THE AMERICAN CLUB

Transport Guidance for Bagged Rice

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Preface

Rice is the staple food for many societies around the world. Of the nearly 475 million metric tons of rice produced globally in 2013, the largest producers were China (with 30% of the total) and India (with 22%)[1]. However, most of the rice produced in these countries is consumed domestically.

In contrast, the largest exporters of rice since 2008 have been Thailand (with about 25% of the total), Vietnam (with about 20%), India (about 16%) and the United States (at just under 10%)[2]. Overall, it is estimated that only 5% to 6% of global rice production is transported internationally. Nevertheless, even this figure represents a significant volume of global trade.

Traditionally, rice was carried as break-bulk cargo onboard general cargo vessels. The techniques used in the carriage of such cargo included the use of permanent wooden dunnage within which spaces were designed to ensure proper ventilation. More recently, the shipment of bulk rice is by way of containerized cargo.

As global demand for food has risen, now most rice shipments are made in bagged form onboard traditional bulk carriers. Therefore, the primary focus of this guidance is upon the carriage of bagged rice in bulk carriers.

Cargo claims have comprised, on average, about 25% of The American Club's total exposure. Within the cargo claims category, bagged rice claims in regions such as West Africa have been the most prevalent type of cargo claims encountered by The American Club's Membership. While The American Club has pioneered innovative actions such as the use of the anti-suit injunction mechanism to significantly reduce and thwart the ability of cargo interests to present fictitious and exaggerated claims involving bagged rice and other cargoes, preventative measures are still the most useful tools to prevent against these potential exposures.

Transport Guidance for Bagged Rice draws upon the knowledge and experience which The American Club has derived from its own claims, from those who are engaged in the operation and/or chartering of ships for the carriage of bagged rice, and from surveyors whose professional experience on behalf of P&I insurers, and from owners and charterers alike.

It is our objective and hope that this guidance proves to be useful to those in the trade of bagged rice. Users are also encouraged to refer to The American Club's website at **www.american-club.com** where additional pictures, animations, Member Alerts, and other relevant information can be found.

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[1]Source: World Rice Production at worldriceproduction.com.
[2]Source: All India Rice Exporters Association.

Foreword and Acknowledgments

Prevention is better than cure. This maxim, however hackneyed, lies at the heart of modern risk management theory and practice. And, far from being the passive indemnifiers of their Members' exposures, P&I clubs, perhaps to a greater degree than most other insurers, regard the provision of loss prevention advice and support as a central part of their mission.

The American Club prides itself as having been at the forefront of such activity. The breadth and depth of the Club's engagement in loss prevention is evident from the range of material it has produced over the last decade, most recently in the form of various e-learning tools and also, in earlier years, through the production of booklets and posters on subjects as varied as environmental pollution, workplace fatigue and the dangers intrinsic to entering enclosed spaces on ships.

This latest loss prevention initiative deals with a subject which is not immediately related to the safety of people or to that of the marine environment, but is one which impacts many Members – and by extension the Club – in a financially direct, and often repetitive, manner. As referred to earlier in the preface by Dr. Bill Moore and George Tsimis, the transport of cargoes of rice by sea is a significant part of the global trade in commodities. The trade has engendered many problems of loading, stowage, carriage and discharge for owners and their clubs over the years.

This document seeks to share with Members – and other interested parties – best practice in this key trade with a view to avoiding both physical loss and financial exposure. The project has been long and complex in its fulfillment, and many thanks are due to all those who have assisted in making it possible.

It is The American Club's hope that the practices outlined in this document will be of benefit to all who deploy them over the months and years ahead and, most importantly to the Members themselves to whom, of course, *Transport Guidance for Bagged Rice* is respectfully dedicated.

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The American Club would like to thank Mssrs. Jeroen de Haas and Nico van Duijvenbode of BMT Surveys, B.V.; Captain Richard Gayton of Braemar Technical Services, Inc.; Mssrs. Graham Ashley, Alain Delmas and Frank Benham of European Transport & Insurance Consultants, SAS; Mr. Michael Heer of Capezzana Shipping and Trading, SA; Captain Dimitris Marinis; Mr. Nils Nahl-Nielsen, Mrs. Maria Gerakaris-Michanzitsis and Mr. Nicholas Parton of Jackson Parton Solicitors; Mr. Paul Sa; and Captain Robert Rayner and his dedicated staff at IDESS Interactive Technologies, Inc. for contributing to the development of the *Transport Guidance for Bagged Rice*. Without their knowledge and experience and willingness to share those fine attributes with the Club, we would have been unable to produce this document.

We would also like to thank Captain Anthony Smith, Mssrs. Manny Beri, Richard Hamilton, Jeff Liu, and Richard Swan of the Shipowners Claims Bureau, Inc. for their dedicated and professional expertise and assistance in bringing the Guidance and the associated website to fruition.

Finally, The American Club would like to express our special thanks to Captain Napoleon Paterakis and his staff at CMI Co., Ltd. for their tireless patience, contributions of photographs and technical information used to complete the Guidance.

The cover art: Mr. John Steventon

Disclaimer

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1. Introduction

1.1 Objectives: *To define and specify the hazards, causes and effects of damages that affect shipboard transportation of bagged rice.*

1.2 Hazards to bagged rice

1.2.1 The primary hazards to bagged rice are water ingress, condensation damage, infestation, mishandling of cargo bags during loading, improper stowage in cargo holds, deficiencies in the ship's condition affecting the cargo holds, and pilferage and theft at the loading and/or discharge port.

1.2.2 *Sea water ingress*. Seawater can damage bagged rice due to leaks through the cargo hatch covers while the vessel is in transit, or through any damaged areas of the vessel's sideshells, adjacent ballast tanks or associated ventilation and sounding pipes in cargo holds.

1.2.3 *Fresh water ingress*. Potential sources of fresh water damage to bagged rice is due to rain while loading or discharging cargo, through hatch covers leakages during passage, via bulk heads adjacent to fresh water tanks, damaged piping that transit though cargo holds, and sweating due to variations in climate temperature and humidity.

