense items should be boxed, crated or placed on cradles or skids to distribute weight.

AVOID MIXING INCOMPATIBLE CARGO. Cargo that exudes odour or moisture should not be stowed with cargo susceptible to tainting or water damage. Items with sharp projections or an awkward shape should be segregated from other cargo by boxing, crating, padding or use of partitions. Cargo subject to leakage or spillage should not be stowed on top of other cargo.

OBSERVE HAZARDOUS MATERIALS REGULATIONS. Consult with the carrier for regulations and restrictions regarding shipment of:

- ▶ **combustibles** ▶ **explosives** ▶ **flammable liquids**
- ▶ **flammable solids** ▶ **gaseous material**
- ▶ **radioactive material** ▶ **magnetized material**
- ▶ **corrosives** ▶ **poisons** ▶ **oxidizers**

After receiving information from the carrier, proceed as follows:

LABEL AND MARK HAZARDOUS MATERIAL PROPERLY. Affix warning placards to container exterior. Note that placards vary throughout the world. What is acceptable at origin may not be in compliance with en route or destination country's regulations. Check regulations before shipment to avoid embargo or delay.

RECORD THE NATURE OF THE CARGO ON ALL SHIPPING DOCUMENTS.

HAVE ALL CARGO AND MATERIALS READY BEFORE STOWAGE BEGINS. Planning ahead facilitates proper placement, stacking and weight distribution. Additionally, it avoids removal of cargo already stowed to accommodate unexpected items, and permits installation of blocking, bracing and filling of voids as stowing operations progress.

PLAN FOR EASE OF UNLOADING. Stow cargo in reverse order of desired cargo discharge. Be sure that forklift openings in pallets or skids face doors. Fill the voids, but avoid wedging or jamming cargo in the container.

COSMETIC DAMAGE. The exterior packing of your commodity is often the first image the consignee sees of your company. A package showing exterior damage, although perhaps only cosmetic in nature, can cause loss of market, poor shipper/consignee relationships and may even cause the goods to be rejected and/or not be paid for even though the contents may arrive without damage.

Repackaging commodities can be very costly as well as time consuming.

Remember that the appearance of your product is in many cases as important as the product itself.

USE OF PALLETS

Pallets are lightweight, double-faced wooden, plastic, or metal platforms that can be readily handled and stowed by mechanical means.

Goods that cannot be shipped individually or are not suitable for independent slinging should be palletised.

By eliminating almost all the manhandling of goods, the use of pallets offers maximum efficiencies in transportation. Pallets can reduce product damage, increase utilisation of storage space and, most importantly of all, fit well with all forms of domestic transport. Forklifts are the most commonly used pieces of equipment for moving pallets and because pallets allow overall speedier handling, they contribute significantly in reducing labour and transportation costs.

The standard size of a pallet in North America is 40"x48", whereas in Europe it is 1,000mm x 1,200mm (the Europallet).

TYPICAL SPECIFICATIONS FOR PALLETS

(Note that the following is only a selection for illustrative purposes, and does not represent the complete range of pallet styles, designs and types.)

TYPES OF PALLETS IN COMMON USE

1. Expendable: used just once — low cost
2. General Purpose: repeated use
3. Specific Purpose: product specific

BASIC DESIGN

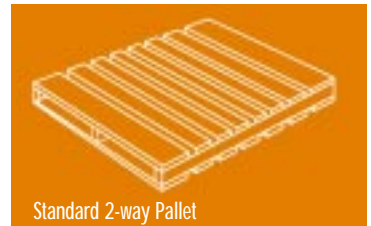
1. Two-way Pallet: permits equipment handling from two sides
2. Four-way Pallet: allows equipment entry from all four sides, but has limited staking ability due to lack of strength and load transfer capability

CONSTRUCTION MATERIALS

1. Softwoods: mainly used for light products and disposable pallets
2. Hardwoods: make the best pallets and have greater strength
3. Composites and steel: greater strength

MOST COMMONLY USED

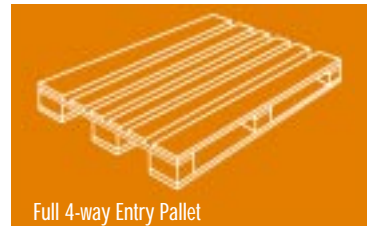
1. Single-face Pallet (often referred to as a skid): most used — one deck only
2. Double-faced Pallet (full deck on both sides; reversible): very strong, good for all forms of handling and shipping
3. Double-faced Pallet (full deck on one side; non-reversible): most rugged and durable — basic pallet for pallet exchange programs



Standard 2-way Pallet



Partial 4-way Pallet



Full 4-way Entry Pallet

COMPARATIVE PALLET DIMENSIONS *(Approximate Equivalents)*

| ISO STANDARD SIZES | | | | NORTH AMERICAN SIZES | | | |
|--------------------|--------|-------------------|--------|----------------------|--------|------------------------|--------|
| Millimetres | | Equivalent Inches | | Inches | | Equivalent Millimetres | |
| Width | Length | Width | Length | Width | Length | Width | Length |
| 800 X | 1 000 | 31.5 x | 39.4 | 32 x | 40 | 813 x | 1 016 |
| 800 X | 1 200 | 31.5 x | 47.3 | 32 x | 48 | 813 x | 1 219 |
| 1 000 X | 1 200 | 39.4 x | 47.3 | 40 x | 48 | 1 016 x | 1 219 |
| 1 200 X | 1 600 | 47.3 x | 63.0 | 48 x | 64 | 1 219 x | 1 629 |
| 1 200 X | 1 800 | 47.3 x | 70.9 | 48 x | 72 | 1 219 x | 1 829 |

Pallets are often referred to as a “unit load” because they permit multiple units to be shipped as one large unit.

The type of pallet that you choose will depend on the internal measurements of the container or truck that is going to transport your goods, as well as the weight and form of the goods being stowed on the pallet. *(See page 32 for stowage patterns)*

| 20' CONTAINER | | | | 40' CONTAINER | | |
|-----------------------------------|-----------------------------------|--------------------------|---------------------------|-----------------------------------|--------------------------|---------------------------|
| Pallet size mm and inches | Recommended Stowage Pattern | Max. No of Pallets | Floor Utilization % | Recommended Stowage Pattern | Max. No of Pallets | Floor Utilization % |
| ISO/NORTH AMERICAN | | | | | | |
| 1000 X 800 | | | | | | |
| 40" X 32" | A | 14 | 83.2 | A | 28 | 81.2 |
| 1200 X 800 | | | | | | |
| 48" X 32" | B or C | 11 | 78.4 | B or C | 23 | 80.1 |
| 1200 X 1000 | | | | | | |
| 48" X 40" | C | 10 | 89 | B or C | 20 | 87.0 |
| OTHER COMMON NORTH AMERICAN SIZES | | | | | | |
| 1100 X 800 | | | | | | |
| 44" X 32" | A | 14 | 91.4 | A | 28 | 89.3 |
| 1100 X 900 | | | | | | |
| 44" X 35.5" | A | 12 | 88.1 | A | 26 | 93.3 |
| 1100 X 1100 | | | | | | |
| 44" X 44" | A | 10 | 99.7 | A | 20 | 87.7 |
| 1100 X 1400 | | | | | | |
| 44" X 55" | A | 8 | 91.3 | A | 16 | 89.3 |

PALLET STOWING PATTERNS

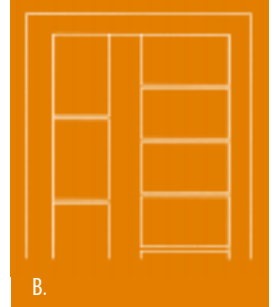
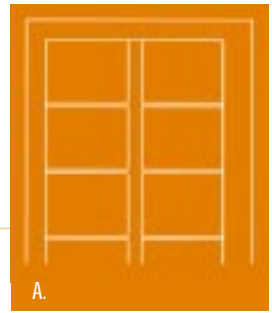
The probability of other cargo being stowed on top, and the possibility of cargo being walked upon, should be taken into account when planning the palletisation of cargo.

POINTERS FOR LOADING PALLETS

- ▶ **Wherever possible, a four-way pallet should be used.**
- ▶ **Goods stowed on pallets should have the weight evenly distributed, with heavy weights always placed on the bottom.**
- ▶ **Goods stowed on pallets must not overhang the edges.**
- ▶ **Interlock all the packages or bags on the pallet and ensure that all void spaces have been eliminated — or reduced to the minimum. Good interlocking provides load stability.**
- ▶ **If irregular-shaped items are being shipped, use spacers between the rows of layers being stowed.**
- ▶ **The use of adhesives can be used for packages of the same sizes and shape.***
- ▶ **Shrink-wrap or plastic wrap can be used for stabilizing cargo on pallets.****
- ▶ **Stretch wrap can also be used as a cargo stabilizer (unlike shrink-wrap, it does not require the use of heat).**
- ▶ **All packages should be well-fastened or banded to the pallet.**
- ▶ **Ensure that all markings are legible and not obscured by wrappings or bandings.**
- ▶ **Extra or adequate protection should be given to the top of the palletised unit; this can be done by using plywood of a least 12mm thick or similar.**

* Adhesives with high shear strength and low tensile strength are probably the best as it allows removal of cases straight up but do not allow the case to slide sideways.

** Shrink-wrapping does not substitute for fastening or banding.



STOWING THE CARGO

For all types of cargo, provide plastic or water-repellent shrouds over top and sides of load to protect against water damage (ship's sweat or leaking containers).

