

HAZMAT

Packager & Shipper™

A Technical Journal – For All Modes of Transport

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U.S. DOT Letters of Interpretation of the Hazardous Materials Regulations: February 2006 and January 2006: Thirty-eight letters sorted, indexed and provided verbatim.

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Which Method of Cargo Securement is Right for Your Company?

By Matthew Bullock, Walnut Industries

The goal of a securement system in rail and ocean transportation is to prevent load shift, resultant damage, product release and safety hazards that may be created by unbalanced loads on board a vessel or railcar. DOT rules and the International Maritime Dangerous Goods (IMDG) Code require cargo to be secured against movement. The methods employed can generally be categorized as either rigid or flexible. A flexible system absorbs and dissipates energy of an impact without incurring damage to packaging or equipment. A rigid system attempts to eliminate acceleration of a load. See Figure 1, Cargo Securement Examples.

Non-metallic straps can be combined to create a lashing assembly and certain manufacturers' systems have been tensile tested and recommended by the Association of American Railroads (AAR). One such assembly has been impact tested successfully by the AAR and will soon become a published and accepted method for intermodal transportation. I have detailed some of the limitations of this system in the accompanying Cargo Securement Matrix, Figure 2.

Ty-Gard® 2000 is a flexible restraint system which utilizes 16" wide bands of high tensile fiber straps adhered to the container with a pressure sensitive adhesive. Ty-Gard can be compared to a seat belt, designed with elasticity to absorb energy preventing damage to the cargo. Ty-Gard material cost is

higher than competitive systems, however, the labor savings moderate the cost and the versatility adds value.

Rigid systems, such as wood or a pneumatically-tensioned strap, often provide only a limited surface area which can potentially create damage to the packaging and result in product release. To help avoid such incidents, this damage force can be distributed using additional corner protectors.

Wood is probably the most prolific method of blocking and bracing. One functional concern with a cargo securement system assembled from wood is lack of consistency. The performance of a wood system relies heavily on the skill level of the installer and the quality and moisture content of the lumber. Strapping systems and manufactured cargo restraint devices can provide the consistency required to responsibly manage the risk associated with load shift of hazardous cargo.

Furthermore lumber-based systems are required to be heat-treated or fumigated and the dunnage must exhibit the International Plant Protection Committee (IPPC) mark as per the International Standards for Phytosanitary Measures (ISPM-15) mandatory requirements. This certification and marking of solid wood packaging material is required on all shipments. Wood packaging and packing materials are a pathway for the introduction and spread of pests.

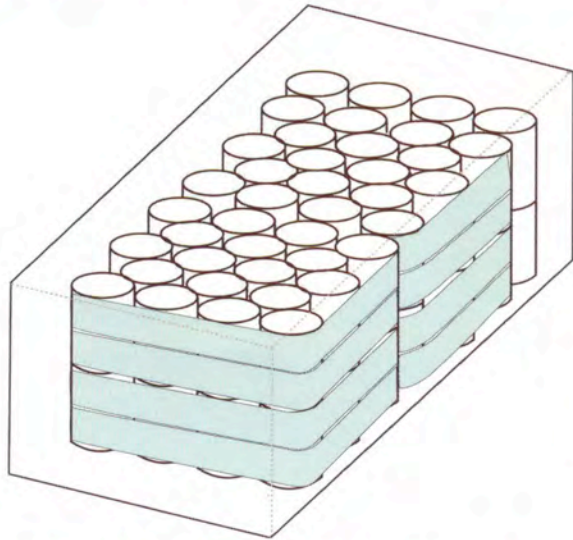
ISPM-15 measures are prepared by IPPC as part of the United Nations global program of agricultural policy.

These phytosanitary measures and guidelines reduce the risk of introduction of quarantine pests associated with wood packaging and packing materials (including dunnage), made of coniferous and non-coniferous raw wood, in use in international trade. The standard was adopted in March 2002 by the Interim Commission on Phytosanitary Measures (ICPM), which directs the objectives of the IPPC, but its implementation was suspended until mid-2003 as a result of issues concerning the legal protection of the associated wood packaging mark. They cover wood packaging and packing materials such as crating, pallets, dunnage, and blocking and bracing materials.

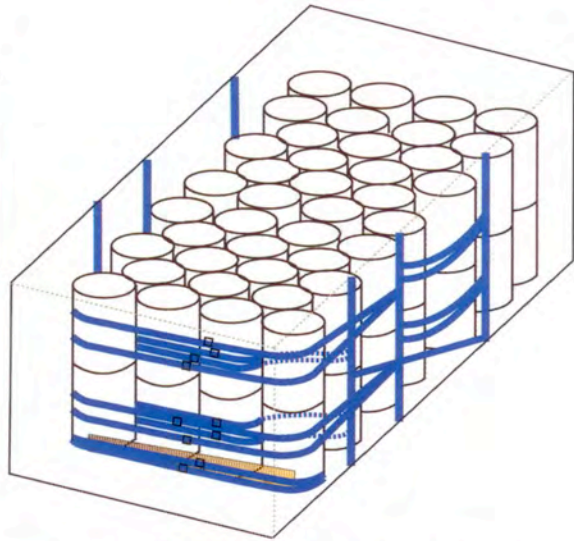
According to the USDA, wood dunnage blocking and bracing members should also be marked in two places on two opposite sides in accordance with Annex II of the standards. Otherwise it can be refused entry or immediately disposed of in an authorized manner. Improperly certified shipments are subject to fines which can be levied by the competent authority's inspectors, or the shipment can be returned to origin, or