1.2.3.1 *Condensation*. Fresh water condensation that accumulates on bagged rice is caused by temperature differences between the cargo, the air in the hold and vessel's steel structure resulting in "sweat". See **Section 5.3** for further information on ship and cargo sweat.

1.2.4 *Contamination*. Rice is sensitive to contamination. Cargo holds can be contaminated from prior cargoes carried in the holds, ship's rust, chipped paint, ship generated odors, and other ship produced debris.

1.2.5 *Infestation*. Cargo holds may also be contaminated by rodent and insect infestation. Rice is particularly susceptible to being infested with pests if stored for two months or longer. Rice can be exposed to granary and rice weevils, flour beetles, drugstore beetles and spider beetles, as well as for dried fruit and meal moths, rats and mice.

1.2.6 *Heat generated from spaces adjacent to cargo holds*. Heat that originates from adjacent spaces to the cargo holds such as the engine room, heated bunker tanks or heated cargo holds can damage bagged rice.

1.2.7 *Theft and pilferage*. Cargo theft and pilferage can be carried out by stevedores, visitors, cargo inspectors, members of the ship's crew, or any other individual(s) with direct access to a ship during loading, discharge and waiting periods.

1.2.8 *Improper stowage*. Damage to bagged rice can occur due to improper stowage. Cargo may shift or cargo stacks may collapse during transit.

1.2.9 *Human error or deliberate action*. Human errors or omissions can be made during tally and draft surveys leading to discrepancies in calculating the amount of cargo being loaded or discharged. Moisture testing of cargo may be erroneous. Deliberate action may include, inter alia, stevedore pilferage or theft, the insertion of intentionally misleading or unreliable tally or survey reports, or the issuance of false or incorrect bills of lading or other cargo documentation.

1.2.10 *Proper documentation control*. Errors, omissions, or lack of proper documentation on the condition or quantity of bagged rice can lead to disputes on the quality or quantity of cargo.

1.3 Damages to bagged rice

1.3.1 *Caking, wetting and mold damage*. Water ingress or condensation can cause the rice in the bags to become wet and permanently damaged through "caking" or also can result in mold development as seen in **Figures 1.1, 1.2 and 1.3**.

1.3.2 *Odor contamination*. Wet rice spreads a penetrating odor which is absorbed by the adjacent rice and may spread from bag to bag and, possibly, through the entire hold. Rice is highly odor-sensitive. Brown rice is particularly sensitive to the absorption of foreign odors.

1.3.3 *Rodent and insect infestation*. Rodents and insects can potentially infest a cargo before or during loading of bagged rice. An example of this is shown in **Figure 1.4**. This can lead to cargo receivers rejecting part or all of the bagged rice consignment at the discharge port or claims for additional fumigation.

1.3.4 *Torn bags*. Bags used to carry rice are normally constructed from woven polypropylene which is a relatively strong material but nevertheless subject to tear and damage during loading, transit or discharge handlings as shown in **Figure 1.5**.

1.3.5 *Stained or discolored cargo bags*. As shown in **Figures 1.6 and 1.7**, bags can be stained due to water ingress, cargo hold condensation, heat damage or other contributing factors.

1.3.6 *Pilferage and theft*. These incidents can lead to shortfalls of cargo at discharge port or to damaged bags. This can be the theft of whole bags or the pilferage of individual bags as shown in **Figures 1.8 and 1.9**.

1.4 P&I claims profile for bagged rice (2000 to 2013)

1.4.1 The frequency and costs of claims associated with bagged rice is significant. Between the 2000 and 2013, the Club has experienced 469 incidents accounting for a total of US$22.3 million in losses for Members.

1.4.2 It is notable that wetness damages accounted for 37% of the frequency of rice cargo claims and 48% of the costs of these claims. Such damages occur from ship and cargo sweat as well as from fresh and salt sea water sources external to the cargo holds. Similarly, cargo shortages accounted for 38% of incidences and 28% of the costs of bagged rice cargo claims. It is also notable that handling damages account for 18% of the incidence of these claims and 20% of the costs are the result of, for example, rough handling by stevedores, improper stowage, heat damage, shift of cargo during transport, etc.

Table 1.1: Frequency and cost of bagged rice cargo claims (2000 to 2013)

	#incidents	US$ (million)	% frequency	% cost
wet damage	175	$10.74	37%	48%
handling damage	83	$4.48	18%	20%
cargo shortage	179	$6.25	38%	28%
infested cargo	11	$0.10	2%	>1%
other damage	21	$0.73	4%	3%

1.5 Objectives of the *Transport Guidance for Bagged Rice*

1.5.1 *Transport Guidance for Bagged Rice* focuses upon loss and claims prevention for shipowners, ship managers, and seafarers engaged in the trade of bagged rice on bulk carriers specific to the hazards as described in **Section 1.2** that lead to incidence of damages or losses as described in **Section 1.3**.

Figure 1.1 | Caked rice as a result of water damage.

Figure 1.2 | Caked rice as a result of water damage also leads to clumping.

Figure 1.3 | Caked rice as a result of water damage leading to the onset of mold.

Figure 1.4 | Cargo surveyor removes a rodent from a rice bag.

Figure 1.5 | A bag of rice damaged and torn as a result of rough handling.

Figure 1.6 | Bamboo mat dunnage along the ship sideshell has been stained through ship sweat. The bag adjacent to the dunnage has been stained through the migration of condensation though the bamboo mat into the bag.

Figure 1.7 | Water damage on a rice bag resulting from the accumulation of condensation.

Figure 1.8 | Bags of rice are torn open and pilfered.

Figure 1.10 | A common means of pilferage is to cut rice bags open while in the cargo hold.

2. Condition of the vessel

2.1 Objectives: *To ensure clean, dry, water and condensation free cargo holds aboard the vessel for bagged rice to be loaded, transported and discharged in an undamaged condition.*

2.2 General

2.2.1 Bagged rice needs to be kept dry to prevent damage. Therefore, it is important to inspect both the vessel's cargo hatch cover systems and ventilators for potential defects as their performance may be critical to the safe carriage of the rice cargo.