CARDBOARD OR FIBREBOARD BOXES

Boxes containing tightly packed, dense items that support sides and ends of the box are stowed using the staggered “bonded block” method. Boxes containing lightweight or fragile items that provide little or no support to the box surfaces are stowed by stacking boxes directly one atop the other. This method takes advantage of the vertical rigidity of the side walls and corrugations in each box. Use plywood or lumber dunnage or fibreboard dividers as auxiliary decking sheets to segregate tiers of different-sized containers.

Use dunnage or pallets on the container floor to elevate the cargo and allow drainage should there be water leakage or ingress.

Fill all voids by bracing or use fillers to prevent cargo from sliding or shifting.

Place rough paper between stowage blocks of boxes or containers with smooth exteriors, to prevent sliding or shifting.

WOOD BOXES AND CRATES

Crates of uniform size and weight should be stacked directly one atop another.

Groups of crates with different weights or dimensions should be separated by partitions, dividers or auxiliary decking.

Fill voids at top, sides or ends by use of partitions or fillers. If large voids are present, block, brace and tie down cargo to prevent movement in any direction.

Use dunnage on container floor to provide sump area for condensate drainage, if crates are not skidded.

When bracing crates, apply bracing to strength members only, not to panels or sheathing.

MACHINERY OR HEAVY ITEMS

Distribute weight by proper placement and use of cradles or skids.

Use deck cleats and bracing to prevent lateral and fore-and-aft movement. Use metal strapping to prevent vertical movement.

Extremely heavy, dense items should be properly secured to the container floor. Consult with carrier or container leasing operator for approved method(s).

Top-heavy items should be shored and braced to prevent toppling. Do not brace against the side panels of the container. All bracing must bear on a structural member of the container. Diagonally positioned bracing to the container floor is preferable for cargo that is top-heavy.

BAGS, SACKS AND BALES

Use the “crosstier” method of stacking bags and sacks to consolidate the cargo and prevent sliding during transit.

Use a sufficient dunnage layer on container floor to provide for condensate and water drainage.

Separate bags, sacks and bales from other cargo by using partitions.



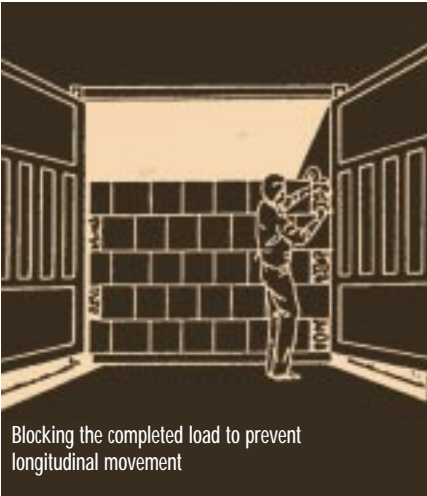
Bags and sacks “crosstier” nesting loading



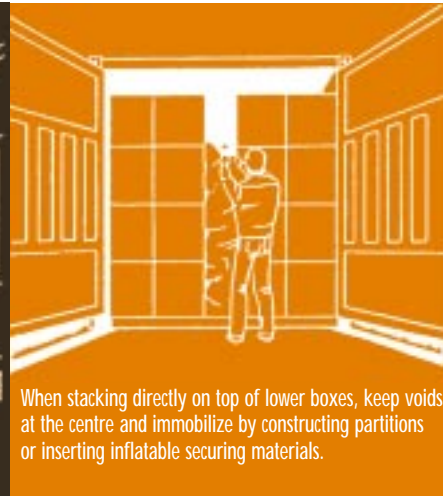
Fill side and end voids to prevent movement of cargo.

DRUMS

Drums containing liquids should be floor loaded. The drums should be stowed on end with filler holes up, as opposed to on their “rounds.” Use dividers to protect drum rims from chafing damage.



Blocking the completed load to prevent longitudinal movement



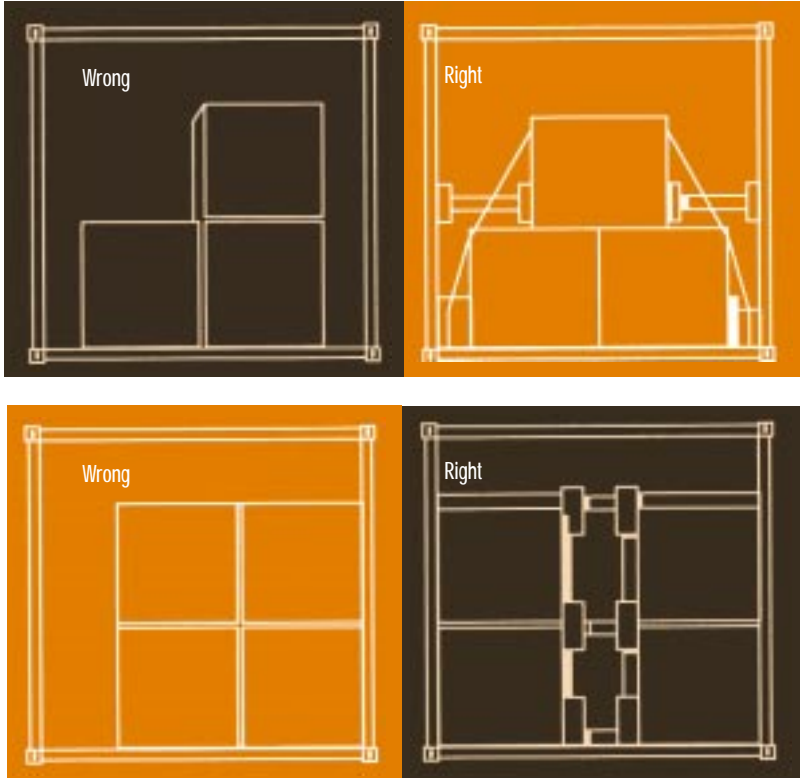
When stacking directly on top of lower boxes, keep voids at the centre and immobilize by constructing partitions or inserting inflatable securing materials.

BLOCKING, BRACING AND DUNNAGING TECHNIQUES AND MATERIALS

Regardless of the mode of transport, tight loading is essential for damage-free shipping. Void spaces and loose or moveable cargo will certainly cause in-transit damage.

It is important to remember that blocking, bracing or using dunnage should only be considered when it will not damage the insides of the trailer or container.

Internal blocking and bracing are used to distribute the weight of the contents of the container or truck over the entire interior surfaces, rather than concentrate on one critical point.



BLOCKING

By blocking a cargo, you are preventing the cargo from moving longitudinally, rail cars and rail moves are most susceptible to this type of movement.

BRACING

In bracing a cargo, you are stopping damage from up and down movements and from vibration; this would be essential for sea and truck movements.

DUNNAGE

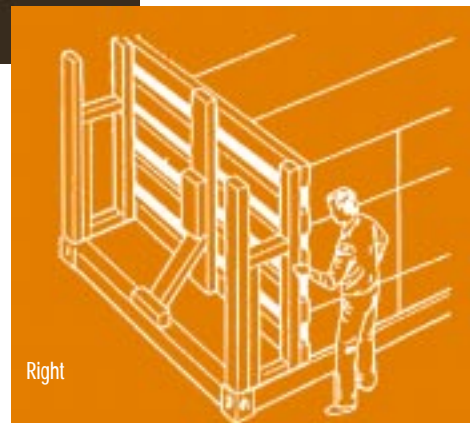
The main use of dunnage is to prevent or limit damage to cargo by breakage, chaffing, crushing, as well as to reduce damage from sweat and moisture. *The use of sufficient dunnage is one of the principal precautions against damage to cargo.*

BULKHEADS

The construction of bulkheads in trailers and containers is used to separate different types and sizes of products, especially where some are taller than others and could fall down on top of shorter ones. Bulkheads are used principally to restrain loads and to act as stabilizers and prevent loads from shifting.

Containers and trailers that are used on railway flat cars (TOFC or COFC mode) pose unique loading, blocking and bracing problems. Doors on trailers and containers do not have high load-bearing strengths, which means that their solid end is the only bulkhead provided. The side-to-side movement of a TOFC or COFC while it is on a railcar is magnified, due to its higher centre of gravity and its tendency to move in different ways to the train when switching or interchanging takes place.

Unloading ramps and specialized cranes and lifting gear also add different stresses than is usual, so rear-end blocking and bracing are a must.



MATERIALS FOR BLOCKING, BRACING, RESTRAINING CARGO, ALSO DUNNAGE AND PALLETS

LUMBER. All lumber should be clean, dry (maximum 19% moisture content) and free of significant splits, shakes and knots.

In North America, softwoods such as spruce, pine and fir are mainly used for cargo blocking, bracing, partitions, bulkheads, dunnage and pallet manufacture. However, in many instances, hardwoods such as oak, maple and ash may be preferred where high strength is needed, or may be specified by the end user.

In Europe, the standard Europallet is a high specification unit requiring hardwood construction. At present, North American softwood pallets are not acceptable in Continental Europe, and goods will have to be transferred before on carriage to destination. However, rationalization of pallet standards within the European Union is continuing and the situation is subject to change.

Exporters intending to ship palletised goods to overseas markets should contact the Canadian Pallet Council for the current status of Canadian-sourced pallets in the intended market.

There are no set general standards for the use of hard-or softwoods in cargo work. For lumber to be used in blocking, bracing, restraining cargo and dunnage, reference should be made to the following publications:

SOFTWOODS. *CAN/CSA - 086.1 - M89 Engineering Design in Wood (Limit Based Design)*. Canadian Standards Association

HARDWOODS. *USDA Agricultural Handbook No. 72. The Wood Handbook (Wood as an Engineering Material)*, available from: U.S. Government Printing Office.