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Cargo Securement Examples



80 Steel Drums secured with Ty-Gard 2000® as per AAR approved method.



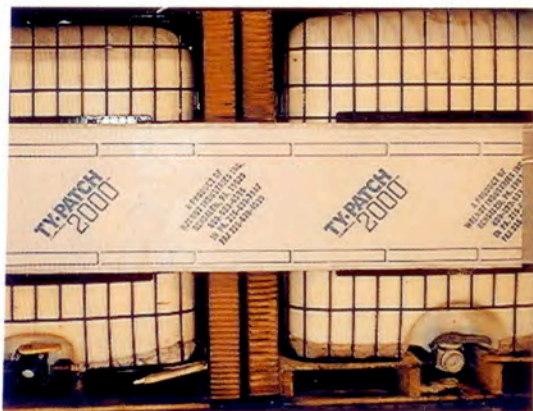
80 Steel Drums secured with Non Metallic strapping configured as per AAR approved method



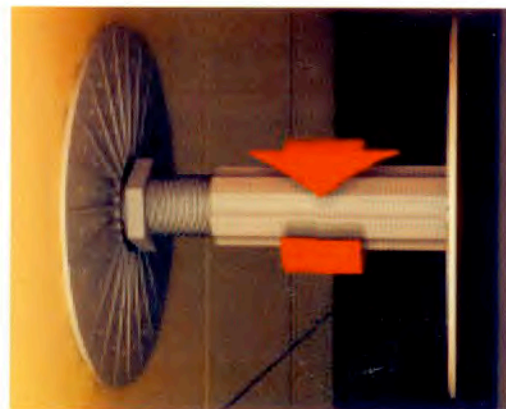
78 Steel Drums secured with Ty-Gard 2000®



72 Steel Drums secured with a AAR approved wooden gate



Lateral Void filled with Honeycomb Dunnage

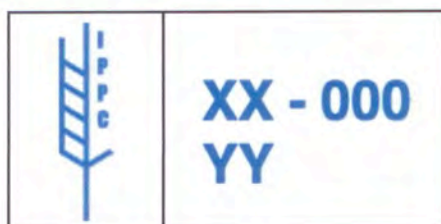


Lateral void filled with Void-Gard adjustable void filler.

Cargo Securement Matrix

Restraint Method	Cost	Packaging			Approvals			Mode			Ease of Use	Comments	
		Drums	Pallets	FIBCS	AAR	BOE /Hazmat	ISPM-15	IMDG	Road	Rail			Ocean
Longitudinal													
1. Non-Metallc Strapping	M	●	○	○	●	○	○	○	○	○	●	○	Low material cost however total system is labor intensive. Fastens to D-rings in containers which have limited strength. Cannot be used in Intermodal Trailers (no anchor points). AAR impact tested system used wooden beam and a total of 27 pneumatically tensioned bands.
2. Ty-Gard 2000	H	●	●	●	●	●	●	●	●	●	●	○	Higher material cost however savings on labor create an economical system. 100% Wood free system suitable for all package types and hazardous cargo for all modes of transportation. Versatility enables a shipper to use one system throughout thier supply chain.
3. Wood	H	●	●	○	●	●	○	●	●	●	●	○	Mid-range material cost however total system is labor intensive. AAR requires 2X6 wood and new ISPM-15 regulations requires wood to be heat treated and stamped with IPPC logo. Rigid system can create damage to packaging.
Lateral													
4. Air Dunnage Bags	H	○	●	○	●	○	●	●	●	●	●	●	Average material cost however landed cost can be higher due to the fact approx. 150 bags are shipped per pallet. Can be subject to valve malfunction, deflation and/or explosion due to barometric fluctuations.
5. Honeycomb Fillers	M	●	●	●	●	●	●	●	●	●	●	●	Low material cost however landed cost can be higher due to the fact approx. 175 fillers are shipped per pallet. Less competitive on large voids.
6. Void-Gard	M	○	●	●	●	●	●	●	●	●	●	●	Higher material cost however landed cost can very economical because 1000 units are shipped per pallet. Adjustability to fit mulitple sized voids.

the shipment can be separated from the packing material, all at the importer's expense. An example of the required mark is shown below. It includes a symbol, and the ISO two-letter country code followed by a unique number which is assigned by the National Plant Protection Organization (NPPO) to the producer of the wood packaging material. Markings should be placed in a visible location, and on at least two opposite sides of the article being certified.



In practice all wood packaging and packing materials (pallets, crates, and blocking and bracing dunnage) made from unprocessed raw wood, must be heat-treated or fumigated. However manufactured wood such as plywood tier separators are not subject to the above-mentioned requirements.

The following matrix can be used as a tool to help select the best method for a particular shipping environment. I have rated and described the advantages and disadvantages of each system. In selecting a system, carefully consider which method best suits the needs for the particular load, the mode(s) of transportation and the applicable regulatory requirements.

I have deliberately not detailed anti-frictional rubber mats or load-locking bars because these systems are not acceptable for hazardous materials securement. Additionally shippers should be aware that Air Dunnage bags are not approved for hazmat shipments by rail. Air Dunnage bags can lose pressure when subjected to barometric fluctuations.

Please see my article in the March/April 2006 issue of *HAZMAT Packager and Shipper* for a review of the pertinent regulations which deal with load securement and for a discussion of the forces commonly encountered in transportation. ☘