2.3 Hatch covers and ventilation

2.3.1 Generally, hatch cover and ventilation system related items should be checked in advance of loading. Most importantly, certain hatch cover specific items should be checked to ensure their good working order as follows:

2.3.1.1 *Hatch cover packings*. Packings should be in good condition. Any replacements or renewals to be made in complete lengths only. Packings should not be repaired in short lengths, should not be imprinted by more than 10mm, or should not be hardened or missing.

2.3.1.2 *Hatch cover compression bars*. Compression bars should be clear of corrosion and free of damage or deformation.

2.3.1.3 *Hatch cover packing channels*. Packing channels are to be clear of corrosion and free of damage or deformation.

2.3.1.4 *Alignment of hatch covers*. Cargo hatch covers are to be correctly aligned.

2.3.1.5 *Coaming drains non-return valves*. Coaming drains non-return valves should be checked to be operational, ensuring they are not blocked and have caps fitted.

2.3.1.6 *Cargo hatch cover dogs, clamps and quick acting cleats*. All hatch cover dogs, clamps and quick acting cleats should all be present, clear of corrosion, properly adjusted with good washers and free of damage or deformation.

2.3.1.7 *Hatch cover landing pads*. Hatch cover landing pads should have minimal wear to avoid over compression of the packings.

2.3.1.8 *Hatch cover coamings*. Hatch covers and coamings are to be clear of corrosion and free of damage or deformation.

2.3.1.9 *Hatch cover hydraulics*. Hatch cover hydraulics are to be clear of corrosion, free of damage, deformation, and leakage free.

2.3.1.10 *Drainage channels*. All drainage channels are to be clear of corrosion and free of damage or deformation.

2.3.1.11 *Vents*. Fitted vents are to be clear of corrosion and free of damage or deformation.

2.3.1.12 *Mechanical ventilator flaps*. Ventilator flaps should be inspected to ensure that they are in good working condition and properly sealed when closed.

2.3.1.13 *Ballast and top side tanks*. The double bottom ballast tanks and top-side tanks (if any) should be pressed up prior to loading to ascertain watertight integrity.

2.3.1.14 *Bilge suctions and tank top openings*. These items should be thoroughly examined, tested and proved fully operational and the strainer plate over-covered with burlap. Bilge wells should be opened and cleaned. Any openings to the tank top should be examined are water tightness and properly secured.

2.3.1.15 *Sounding pipes and other hold pipes*. Piping systems should be examined and cleared of any debris. Any pipes within the holds, including ballast pipes or tank air pipes should also be closely examined to ensure they are in good working condition. In addition, sounding pipe closures should be checked to ensure that they are watertight.

2.3.2 *Maintaining reports on the condition of the hatch covers*. The owner should maintain up to date written reports on the conditions of the hatch covers that include:

(1) maintenance and repairs are carried out;

(2) at both load and discharge ports after testing the operability of the hatch covers as specified in **Section 2.3.1**; and

(3) when condition surveyed.

2.3.3 It is the shipowner's responsibility to maintain cargo hatch covers in good operable condition and to establish an effective inspection and maintenance program so that due diligence may be proven in the event of any cargo claim.

2.3.4 The simple reliance on class and International Convention on Load Lines, 1966 certificates and hose or ultrasonic testing may result in the discovery that the hatch covers are not in the condition to prevent water ingress damage.

2.3.5 Similarly, charterer's inspections and "on-hire" surveys may not include ultrasonic weather tightness testing and subsequent approvals should not be considered as proof of satisfactory status of these items.

2.4 Use of Ramnek tape

2.4.1 The use of Ramnek tape should be avoided.

2.4.2 There are generally two situations whereby charterers request that Ramnek tape be applied, when:

(1) the supercargo or charterers representative notice that the hatch covers are in a poor condition and that repairs might interfere with the ship's intended sailing schedule; or

(2) it is mentioned in the charter party that the hatch covers need to be sealed with Ramnek tape upon completion of loading operations. This should only be considered as an extra level of protection.

2.4.3 It is important to note that if and when charterers ask to use Ramnek tape, it does not relieve the shipowner from their duty under the charter party to present their vessel in seaworthy and cargo worthy condition.

2.5 Cleaning of vessel cargo holds

2.5.1 The conditions of the cargo holds can be adversely affected by a number of contributing factors that make the holds unsuitable for loading bagged rice. Depending upon the cargo hold conditions and requested if by charterers or charter party requirements, holds should also be disinfected, deodorized and/or ventilated.

2.5.2 Damage can also be caused by contamination from foreign bodies when there is inadequate segregation between cargo consignments. Such contamination can result in costly re-processing in the rice mill to remove the foreign bodies. With this in mind, the following precautions should be taken in preparing the cargo hold before the loading of bagged rice:

2.5.2.1 Cargo holds should be properly cleaned and prepared and all compartments, including sides, stringers, pockets, brackets, etc., should be cleaned, swept, washed, mopped, well ventilated and dried.

2.5.2.2 Rust and scale which might contaminate the cargo should be removed. Paint or lime wash may also be applied as appropriate to avoid the direct contact of scaled ship side with the bagged rice and also provide a sound and hygiene condition to carry cargo.

2.5.2.3 All residual gases should be thoroughly ventilated as their odor may taint the bagged rice.

2.5.2.4 All of the hold bilge wells should be clean and free from any previous cargoes or cargo residue, bilge water and moisture. Hold bilge suctions should be tested and demonstrated as functional.

2.5.2.5 If there is any sign of insect or rodent infestation, the use of insecticides may be considered for use by sealing the holds and fumigating. Such operation should be performed by an approved professional in a safe manner.

2.5.2.6 During the cleaning process, close attention should be paid to tank top, ceiling box, beams, frames, spar ceiling, hatch beam, etc.

2.5.2.7 Double burlap wrapping should be applied on the bilge cover plate and adhered with tape.

2.5.2.8 Hatch covers should be fully weather tight to avoid any chance of water ingress.

2.5.2.9 Cargo hooks should not be used for bagged rice cargo. Flat webbed slings and canvas and pre-slinging may help to reduce the likelihood of cargo damage.

2.5.2.10 *Certificate of cleanliness*. It is highly recommended that a qualified third party inspection is performed after the cargo holds have been cleaned before accepting bagged rice. The inspection should also result in the issuing of a certificate confirming fitness for loading.