For pallet construction in Canada, there are again no set standards. Each industry, or user, tends to set its own requirements according to actual use, handling requirements and loading.

AIR BAGS/INFLATABLE DUNNAGE. Constructed from multiple kraft paper, fibre or rubber and with inner liners of polyethylene, air bags come in a range of sizes and in both reusable and disposable forms.

Air bags function at their best in spaces between 10cm and 20cm, but can cope with up to 30cm.

It should be remembered that air bags work by exerting pressure against a surface; therefore, they should not be placed between the top of a cargo and the roof of the container or truck. Air bags should not be placed between cargo and the doors as this will make opening the door hazardous.

A check should always be made for sharp edges and/or protrusions in order to avoid punctures.

STRAPPING. Straps can come in various widths and strengths and are made from metals, plastics, fibres and rubber.

Heavy-duty metal straps are used to tie down heavy, irregular or awkward-shaped items.

Nonmetallic straps are used for tying down lightweight cargo items or units and has only a fraction of the strength of similar steel material. They will not resist shearing on a sharp edge and will stretch as much as 9%.





COMPLETING THE STOW

ISOLATE CARGO FROM CONTAINER/TRAILER/RAILCAR DOORS. Construct partition across rear of stowed cargo to prevent it from contacting doors and falling out when doors are opened.

PROVIDE WATER DAMAGE PROTECTION. Cover cargo adjacent to doors with plastic or waterproof paper sheets to protect cargo from possible water entry via door gaskets.

VENTILATED CARGO. Ensure that air flow in container is unrestricted and that vents are open and clear.

CLOSE AND SEAL DOORS. Ensure that all locking cams are engaged. Affix locks and seals. (On units with side and end doors, be certain to check both.) Record seal number and enter on shipping documents.

CONDUCT LOAD PLANNING – ENSURING ALL VOIDS ARE FILLED

Load planning simply means figuring out how you want to arrange the shipment in the container or trailer — before you actually start loading.

A tape measure is one of your most important tools in helping you figure out how the shipment will fit in the trailer or container. Make sure you know the exact clear internal dimensions of the trailer or box, and that you relate this to your package size for length, width and height.

A simple sketch or diagram can be an effective tool to reduce loading time and eliminate damage.

BENEFITS OF LOAD PLANNING

- ▶ **After you have worked out how the freight will fit, the actual loading will proceed more quickly and smoothly, and voids can be adequately filled.**
- ▶ **Delays will be minimized.**
- ▶ **You will know that the shipment fits the trailer or container.**
- ▶ **You will know where the shipments are in the trailer or container.**

THINGS THAT GO WRONG WITHOUT LOAD PLANNING

- ▶ **The top tier may not fit properly and you may have to unload some pallets and start over. This can cause more damage and confusion on the shipping dock.**
- ▶ **You may have to unload the unit to turn pallets around so they will fit better.**
- ▶ **You may find that the shipment won't fit, and you need to unload and re-order another type or size of trailer or container.**



NOTE:

1. Make sure the shipment will fit before you start to load.
2. Use your tape measure.
3. Use a loading sketch or diagram.

- ▶ **If you need help in load planning, ask your carrier.**
- ▶ **Use packaging materials extensively to fill empty space, to stop cargo from moving.**
- ▶ **Problems that seem minor at the time of loading can get much worse in transit, sometimes resulting in damage to the entire load. For example, a small leak can contaminate the whole shipment. A collapsed carton can let the whole shipment move around enough to damage other cartons.**

LOAD PLANNING DIAGRAM

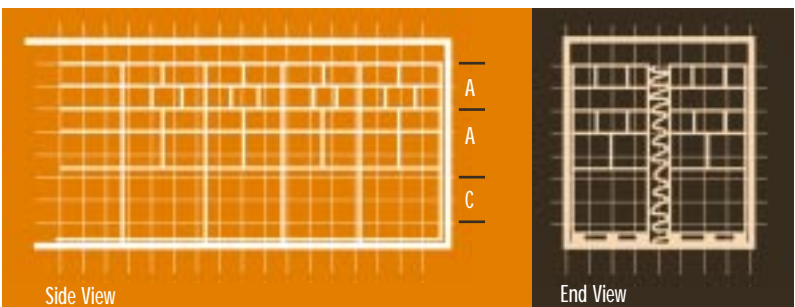
Shipment A. Light Freight in Cartons: “Top” Freight

Shipment B. Heavier Freight in Cartons: “Mid” Freight

Shipment C. Palletised Heaviest Freight: “Base” Freight

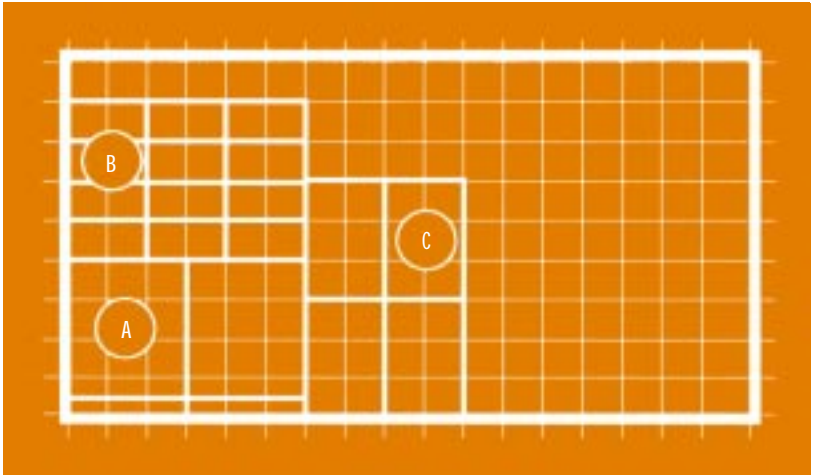
A simple hand-drawn sketch will do, but better still, prepare some “blank” side-and-end-view diagrams for use in planning the stow.

Some companies use computers to help in this process.



KEEPING TRACK AS LOADING PROCEEDS

- ▶ **In addition to having a good plan for the loading, along with good loading procedures and equipment, it is critical to keep track of the loading operation as it proceeds. Prepare a diagram to give you and your colleagues a good idea of what is already loaded.**



- ▶ **Keep an accurate count of the pieces loaded at all times. Have one person responsible for this. Losing track of the piece count can cause great confusion. It can result in having to unload and recount or run the risk of shipping too many or too few items to your customer. It could even result in your carrier being overweight.**

CHOOSE THE CORRECT HANDLING EQUIPMENT

- ▶ **It is critical to select the appropriate equipment for your situation.**
- ▶ **Correct handling equipment will not only make the loading go more smoothly and efficiently, it will also reduce damages.**
- ▶ **If you are loading with a forklift truck, make sure you use forks that are the correct length. Forks that are too long can damage the freight, as well as the trailer or container itself.**

CORRECT PROBLEMS IMMEDIATELY – NOT LATER

Correct problems immediately. If neglected, the problem may have to be corrected later, perhaps at a great distance and in another time zone. Then costs rise rapidly and customers become dissatisfied.

SOME EXAMPLES OF PROBLEMS ARE:

- ▶ **A shrink-wrapped pallet with leaning contents will be extremely difficult to stow. Check with a carrier whether it should be reassembled.**
- ▶ **Odd-shaped palletised load. For example, a pallet having a single carton on top must be loaded on the top tier, and precludes another pallet above it.**
- ▶ **Leaking or spilling contents. Check leaks. This could damage the whole shipment and could be dangerous, depending on the substance.**
- ▶ **Checker counts 8 pieces when paperwork shows 10 pieces. Check before proceeding.**
- ▶ **Labels or description of goods on freight do not match paperwork. Check and correct before proceeding.**

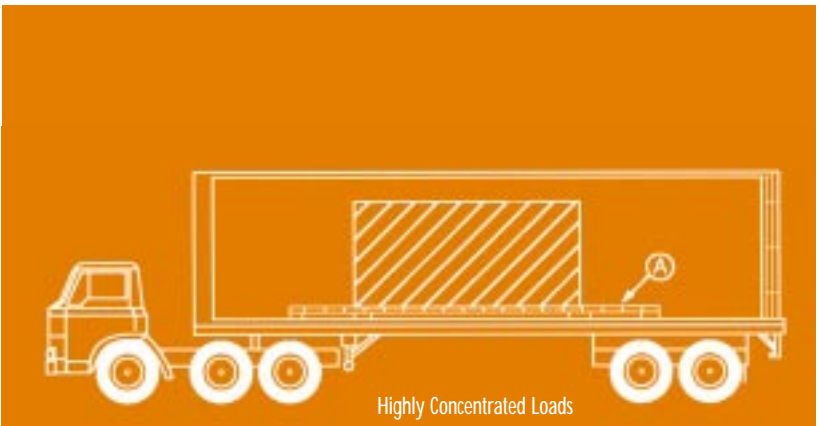
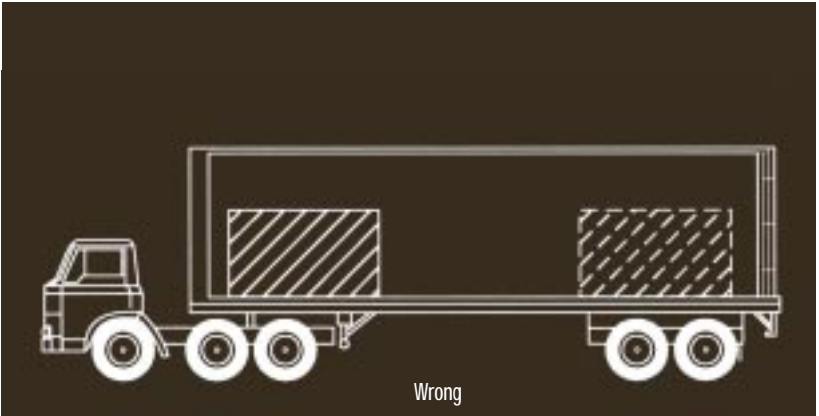
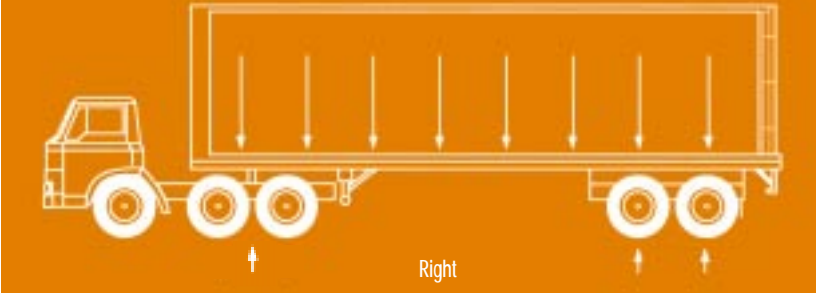
WEIGHT DISTRIBUTION ON LOADING

Although the descriptions and diagrams that follow describe weight distribution recommendations for trailers, the same principles apply to heavy goods stowed in a freight container.

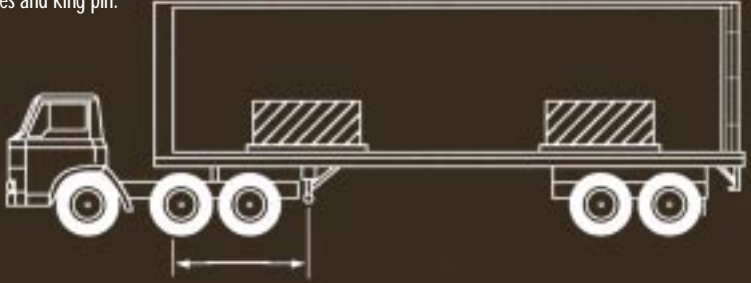
NOTE:

Carriers need specific accurate information concerning weight so that they can ensure government regulations are met. There are significant differences between maximum gross vehicle weights within Canada, the U.S. and most European countries.

Trailers are designed for uniform load distribution, as shown below. Distribute the load equally between the rear tires and the king pin, which transfers its load to the truck.



Units loaded in either position indicated below are incorrect because weight is not equally distributed to tires and king pin.



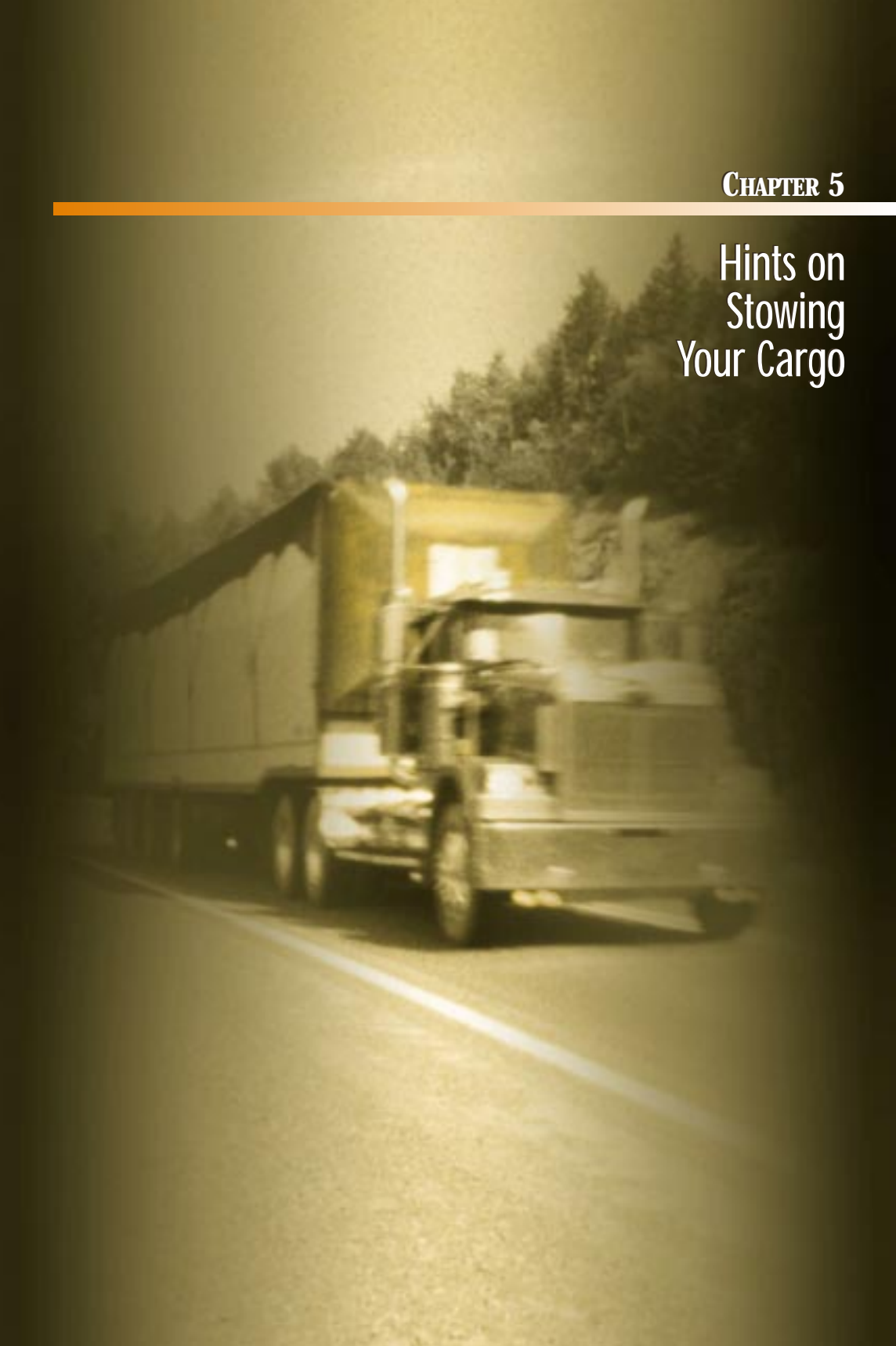
Weight units should be placed in any 10 linear feet (3m). Adding a skid (A) of adequate length will help properly distribute weight.

Trailers are often left unsupported by truck tractors and are lifted by cranes. In positioning two concentrated weight units as illustrated, position the forward unit for equal weight distribution on the landing gear (approximately 3m from front of trailer).



CHAPTER 5

**Hints on
Stowing
Your Cargo**



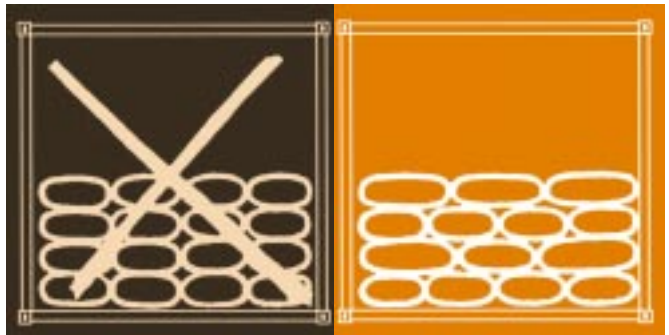
The following text and graphics illustrate the “Do’s and Don’ts” of cargo stowage.

SECURING CARGO

1. Whenever possible, use the lashing points attached to container or truck walls and floor to tie down your cargo.
2. Container or truck walls should not be exposed to localized pressure from protruding cargo sections.
3. When wooden wedges are fixed to the floor, it should be remembered that they will have to be removed again without damage to the floor.
4. Large void spaces should be “fenced off” by means of wooden screens or bulkheads. Small void spaces can be filled with air cushions, wood shavings in sacks, plank separation, or use of loading lashes.
5. Doors have to be secured against sliding cargo (use nets or planks).
6. Loading lists and invoices should be attached securely to easily visible places in the container or truck.
7. Door locks and customs seals should be checked carefully before dispatch.

1. BAGGED CARGO

Should be stowed on the bricklaying principle with alternating tiers. This consolidates the cargo and minimizes sliding during transit.

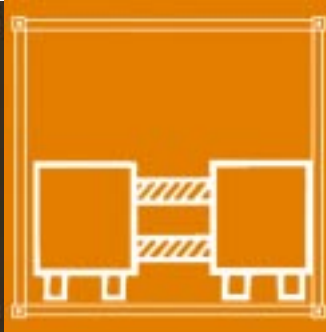


2. BARRELS

To be stowed in upright position (bung on top) with horizontal planking to separate the tiers.



3. PALLETIZED CARGO



No space should be left between pallets and container walls; space left between pallets should be tightly filled with suitable material.