3. Dunnage

3.1 Objectives: *To ensure that proper dunnage is applied for the protection of bagged rice in a clean, dry, water and condensation free environment during transport.*

3.2 General

3.2.1 Bagged rice is a cargo that is susceptible to damages from a wide range of hazards as those described in **Section 1.2**. In order to prevent specified damages such as water damage from condensation, appropriate dunnage should be used to protect the cargo.

3.2.2 Each country or port authority jurisdiction may have different rules as to the use of specific types of dunnage. Local agents should always be consulted in advance to determine if there are any local restrictions on the use of particular types of dunnage that are used.

3.2.3 The responsibility to properly dunnage, unless otherwise provided for in the applicable charter party, lies primarily with the charterer. Accordingly, considerable thought and care should be taken to ensure that a proper dunnaging plan is implemented to avoid unnecessary exposure to allegations of cargo damage caused in whole or in part a breach of duty to properly dunnage.

3.2.4 There are three primary types of dunnage used for bagged rice transported on bulk carriers:

(1) bamboo sticks, mats and kraft paper; or

(2) timber dunnage combined with corrugated cardboard and kraft paper; or

(3) a combination of Styrofoam, plastic/polythene sheet and kraft paper as pioneered by Allied Maritime Inc.

3.2.5 This section discusses these dunnage options for carriage of bagged rice and the benefits and disadvantages in applying each option.

3.3 Bamboo materials

3.3.1 It has been common practice in some ports to protect rice cargoes using bamboo mats and sticks. These materials are still widely used today in the wrong belief that they provide the best possible protection. Dunnage usually consists of bamboo sticks laid in a crisscross pattern on the steel tank tops as shown in **Figure 3.1.**

3.3.2 The bamboo sticks are completely overlaid with bamboo mats on the tank tops as seen in **Figure 3.2**. This is similarly laid along the sides of the vessel's bulkheads and sideshells as seen in **Figure 3.3**. There are shortcomings to using bamboo sticks as they are not free from moisture, and may possibly retain and bleed moisture into the cargo holds while the vessel is in transit. Bamboo sticks may appear dry on the outside but may have a moist pulpy interior. Bamboo mats overlaid by kraft paper should never be used as the fragile kraft paper will become destroyed and rendered useless.

3.3.3 As observed in **Figures 1.6 and 3.4**, experience has shown that when there is condensation or wetness on the tank top, bamboo mats tend to absorb moisture and pass the moisture onto adjacent bags that rest upon them. The greater the condensation, the further damage transferred to more adjacent bags.

3.3.4 *Benefits of using bamboo materials*. Bamboo materials are relatively cheap and easy to access in some countries where bagged rice cargoes are regularly loaded. The materials are re-usable and relatively lightweight making them easily transportable.

3.3.5 *Disadvantages of using bamboo based materials*. Bamboo based materials tend to retains residual moisture. In addition, there are locations where it is difficult to discharge dunnage. It is noteworthy that Peru does not allow bamboo mats and sticks to be discharged at their ports. A similar restriction applies in Chile, where disposal of dunnage materials such as bamboo mats and sticks are not allowed.

3.4 Timber dunnage

3.4.1 Timber dunnage (thick planks) should be placed in two layers on the tank top of each hold. The lower layer in a fore and aft direction, to provide drain channels, and the second layer laid athwart ship to prevent the lower tiers of bags coming in to contact with the tank top and avoid wet damage to cargo. The timber dunnage should be well cured, dried and the use of fresh sawn timber should be avoided.

3.4.2 The timber is also applied vertically on the hopper tanks, enabling condensation water developing against the side plating to be drained off to the tank top/bilges. The bags should be kept from the ships' sides and bulkheads, leaving a void space of approximately 12 inches (30 centimeters).

3.4.3 Timber planks can be laid horizontally between the bags protruding approximately 30 cm from bulkheads to ensure there are proper void spaces at the periphery of the stow. No vertical applied timber is then required at the sides or bulkheads, which is also difficult to apply at these locations.

3.4.4 Thereafter, kraft or an equivalent liner paper, or corrugated cardboard, should be placed on top of the timber dunnage. Timber dunnage should also be laid between about every 10 layers of bags, to support a firm stow, and to avoid stow collapse which may obstruct proper ventilation.

3.5 Allied Maritime's approach: Styrofoam, plastic/polythene sheets and kraft paper

3.5.1 Allied Maritime, Inc. has patented and successfully applied a simple and novel approach to dunnage protection of bagged rice using three types of protective materials: Styrofoam, plastic/polythene sheet, and kraft paper. These practices are summarized in **Table 3.1.**

Table 3.1: Allied Maritime approach to dunnage arrangements

Cargo hold location	Plastic sheet	Styrofoam	Kraft paper	Optimal Arrangement	Alternative Arrangement
Sideshells	X	X	X	Plastic sheet & Styrofoam	Plastic sheet & Kraft paper
Transverse bulkheads					
forward bulk-head, cargo hold no. 1	X	X	X	Plastic sheet & Styrofoam	Plastic sheet & Kraft paper
aft bulkhead adjacent to engine room	X	X	X	Plastic sheet & Styrofoam	Plastic sheet & Kraft paper
all other	X		X	Plastic sheet & Kraft paper	Kraft paper
Hopper tanks	X		X	Plastic sheet & Kraft paper	Plastic sheet or Kraft paper
Hatchways	X	X	X	Plastic sheet & Styrofoam	Plastic sheet & Kraft paper
Hatch coamings	X	X		Plastic sheet & Styrofoam	Plastic sheet or Styrofoam
Tank tops and tank top sloping plate	X		X	Plastic sheet & Kraft paper	Plastic sheet or Kraft paper
On top of cargo			X	Kraft paper	

3.5.2 *Tank tops and hopper tanks*. Tank tops and hopper tanks should be lined with kraft paper covered by plastic/polythene as shown in **Figures 3.5 and 3.6**. Alternatively, tank tops and hopper tanks can be lined with kraft paper only.