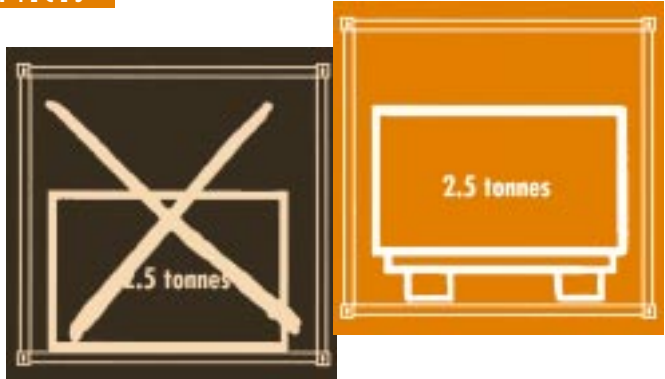
4. LIGHT PACKAGES

To be stowed on top of heavy ones.



5. HEAVY PIECES

To be mounted on skids to prevent damage to floor or cargo when unloading.

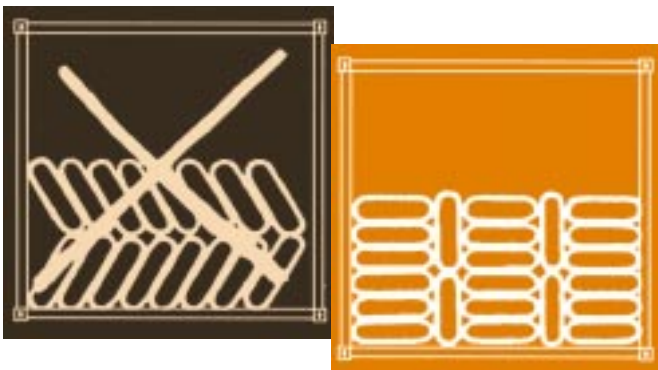


6. ROLLS



Paper rolls should be loaded upright. Spools, coils and carpet rolls may be loaded on their sides, but forklifts must be fitted with appropriate handling devices.

7. TIRES



To be stowed flat in piles with upright tires wedged between piles to eliminate movement.

8. PACKAGES OF EQUAL SIZE

Prepare a stowage plan beforehand to save time and space.



9. MIXED LOAD (E.G., BOXES, CARTONS AND BAGS)



Should be segregated with heavy items at the bottom.

10. ODOROUS CARGO

Should not be loaded near any cargo, which is sensitive to smell contamination. If sensitive cargoes must be shipped together, then ventilated or temperature-controlled units should be used.



11. "DRY" AND "WET" CARGO

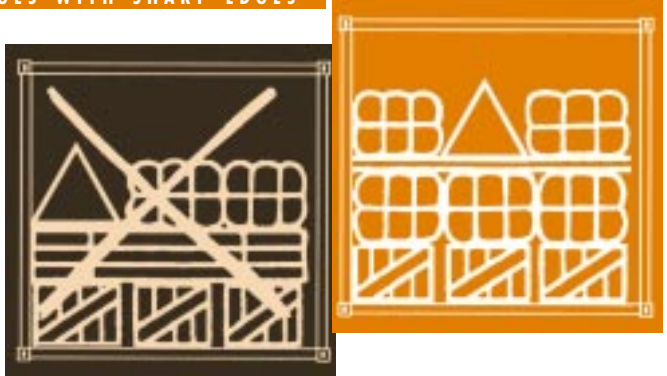


Should only be loaded in the same container when they can be strictly separated. "Wet" cargo should be

loaded on the floor, and adequately covered with boards on which the "dry" cargo can then be stacked.

12. PACKAGES WITH SHARP EDGES

Packages with sharp edges should be loaded in the middle, leaving space to walls. Very special care must be taken to protect load against sliding.



13. IF CONTAINER IS NOT FULLY LOADED

If container is not fully loaded, cargo must first be evenly stowed on floor before layering.





CHAPTER 6

**Standard
Equipment
for International
Moves**

SELECTING THE RIGHT CONTAINER

Consultation with both the freight forwarder and the ocean carrier will permit selection of the type and size of container most suitable for the cargo.

Many types and sizes are available to the shipper. The most common is the standard dry cargo container that may be used for a great variety of general cargo goods. Keep in mind however, that containers are not yet truly metric and are usually identified by their imperial measure. The discussion below refers to outside dimensions; see page 57 for usable interior dimensions and capacities.

WIDTH

All containers in international trade are 8'0" maximum width. However, some special containers are appearing in European intermodal moves that are 2.5m wide. This is very close to the 102" standard van width in North America, and is designed to accept a better pallet stow.

LENGTH

Standard lengths in international trade are 20' and 40', although 45' units are beginning to be carried in both Pacific and Atlantic routes. The 48' and 53' box sizes are only used in domestic services within the United States and Canada by carriers in their dedicated services.

HEIGHT

Containers generally come in four heights: 8'0", 8'6", 9'0" and 9'6". However, some heights are more common than others. Typically, a 20' box will be available in 8'0" and 8'6", with a few at 9'0" and 9'6". 40' boxes are usually 8'6" or 9'6" (high cube). 45', 48' and 53' are only available in the 9'6" height.

PAYLOAD

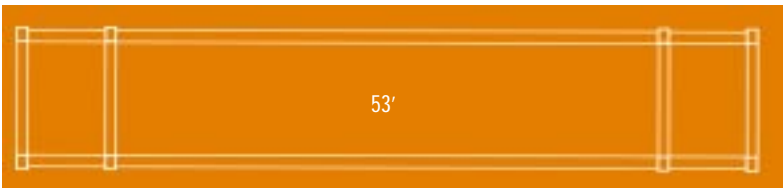
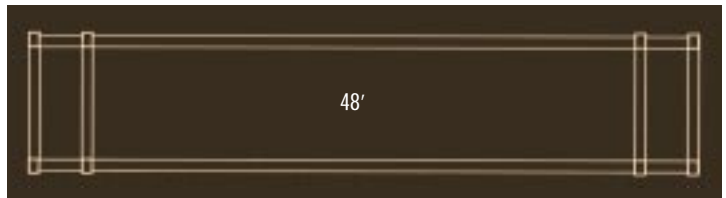
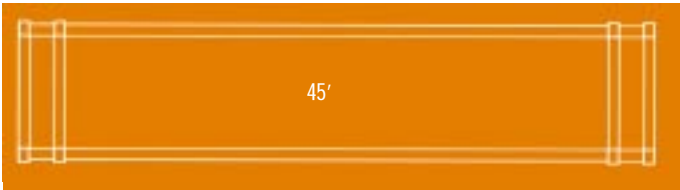
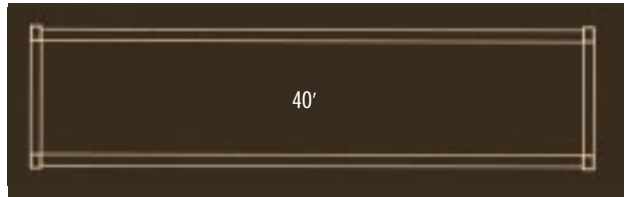
The actual payload depends on both the type and size of container. Greater payloads are achievable with aluminum boxes than with steel.

20' containers now have a maximum permitted gross weight of 24 tonnes; note, however, that some older containers are only rated to 20 tonnes, which was the original standard.

40', 45', 48' and 53' containers are rated at 30.48 tonnes maximum gross weight.

CONTAINER SIZES

The four largest container sizes can be visually identified by the number and location of corner post/lifting locations.



TYPICAL SPECIFICATIONS OF DRY FREIGHT CONTAINERS

| Category | Exterior Dimensions | Interior Dimensions | Door Opening | Cube Capacity | Weights |
|--------------------|---|------------------------------------|----------------------|--|--|
| 20' | Length = 19'10 1/2" Width = 8'0" Height = 8'6" | 19'30 7/8" 7'8 1/4" 7'9 7/8" | 7'8 1/4" 7'5 1/4" | 1173 ft ³ 33.2 m ³ | TARE: 2340 kg (5160 lbs) Max. Payload: 21 660 kg (47 740 lbs) ISO Max. Gross: 24 000 kg (52 900 lbs) |
| 40' | Length = 40' Width = 8'0" Height = 8'6" | 39'5 1/4" 7'8 1/4" 7'9 7/8" | 7'8 1/4" 7'5 1/4" | 2391 ft ³ 67.7 m ³ | TARE: 3960 kg (8730 lbs) Max. Payload: 26 520 kg (58 470 lbs) ISO Max. Gross: 30 480 kg (67 200 lbs) |
| 40' High Cube | Length = 40' Width = 8'0" Height = 9'6" | 39'5 1/4" 7'8 1/4" 8'10 1/8" | 7'8 1/4" 8'5 5/8" | 2692 ft ³ 76.2 m ³ | TARE: 4150 kg (9150 lbs) Max. Payload: 26 330 kg (58 050 lbs) ISO Max. Gross: 30 480 kg (67 200 lbs) |
| 48' Domestic | Length = 48' Width = 8'6" Height = 9'6" | 47'3 7/8" 8'2 1/2" 8'11" | 8'2 1/4" 8'11" | 3463.1 ft ³ 98.01 m ³ | TARE: 4399 kg (9700 lbs) Max. Payload: 26 077 kg (57 500 lbs) ISO Max. Gross: 30 480 kg (67 200 lbs) |
| 53' Domestic | Length = 53' Width = 8'6" Height = 9'6" | 52'6" 8'2 1/2" 8'10 1/2" | 8'4" 8'10 1/2" | 3830 ft ³ 108.5 m ³ | TARE: 4665 kg (10 280 lbs) Max. Payload: 25 815 kg (56 920 lbs) ISO Max. Gross: 30 480 kg (67 200 lbs) |
| European Wide Body | Length = 12 192 mm Width = 2500 mm Height = 2743 mm | 12 100 mm 2450 mm 2517 mm | 2420 mm 2424 mm | 74.8 m ³ | TARE: 3350 kg Max. Payload: 27 130 kg ISO Max. Gross: 30 480 kg |



SPECIAL TYPES AND NEW EQUIPMENT THAT MAY BE AVAILABLE

Specialized containers should be used for goods or commodities requiring unique handling, or that are being transported to particular environments.

Some types of specialized containers are:

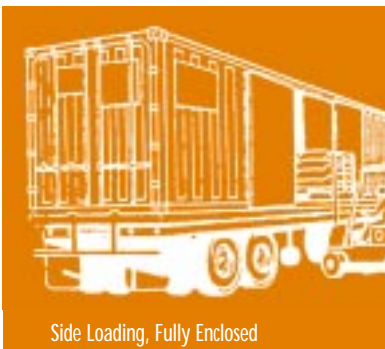
- ▶ **Side-loading fully enclosed**
- ▶ **Refrigerated**
- ▶ **Flat rack**
- ▶ **High cube**
- ▶ **Open top**
- ▶ **Liquid bulk**
- ▶ **Auto**
- ▶ **Half height**
- ▶ **Ventilated**
- ▶ **Dry bulk**
- ▶ **Livestock**

The availability of special containers should always be checked with the container leasing companies, carriers or freight forwarders.

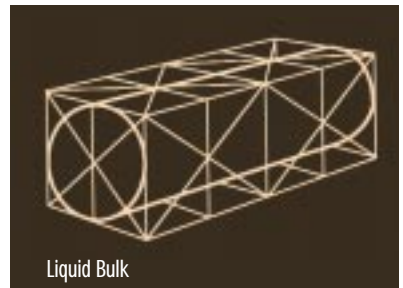
SIDE-LOADING, FULLY ENCLOSED. Equipped with side doors for use in stowing and discharging cargo where it is not practical to use end doors, as when the container must remain on a railcar while cargo is placed in or removed from the container.

OPEN TOP. Used for carriage of heavy, bulky or awkward items where loading or discharging the cargo through end or side doors is not practical. Most open-top containers are equipped with fabric covers and are often termed “soft” or “rag” top containers. Some open-top versions are fitted with removable, hatch-type panel covers or a detachable, full metal roof.

EXAMPLES OF SPECIAL CONTAINERS



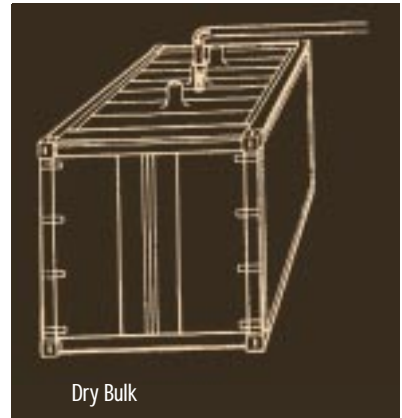
Side Loading, Fully Enclosed



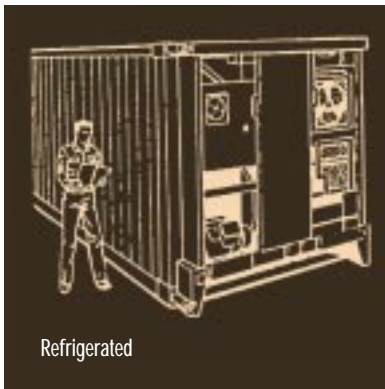
Liquid Bulk



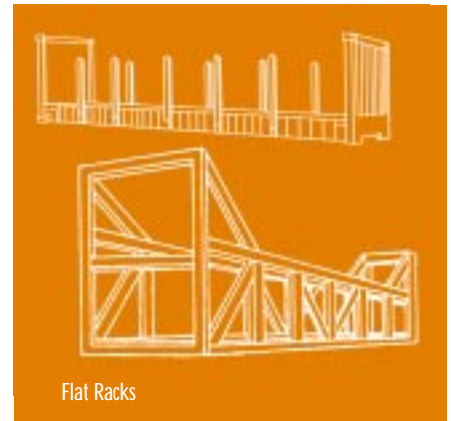
Open Top



Dry Bulk



Refrigerated



Flat Racks

VENTILATED. Equipped with ventilation ports on ends or sides, and used for heat-generating cargo or cargo requiring protection from condensation (sweat) damage. Versions with powered air-circulating fans are available. Vents are normally fitted with baffles to prevent entry of sea or rain water.

REFRIGERATED. Insulated and equipped with a built-in refrigeration system, powered by direct electrical connection or by diesel or gasoline generator. It is used primarily for foods or other commodities requiring a temperature-controlled environment.

LIQUID BULK. Tank-type containers for carriage of liquids. Some have been designed to high-level specifications for carriage of certain hazardous materials.

DRY BULK. Designed for carriage of bulk cargo such as dry chemicals and grains.

FLAT RACK. Available in a variety of sizes and models. Flat racks are used for lumber, mill products, large/heavy/bulky items, machinery and vehicles. Some are equipped with removable sides.

AUTO. Used for carriage of vehicles and available in enclosed or open versions.

LIVESTOCK. Configured for the nature of livestock carried; containers are available for transporting poultry, cattle and other livestock.

HALF HEIGHT. Used for dense or very heavy cargoes where an open top is desirable.

EXAMPLES OF SPECIAL CONTAINER APPLICATIONS

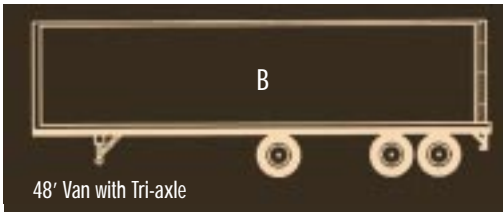
| <i>Container Type</i> | <i>Possible Applications</i> |
|--|---|
| High Cube Containers | Carpets, appliances (e.g., freezers, ovens), consumer electronics (e.g., TVs, VCRs), tobacco, toys, high-volume cargo |
| Non-ISO Small Container Cargo Baskets | Supplies for remote inland or offshore drilling sites, household goods, small consignments, lock-up storage, air transportable consignments |
| 20' Bulk Container | Malt, breads, grain, granules, gravel, sand, nuts and bolts, printers' ink, screws, sugar and dry chemicals |
| 20' Half Height <i>(Open Top)</i> | Drums, pipes, rails, rods, steel beams and ingots, marble slabs, copper blisters/anodes, heavy ores, castings |
| 20' and 40' <i>(Open Top)</i> | Agricultural and construction machinery, boats, glass, ingots, logs, scrap, salted hides. |
| 20' Bulk Discharge <i>(Open Top)</i> | Coal, ores, sand, glass cullett, scrap, fertilizer |
| 20' Produce Carrier <i>(Open Side)</i> | Produce, livestock, side-load items |
| 20' Ventilated Container | Beans, cocoa beans, coffee, onions, potatoes, produce, seeds, spices, tobacco, pulses, garlic, metal goods liable to rust damage, electronic goods |
| 20' and 40' Flatracks and Platform Flats | Agricultural machinery, air conditioners, boats, boilers, coils, construction machinery, electric generators, electrodes, large irregular-shaped items, logs, machinery, newsprint or paper rolls, pipes, rods, steel beams, tanks, tinplate, transformers, trucks, motor vehicles, over-height/over-length items, plywood sheets |
| Refrigerated/Insulated Containers | Fruits, vegetables, fish, meat, canned goods |

SOME TYPES OF VAN TRAILERS AVAILABLE

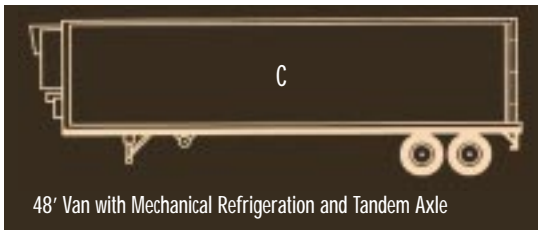
COMMONLY USED VAN TRAILLERS



45' Van with Tandem Axle



48' Van with Tri-axle



48' Van with Mechanical Refrigeration and Tandem Axle

TYPICAL TRAILER SPECIFICATIONS

| Trailer Type | Interior Dimensions | | | Volume In Cu. Ft. | Tare Weight In Lbs. | Type of Floor |
|--------------|---------------------|-------|--------|-------------------|---------------------|----------------|
| | Length | Width | Height | | | |
| A | 44'5" | 98" | 105" | 3174 | 15 900 | Wood |
| B | 46'6" | 97.5" | 106" | 3322 | 23 000 | Steel and Wood |
| C | 46'6" | 97.5" | 106" | 3361 | 20 500 | Aluminum |

The above is only a small sample of the many types and sizes of trailers that are available from carriers. Check with your carrier for the best one for your situation.

A close-up, front-facing view of a yellow and black CP locomotive. The locomotive is illuminated from the front, casting a glow on the gravel tracks. The number '9633' is visible on the right side of the front panel. The CP logo is prominently displayed in the center. There are various mechanical components, pipes, and lights visible on the front of the engine. The background is dark, suggesting a night or low-light setting.

CHAPTER 7

Insurance

If the advice in this booklet has been followed, there should be little likelihood of an insurance claim. However, if the worst happens and there is damage or loss, then read on.