3.5.3 *Sideshell protection*. On sideshell plating, Styrofoam and plastic/polythene sheeting is used. Styrofoam sheets are placed along the sideshell between frames and then covered over with plastic/polythene as seen in **Figures 3.7 and 3.8**. It is recommended that the plastic/polythene sheeting and Styrofoam combination should be placed to reach, at a minimum, to the draft line when the vessel is fully loaded with cargo. Alternatively, if Styrofoam material is not available, kraft paper covered by plastic/polythene sheeting should be used.

3.5.4 *Transverse bulk heads*. Transverse bulkheads should be lined with kraft paper overlaid with plastic/polythene as observed in **Figure 3.9**. Alternatively, transverse bulk heads can be lined with only kraft paper as seen in **Figure 3.10**. The above applies with two exceptions:

(1) *Transverse aft bulkhead of the cargo hold immediately adjacent to the engine room*. Heat generated from the engine room can possibly damage the bagged rice cargo immediately adjacent to that bulkhead.

(2) *Forward transverse bulkhead of cargo hold number 1 (collision bulkhead)*. The collision bulkhead is more susceptible to temperature changes due to the void space forward of this bulkhead. Therefore, Styrofoam sheets covered with plastic/polythene should be considered as the appropriate dunnage to be used at that location. If Styrofoam is not available, at a minimum kraft paper covered by plastic/polythene sheeting should be used.

3.5.5 *Hatchways*. Hatchways should be lined with Styrofoam covered by plastic/polyethylene sheeting and overlaid with kraft paper.

3.5.6 *Top sloping tank plate*. Top sloping tank plate should be lined with kraft paper covered by plastic/polyethylene sheeting as shown in **Figures 3.11 and 3.12**.

3.5.7 *Hatch coamings*. Hatch coamings should be covered by Styrofoam and plastic/polyethylene sheet as seen in **Figures 3.13 and 3.14**. However, as needed, holes should be made to allow ventilation.

3.5.8 *On top of cargo*. As seen in **Figures 3.15 and 3.16**, kraft paper can be placed on top of the cargo once loading has been completed. Plastic/polythene should never be used as it entraps the residual moisture of the cargo which can condensate inside the plastic/polythene covering.

3.5.9 *Caution in using Styrofoam*. Caution should be taken using Styrofoam near ventilation openings (e.g. on the hatchways). The Styrofoam should be carefully cut and fitted so as to not to prohibit the flow of air through the ventilation openings.

3.5.10 *Advantages of using plastic/Styrofoam based materials*. The proper placement and combination of these dunnage materials have proven to be effective in reducing condensation damage on bagged rice caused by direct contact with ship's steel structure.

3.5.11 *Disadvantages of using plastic/Styrofoam based materials*. Plastic and Styrofoam based materials are more costly than bamboo dunnage. Also, Styrofoam is not always easily obtained product in many ports. In addition, plastic and Styrofoam dunnage materials may be difficult to dispose of at some ports. Furthermore, proper care is required that the stow does not become closed off by polythene sheeting material, reducing the ventilation capacity through the stow. The plastic/Styrofoam based materials are only used as insulation material between colder ship's steel parts and the warmer cargo.

3.6 Use of bagged saw dust

3.6.1 A successful method used to further reduce the accumulation of condensation in the cargo hold that may damage cargo, owners or charterers may also consider using saw dust in bags placed between the lower brackets of the shell plates and the hopper tanks as shown in **Figures 3.17 and 3.18**. Alternatively, timber planks are used for drainage as described in **Section 3.4.2**.

3.6.2 In order to reduce the instances of the vessel's sideshells accumulating condensation that may damage the cargo at the hopper tank plating and tank top, drain channels should be constructed to drain off condensation.

3.6.3 Saw dust bags should be considered for use with caution as it could possibly result in the accumulation of moisture, which will not be drained off to the bilges, but may affect the cargo instead.

Figure 3.1 | An example of a cargo hold being prepared for the transport of bagged rice. Note the vessel's tank top being lined with cross bamboo sticks and bamboo matting lay atop. Kraft paper is used for lining the hopper tanks.

Figure 3.2 | A cargo hold being prepared to transport a consignment of bagged rice. Note the vessel's tank top being lined with cross bamboo sticks and bamboo matting lay atop.

Figure 3.3 | Bamboo mat dunnage placed along a corrugated transverse bulkhead.

Figure 3.4 | Bamboo mat dunnage placed along the ship sideshell has been stained by ship sweat. The bag adjacent to the dunnage has been stained as a result of the migration of water though the bamboo matting.

Figure 3.5 | The cargo hold top tank, base of the transverse corrugated bulkhead and base of the hopper tank top have been lined with kraft paper overlaid with clear plastic sheeting.

Figure 3.6 | Kraft paper overlaid with plastic sheeting on the tank top. This continued vertically along the corrugated transverse bulkhead in background.

Figure 3.7 | Styrofoam laid between sideshell frames and then overlaid with blue plastic sheeting.

Figure 3.8 | Styrofoam sheets are covered with plastic along the sideshell. Note that bags of rice can be loaded to touch the plastic sheeting so moisture from ship sweat cannot penetrate.