OCEAN CARGO INSURANCE IN INTERNATIONAL TRADE

Ocean cargo insurance is concerned primarily with international commerce. Basically, anyone who has an insurable interest in a cargo shipment (i.e., anyone who would suffer a loss if the cargo were damaged or destroyed or who would benefit from the safe arrival of the cargo) has a need for an ocean cargo policy. The cargo insurance policy compensates the exporter or importer in the event of loss or damage to goods due to a peril insured against while at risk under the policy.

Historically, each voyage of an ocean-going vessel is a joint venture of the shipowner and all the cargo owners. Centuries of tradition, trade practices, and maritime and international commercial law affect the interest of the international trader.

Cargo insurance protection is an aid to commercial negotiations. It allows traders to proceed with confidence in the knowledge that each party to the transaction is properly protected. In most cases, the cost of marine insurance is nominal when compared with the value of the goods and the freight cost.

The marine cargo insurance policy can be designed to meet the individual needs of the exporter or importer in an international transaction.

Cargo insurance is available in two basic forms:

A) SPECIAL CARGO POLICY (VOYAGE POLICY). Insures a single specific cargo movement; and

B) OPEN CARGO POLICY. An open cargo policy can be written to cover all cargoes shipped by the assured in foreign trade by overseas vessels, aircraft and foreign parcel post. Coverage is afforded while goods are in transit from the seller's warehouse to the buyer's warehouse in due course of transit. The contract is tailor-made to fit requirements of the individual assured's shipments and can be written to cover broad or named perils.

AMOUNT OF INSURANCE

The open cargo policy contains a valuation clause (a formula for determining the amount of insurance in advance of shipment). This formula can be tailored to conform to trade customs or to follow variation in the value of any commodity, which is subject to price fluctuations.

A common form of valuation clause reads:

Valued at amount of invoice including all charges in the invoice and including prepaid and/or advanced and/or guaranteed freight not included in the invoice, plus ten percent.

The above formula establishes the insured value, which generally approximates market or landed value.

The addition to the invoice face value can range from effectively zero to technically an unlimited level, depending on a number of factors. This is particularly important where goods are ordered at a fixed price, but with a long lead time to delivery. For example, goods sold in early 2000 at \$1 million value C.I.F. customer plant, against delivery mid-2000, may be worth \$1.5 million at mid-2000, if the goods had to be remanufactured following loss of the original shipment.

It is, therefore, extremely important that adequate insurance is purchased to cover all eventualities relative to the shipment, and that the level and terms are agreed upon with your underwriter beforehand.

You should, as the shipper, ensure that all the costs for which you are responsible have been taken into account. These may include: export packing, local cartage, ocean freight (Note: freight rates can change dramatically in a short period of time), forwarders fees, consular fees.

COST OF INSURANCE

The loss experience developed on an assured's own account heavily influences the judgment of the underwriter as respects rating. Cargo insurance premiums are calculated by applying a rate to each \$100 of insured value. For example, a 25-cent rate on a \$10,000 shipment develops a premium of \$25.

It is the usual practice to issue, with an open cargo policy, a schedule of marine rates that can be used by the assured to quickly and conveniently calculate the cost of insurance on each shipment. One applies the rate quoted in the policy for a specific destination or point of origin and the product to be shipped to the insured value to determine the premium charge. This method is especially convenient to exporters quoting C.I.F. prices in establishing the total cost of shipping goods to overseas destinations.

TYPE OF LOSS

There are three areas of possible loss or damage and expense in which your cargo can become involved. The first is Particular Average, which is simply partial loss or damage to your own cargo. The second is General Average, which occurs when a sacrifice is made and an extraordinary expense is incurred for the benefit of the whole venture and toward the cost of which your cargo may be asked to contribute. The third type of possible loss concerns the Total Loss of vessel and cargo by sinking, stranding, explosion, fire and other causes. Where your cargo is totally lost, it is customary for underwriters to require the full set of negotiable bills of lading, the original invoice and all negotiable copies of the insurance policy or certificate. It should be noted that these documents will also be required where an entire shipment disappears or is “non-delivered”.

Sometimes damage to the cargo when it arrives is so extensive that the full amount of the insured value is paid by underwriters. This is known as Constructive Total Loss, but since it differs only in degree from the partial loss known as Particular Average, the procedure outline in the following paragraphs applies in such cases.

The term Particular Average covers partial loss of or damage to your goods and a consignee is seldom advised of any such shortage or damage, but merely that the ship has arrived and the cargo is available for delivery. If loss or damage has occurred, it then becomes the responsibility of the consignee or the agent handling the receipt of the cargo to preserve and protect any claim, which the former may have against either the ship or the insurance company, or both. It is most important to preserve the claim against the ship since failure to do so may impair or destroy underwriters' rights of subrogation against the carrying vessel and so prejudice your own claim against them.

When your cargo arrives at the final destination, as specified in the policy:

- a) Count, weigh, tally, and examine it before accepting delivery. If a container shipment, record the seal number. If the seal is broken on arrival, note this on the receipt.

- b) Give an explicit receipt, for example, not "3 cases damaged" but "2 cases top broken, 1 case wet."
- c) If possible, keep a copy of the receipt. If not, write a memorandum of the manner in which it was signed.
- d) Notify your broker or underwriter promptly. (Assuming the loss is more than trivial, your underwriter will appoint a surveyor.)
- e) Telephone the carrier about the loss and invite inspection.
- f) Write to the carrier, hold the carrier responsible for the loss and at the same time, confirm your telephone conversation.

Should you encounter concealed damage, promptness in notifying both the carrier and your underwriter takes on even greater importance. Written notice of such damage must be given to the carrier within three days after delivery in order to have any chance at all of making recovery. You should also bear in mind that prompt notice of all concealed damage after arrival is sometimes the only evidence underwriters have that the damage did actually occur during the insured voyage.

The foregoing applies specifically to a Canadian importer who is insured in Canada. If on the other hand your cargo is insured overseas, your documents will include an insurance certificate to which you should refer to find the issuing company's nearest settling or survey agent. In this situation, you will have to pay the surveyor's fees before obtaining the report, but these can be included in your statement of claim and will be paid by the underwriter, if the claim itself is payable. Also, it is advisable to have all pertinent documents available for the surveyor's inspection to enable the surveyor to write a complete report. If the report is incomplete and your claim has to be sent overseas for settlement, this can lead to protracted correspondence and delay.

DOCUMENTING A CLAIM

Documenting a claim is a relatively simple procedure, and if done properly the first time, inconvenience and delay can be avoided.

The following represents a complete list of required documents.

- ▶ **A copy of the supplier's commercial invoice and packing list**
- ▶ **A signed copy of the Ocean Bill of Lading**
- ▶ **A signed copy of the Inland Bill of Lading or Freight Bill, if there was an inland journey not covered by a Through Bill**

- ▶ **Copy of Customs Entry, when duty and sales tax have been insured**
- ▶ **Original insurance Certificate or Policy. If reporting under an Open policy, show Open Policy number and declaration**
- ▶ **Copy of written claim or notice of claim filed with the last carrier and the original or a copy of any reply received. (The reply may follow other documents, but a copy of the written claim must be sent when a claim is presented to underwriters.)**
- ▶ **An original or signed copy of the survey report. If the surveyor was appointed by underwriters, his report will be mailed directly to them**
- ▶ **A copy of the receipt given to the last carrier or to Customs. If a copy is not available, attach a copy of the memorandum showing the nature of the receipt and the exceptions noted**
- ▶ **Copy of Dock Receipt**
- ▶ **If shortage or non-delivery through a Ports Canada port, a copy of the Missing Cargo Report Form**
- ▶ **Most Ocean bills of lading provide that the carrier will be discharged from all liability unless suit is commenced within one year from the date of delivery. Therefore, if any claim is submitted to your broker or underwriter more than ten months after delivery, you should obtain a letter from the carrier extending the time to sue by several months. This permits your underwriters to proceed against the carrier under subrogation, any net recovery being reflected in your loss experience. Failure to protect these subrogation rights may seriously prejudice your claim against underwriters, and affect your insurance rates**
- ▶ **Damage Certificate duly signed by customs authorities and shipping company's agents as evidence of pilferage, particularly where dock receipts or other receipts proving shortage cannot be provided. Letter from shipping company's agents or port authorities acknowledging the non-delivery of packages**

There can on occasions be exceptions or additions to the foregoing list.

Where import duty and sales tax are insured, the importer should take steps to have a customs appraisal where goods are damaged and a claim should be filed for rebate in accordance with customs regulations. Where pilferage is concerned, a damage certificate should be obtained from the carrier and a claim similarly filed through the customs broker.

Finally, a word about small losses. First, let it be said that underwriters will pay any properly documented loss covered by the policy regardless of size. Nevertheless, no one in business can afford to overlook the cost of collecting a dollar. A claim for a small loss usually entails the same processing costs for a much larger claim. The cost includes every action, of any member of your staff, related to the claim from the moment of its discovery until the settlement cheque is processed through your own accounting procedures. At the same time, you must also realize that these losses are all charged to your loss experience by your insurer.

FUNCTION OF THE SURVEYOR

Other than small losses, a receiver or shipper is advised to use the service of a qualified surveyor.

The purpose of a survey is to establish the cause of loss or damage to the goods. The surveyor, through personal experience and expertise, must try to determine at which point in the transportation chain damage could have taken place. The surveyor's judgment is critical in such situations for it will be the surveyor's decision as to whose responsibility the damage or claim may ultimately fall.