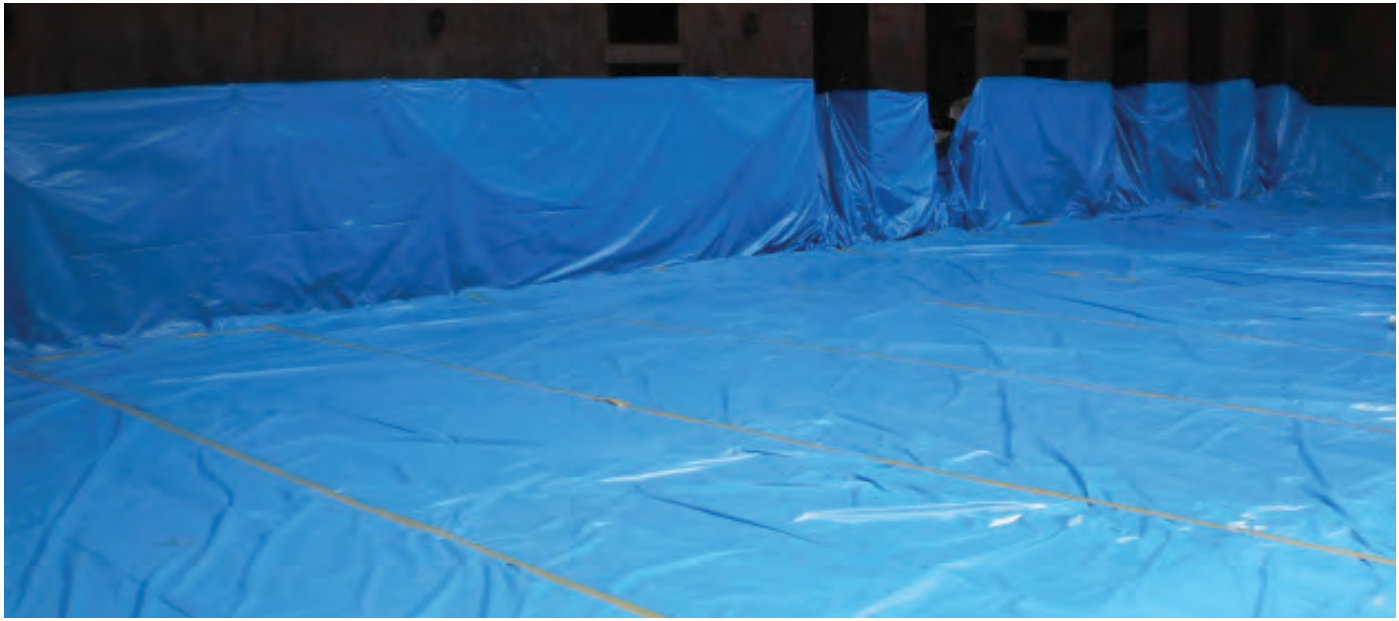

Figure 3.9 | Kraft paper overlaid with plastic sheeting on the tank top and continue vertically along the corrugated transverse bulkhead.

Figure 3.10 | The transverse bulkhead in the background is covered with kraft paper. Note how bags are placed tightly into the bulk head. No space is wasted.

Figure 3.11 | Note the kraft paper covered by plastic/polyethylene sheeting on the top side of the top sloping tanks.

Figure 3.12 | Cargo loaded to the foot of the hatch coamings. Note the kraft paper covered by plastic sheeting on the top sloping tanks.

Figure 3.13 | Stevedore inserting Styrofoam sheet between hatch coaming and plastic sheeting.

Figure 3.14 | Cargo is stacked to the foot of the hatch coaming. Note the stack of Styrofoam sheets used for insertion between the hatch coaming and plastic sheeting.

Figure 3.15 | Cargo is loaded to the foot of the hatch coaming and covered with kraft paper. Also note the plastic sheeting protruding out of the sloping wing plates and taped to the hatch coamings.

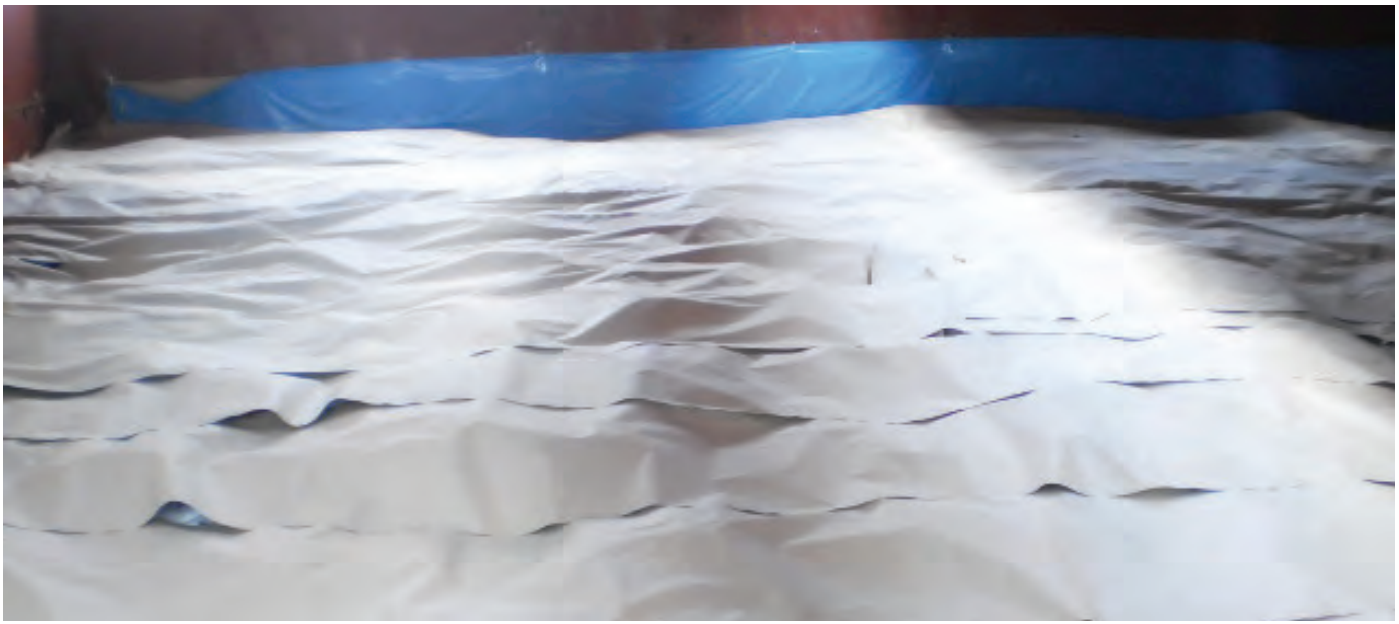

Figure 3.16 | Cargo is loaded to the foot of the hatch coaming and covered with kraft paper.

Figure 3.17 | Saw dust in burlap bags is inserted at transition point between sideshell and top of hopper tank. Notice the Styrofoam sheets above and kraft paper beneath the bags is then overlaid with plastic sheeting.

Figure 3.18 | Saw dust in burlap bags is inserted at transition point between sideshell and the top of the hopper tank.

4. Stowage of bagged rice

4.1 Objective: *To properly stow bagged rice to prevent cargo shifting and condensation damage during transport.*

4.2 The stowage plan

4.2.1 Stevedores hired to load cargo are usually not contracted by the owner, but contracted by the shippers or charterers. In general, stevedores in many parts of the world are usually unskilled and untrained workers and it is the responsibility of the charterer/shipper to employ competent stevedores. Therefore, it is important for shipowners to properly monitor stevedores during loading and discharging operations to ensure they are done without damage to cargo and to shippers or charterers specifications.

4.2.2 Shipowners should do their best to encourage charterers to hire qualified and experienced stevedores to arrange and lay appropriate dunnage to reduce the possibility of stowage related problems.

4.2.3 *Stowage plan*. Shipowners, in coordination and communication with the vessel's Master and chief officer, should be made aware of the charterer's stowage plan requirements in writing in advance of cargo operations commencing. At a minimum, particular consideration should be given to the following:

4.2.3.1 The shipowner, Master and crew should ensure that the bagged rice is stowed as per the charterer's or shipper's specifications and instructions.

4.2.3.2 The cargo should be properly laid out and configured to allow for proper ventilation. Depending upon the requirements of the charterer or the shipper, ventilation channels in the cargo may be constructed to allow for the free flow of ventilating air. Constructions of channels are considered on a case-by-case basis depending upon the volume of cargo, ventilation capabilities of the vessel, and the dimensions and configuration of the cargo holds. **Figures 4.1 and 4.2** show examples of bagged rice stowed with ventilation channels.

4.2.3.3 Depending upon the types of dunnage materials used as described in **Section 3**, particular attention should be paid to cargo being stowed near or against:

a. ship sideshells;

b. aft most transverse cargo bulkhead adjacent to the engine room;

c. forward most bulkhead of cargo hold number 1;

d. corrugated transverse bulkheads;

e. ship frames;

f. wooden dunnage;

g. ventilation ducts; and

h. any other potential cargo hold related physical characteristics that may affect the cargo whilst in transit (e.g. piping arrangements, other types of cargoes and their dunnage, etc.).

4.3 Condition of cargo upon arrival onboard ship prior to and during stowage

4.3.1 *General*. As specified in **Section 1.3**, damages can occur prior to arrival onboard ship such as rodent or insect infestation, caking, mold, wetness, tearing, staining or discoloration of bags or odor contamination. These damages can occur in the storage warehouse, while being transported to the ship via truck or river barge. The vessel should only receive and transport bagged rice that is in an acceptable physical condition. **Section 6** provides further guidance for the crew to ensure cargo is received onboard the vessel in an acceptable condition.

4.3.2 *Pre-arrival damage to cargo*. Vessels customarily load consignments of bagged rice at mooring buoys or anchorages. Bagged rice is transported by truck from inland locations or directly into wooden or steel barges for transport to vessels awaiting loading. Bagged rice cargo can be exposed to moisture damage during the barge leg of the voyage due to sea and/or fresh water ingress via the barge hull planking of older wooden barges or via the deck/hatch cover arrangements of both steel and wooden barges. This is a particular concern during inclement weather seasons.

4.3.3 *Bundling of bagged rice*. Bagged rice is normally brought aboard ship via cranes in bundles from barge or from ashore as seen in **Figures 4.3**. All bundles should be examined as closely as possible as they arrive on board by the crew and by the tally surveyor as shown in **Figure 4.4** before being lowered into the hold.

4.3.4 *Cargo moisture*. The typical moisture content for rice is between 15% to 22% (United States) or 19% to 25% (Asia) and is normally dried to a moisture content of 12% to 14% to prevent spoilage. For ocean transport, the ideal moisture content upon arrival onboard ship should be between 14% and 14.5%.

4.3.5 *Moisture testing*. A sufficient number of samples of full rice bags should be tested to ensure the proper moisture content upon arrival of the bags to be loaded aboard ship by qualified surveyors as shown **in Figure 4.5**. This has been found to be of particular concern for cargoes originating from Vietnam and tests from multiple samples should be performed.

4.3.6 *Cargo infestation*. Chewing damage caused by cereal pests generates an increased "respiration" in the cereal (hot spots). This associated with the metabolic activity of the pests themselves, promotes evolution of heat and moisture. Consequently, this provides favorable living conditions for molds and, at very high moisture levels, bacterial growth as seen in **Figure 1.3**.

4.3.7 *Physical condition of bagged rice*. The physical condition of the cargo that is accepted aboard ship should be in excellent condition with clean bags that are free of water, discoloration, mold, tearing and infestation.

4.4 Preparation of holds for stowage

See **Section 2.5**, *Cleaning of vessel cargo holds*.

4.5 Importance of ventilation for proper stowage

See **Section 5**, *Ventilation of bagged rice*.

4.6 Crew role in ensuring proper stowage

See **Section 6**, *Precautions during loading, transit and discharge*.

4.7 Surveyor role in ensuring proper stowage

See **Section 7**, *Cargo surveying*.

4.8 Use of fumigants

4.8.1 When fumigants are to be used, the shipowner should request from the consignor a statement that specifies the details of the insecticides or fumigants to be discharged.

4.8.2 Rice is generally fumigated with methyl bromide or phosphine gas. However, the use of methyl bromide is prohibited in many developed countries under the Montreal Protocol. As a general practice, methyl bromide takes at least 24 hours to be effective. Other fumigants, such as metal phosphide, take at least 72 hours and carbon dioxide requires 96 hours, to take full effect. There are concerns regarding the use of phosphine gas as some pests in Asia, Australia and Brazil are growing resistant to this fumigant.

4.8.3 It should be noted that the success of fumigation depends on whether the cargo hold temperature and fumigation time are adapted to the development cycle of the insect or insects. For the best results to be achieved, it is recommended that the manufacturer's guidelines be consulted and followed.

4.8.4 Fumigants should only be handled by personnel who are properly instructed and qualified in the use of these products as seen in **Figure 4.6**. Personal protective equipment should also be used when discharging such cargoes as required.