In inspecting pilfered or damaged consignments, the surveyor is acting as an impartial observer, duty-bound to report in detail the extent of loss and on the evidence of loss. The surveyor is not expected to decide whether the loss is, or is not, recoverable under the terms of the policy. The surveyor's actions and recommendations are aimed at minimizing the loss regardless of what insurance protection is available and do not imply that a claim for loss or damage will be paid by underwriters nor do they prejudice the latter's position in this regard.

CARGO DAMAGE MONITORING AIDS

New tools are now becoming available that will be able to assist in determining the facts that cause damage in a transport move. These tools are known as “digital data collection units.”

The units that gather transportation data are typically quite small (5cm x 5cm x 15cm) and battery powered. They record the exact data and the time of any incident that results in unusual gravitational forces affecting the package. The information retrieved will advise all parties concerned as to which exact point of the transit the problem occurred. They record effects on packages of such factors as condensation, shock forces, vibrations or impacts and are, in many ways, similar to the “black boxes” carried on aircraft.

The recorders fall in to the following categories:

- 1. SHOCK AND VIBRATION RECORDER.** This records full wave forms exceeding selected thresholds;
- 2. DROP HEIGHT RECORDER,** which accurately records data from drop heights and acceleration wave forms; and
- 3. PEAK ACCELERATION RECORDER.** This records humidity levels and temperatures experienced over long periods (up to 180 days).

Although not necessarily determining the exact cause of a problem, these new recorders can be of great help to both shippers and carriers in rectifying and identifying weak links in the transport chain.

If a loss occurs, and a survey determines that a claim should be made, the most important element in successful presentation of an insurance claim is promptness. The danger of delay invalidating an otherwise valid claim cannot be stressed too heavily.

Summary Checklist of Do's and Don'ts for Shippers



- ▶ **Don't** be afraid to venture into the export market, but do so with consultation and advice from your export association, a professional freight forwarding organization, an authoritative cargo insurance broker, and other recognized institutions.
- ▶ **Do** understand where your goods actually have to go and how they will get there, by what transportation modes, as well as how long it will actually take.
- ▶ **Do** look at an atlas. Think about what you would need to know if you had to get there.
- ▶ **Do** take into account the possibilities of delays, hold ups and weather extremes.
- ▶ **Do** take time to discuss with your forwarder or packer all the variations for both packing and methodology of stow.
- ▶ **Don't** take short cuts.
- ▶ **Don't** proceed without a plan of how you are going to stow for the intended move. What precautions you are going to take, what materials you are going to require, and how they are going to be used?
- ▶ **Don't** hesitate to revise your stowage plan. It is better to have made several stowage plans on paper than to actually load and unload a container or trailer several times.
- ▶ **Do** call for a cargo surveyor to look at your plan if you are unsure. Your insurance broker may help you here, or go directly to the surveyor association.
- ▶ **Do** order the correct size of sea container or trailer that you need.
- ▶ **Don't** be concerned to decline equipment that you did not order.
- ▶ **Do** check the equipment thoroughly on arrival. If you are unsure of what to look for, ask your surveyor to undertake the task.
- ▶ **Do** ensure that all your cargo is ready to load.
- ▶ **Don't** be afraid to check the load stow again before commencing — use your measuring tape!
- ▶ **Don't** rush the load. Ensure that your preplan and precautionary measures are being adhered to.
- ▶ **Do** take photographs as the stow proceeds.

- ▶ **Don't** ignore damage on loading, regardless of how small it is.
- ▶ **Do** have your own surveyor check the stow before closing, locking and sealing the doors, if you are unsure.
- ▶ **Do** consider your own reaction if you received goods in a damaged or useless condition because of lack of care in stowage.
- ▶ **Don't** think that because the insurance company has provided a monetary recompense for the damage, that damage control is over.
- ▶ **Do** ensure that the goods have been packaged and stowed so that despite any problem en route, they arrive in good condition — just the way you would like to receive products.

Remember: it is your business that you are looking after.



The following are for guidance only and should not be used as legal definitions of the terms.

CELL GUIDES — Vertical guides (similar to those in an elevator shaft) within which the container fits and is constrained at its four vertical corner posts. The containers are stacked one above the other and the bottom container takes the static and dynamic vertical loads resulting from those resting on it. These loads are transmitted through the corner posts of the containers to a reinforced doubling plate on the tank top, or bottom of the hold.

CELLULAR CONTAINERSHIP — A vessel designed to carry standard freight containers in cells formed by a system of guides. The vessel hatch covers are specially arranged to carry several tiers of containers. Such vessels usually cannot carry other cargo without undergoing major conversion work.

CHASSIS FRAME — This unit serves as a chassis, but without fixed wheels. It is the centre of a three-piece combination: the container, the chassis frame and the bogie. The container is secured to the top of the chassis frame by four corner tie-down fittings. The bogie is secured to the bottom of the frame in the same manner as it would be secured to a container were it a two-piece combination.

COMBINATION CONTAINERSHIPS — In addition to cell holds for the accommodation of containers, other distinctive means of handling cargo are present in the same hull: roll-on roll-off, palletized cargo handling through side ports, or the capability for transporting bulk commodities in the lower holds.

CONTAINER (BASIC DEFINITION) — An enclosed, permanent, reusable, non-disposable, weather-tight shipping conveyance. Fitted with at least one door, and capable of being handled and transported by existing carrier-owned equipment, both land and sea.

CONTAINER/BULK CARRIER — Often referred to as a Conbulker. These vessels are bulk carriers with hold/hatch dimensions arranged to permit stowage of containers in some holds. These may have portable cell guides. Hatch covers are strengthened to permit deck stowage of containers.

CONTAINER CHASSIS — A semitrailer chassis with tie-down corner fittings for receiving and securing a container of modular size. The 20' chassis can be either a single or tandem axle, depending upon the load requirements. The 40' chassis is a tandem axle unit and is usually equipped with sufficient tie down fittings to enable it to accommodate either two 20' or one 40' container.

CONTAINER ON FLAT CAR (COFC) — Is the form of “piggyback” where the container is first demounted from the chassis or bogie, prior to being loaded and secured directly onto a railroad flat car. It is a piggyback without wheels.

CONTAINERISATION — Is the act of using containers for the transportation of general commodities. In a narrower sense, it is the placing of the commodities in the container in a secure manner, and the eventual removal of said commodities in an orderly manner at destination.

CONTAINERSHIP — A container ship is one which is designed specifically for the carriage of standard freight containers. Various types may be identified including:

- ▶ cellular containership,
- ▶ container/bulk carrier,
- ▶ semi containership,
- ▶ ro/ro ship,

Standard containers are built to conform to certain international dimensions determined from time-to-time by TC 104 (Technical Committee 104) of the International Standards Organization.

DESTUFF — To empty a container.

FULL CONTAINERSHIP — See Cellular Containership.

HOUSE-TO-HOUSE — Shipment is containerised at the shipper's factory or warehouse, and then transported to the consignee's premises, where the cargo is unloaded.

HOUSE-TO-PIER — Shipment is containerised at the shipper's factory or warehouse. It is then destuffed at the discharge pier prior to final delivery.

PIER-TO-HOUSE — Cargo is containerised on the loading pier of the ocean carrier handling the shipment. Upon termination of the movement, the container is moved off the arriving pier and delivered directly to the consignee's factory or warehouse for removal of the shipment.

PIER-TO-PIER — Ocean carrier containerises shipper's cargo on the loading pier, and removes cargo from the container on the arriving pier.

INTERMODAL CO-ORDINATED TRANSPORT — This is normally used to describe the capability of interchange of container units among the various carriers. The fact that the containers are of recognized modular dimensions, and have common handling characteristics, permits them to be transferred from trucker to railroad, to ocean carrier, in an origin-to-destination movement.

PIGGYBACK — The point-to-point movement of one transportation vehicle upon another. A highway semitrailer on a railroad flat car is the usual form of piggyback transportation.

ROAD RAILER — A standard 45' dry van fitted with a hydraulically adjusted bogie between the rear axles. The unit is thus bi-modal and can operate on either rail or road.

Ro/Ro SHIP — Such vessels usually have stern ramps (but may have side doors) that permit cargo to be driven on and off on regular trailers, or special low-profile trailers. Some vessels combine both ro/ro and cellular containership features.

SEMI-CONTAINERSHIP — (Also known as Partial Containership) — A conventional general cargo ship with one or two holds fitted with vertical cells. In most configurations, additional holds can be converted to cell stowage, if container traffic demands. Nonstandard cargo containers and/or break bulk cargo is carried in the conventional holds and 'tween decks.

SINGLE-AXLE BOGIE — An assembly consisting of two wheels, axles, suspension system and overhead mounting for securing and supporting one 20' container. The bogie also carries rear lights, licence plates and mud guard flaps.

SPECIAL PURPOSE CONTAINERS — See Chapter Six.

SPLIT-AWAY CHASSIS — A 40' chassis constructed so that it detaches at midpoint and becomes two 20' chassis, each fitted with tie down corner fittings for receiving and securing a 20' container. The two single-axle bogies work in tandem when the chassis are joined together to form a 40' unit, but separate (one under each chassis) when the unit is split into two, 20' chassis.

STUFF — To load a container.

TARE — Unladen weight of a container or trailer.

TRAILER ON FLAT CAR (TOFC) — Probably the most common and best-known form of piggyback. Highway truck trailers are either lifted on and off in side transfer, or else end loaded and unloaded from a fixed ramp. When containers move in this type of service, they are first mounted on a chassis or bogie, prior to loading on the piggyback rail car.

UNITIZATION — The consolidation of a number of individual items into one large shipping unit for easier handling. It is also the securing or loading of one or more large items of cargo onto a single structure, such as a pallet.