4.8.5 A certificate of fumigation should be obtained which not only lists the product used but which also contains precise instructions from the fumigating company on when the crew should start ventilation. This is important because the days immediately following loading can be critical. The length of time of the fumigation, and the commencement of fumigation should be documented carefully.

4.8.6 In cases where the cargo has been fumigated, on no account should crew members enter the cargo holds until they have been appropriately ventilated and certified as gas-free.

4.9 Interlocking of cargo bags across ventilation channels

4.9.1 It is a common best practice that every 5 or 6 tiers of cargo being stowed should interlock by laying "cross bags" between adjacent stowage stacks when ventilation channels are used for bagged rice stowage. Examples of this practice are shown in **Figures 4.7 and 4.8**. This practice will allow for better stability of the stacks to prevent cargo stack slippage that could potentially block ventilation channels.

4.10 Documenting the condition of cargo upon arrival onboard ship

4.10.1 *Documenting condition of cargo upon arrival aboard ship*. Each incident of bagged rice damage prior to or during stowage should be properly documented, photographed or filmed, if possible. Bags that have been damaged should be rejected immediately and returned to the cargo barge or shoreside.

4.10.2 *Documentation of cargo damage details and the Mate's Receipt*. Details of any damaged cargoes arriving onboard ship, found damaged, or damaged during stowage should be documented. This information should be retained and submitted as supporting documentation for the Mate's Receipt. In the event of damage, the Mate's Receipt should be endorsed with relevant remarks reflecting the quantity and type of damage found. For example, "*2 torn bags*", "*5 discolored bags*", "*3 moldy bags*", or "*4 parcels slightly/moderately/heavily infested with live vermin*."

Figure 4.1 | Stevedores loading and stacking bags with ventilation channels between stows. In the background, note the Styrofoam covered by plastic along the sideshells.

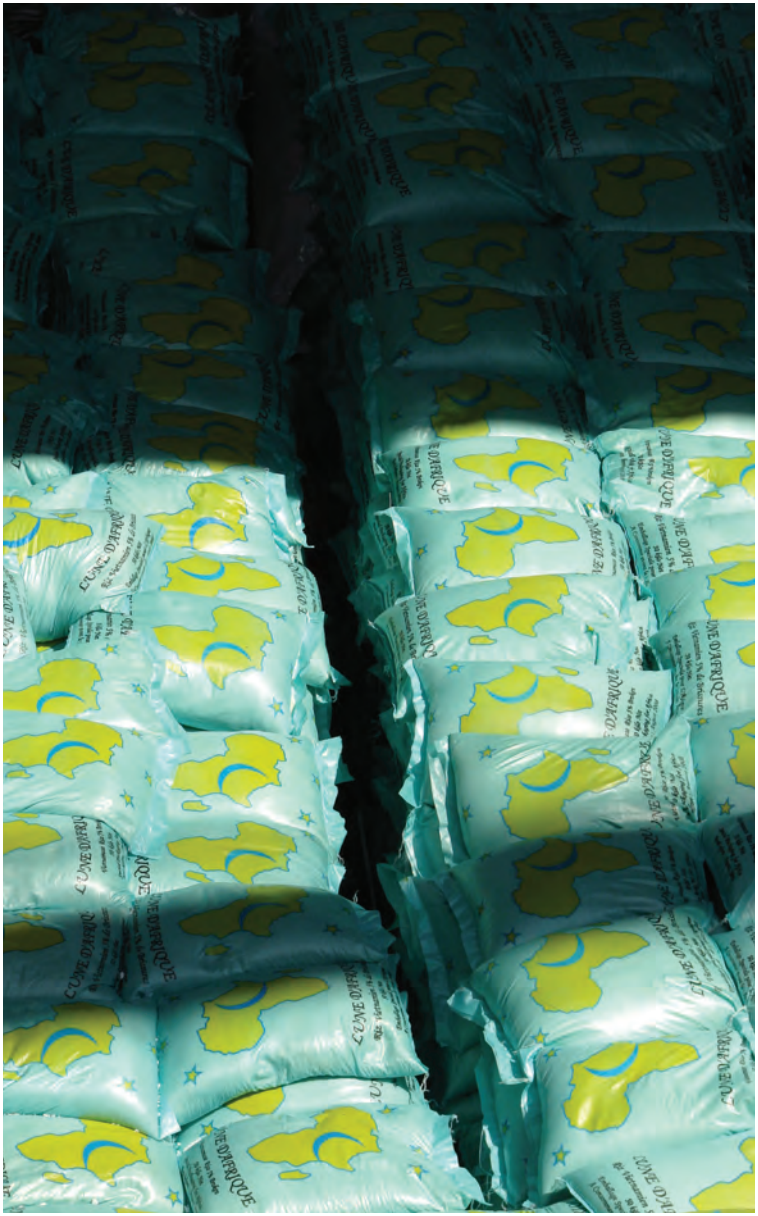

Figure 4.2 | A ventilation channel in the cargo hold filled with bagged rice.

Figure 4.3 | Bundles of rice being hauled overboard to be tallied and placed in the cargo hold.

Figure 4.4 | Surveyors tallying a bundle of rice being hauled overboard from a rice barge into the cargo hold.

Figure 4.5 | A cargo surveyor taking moisture content measurements directly from a stowed bag of rice in the cargo hold.

Figure 4.6 | Pesticides used for fumigation being dispersed into cargo holds.

Figure 4.7 | Ventilation channel between stacks of bagged rice. Note that every 5 or 6 tiers, that a rice bag is set across stacks interlocking the tiers. This is done so to stabilize the stacks of cargo preventing collapse and shifting of stacks.

Figure 4.8 | Note in the center foreground of the picture the bags laid across the ventilation channel running left to right interlocking the tiers. This is done so to stabilize the stacks of cargo preventing collapse and shifting of stacks.

5. Ventilation of bagged rice

5.1 Objective: *To properly ventilate the cargo holds to reduce the likelihood of condensation damage to bagged rice cargoes.*

5.2 Purpose of ventilation

5.2.1 Ventilation should not be used as a means to cool the cargo. The temperature of the bulk of the cargo will remain essentially constant throughout the voyage. The purposes of ventilating bagged rice are:

(1) to remove the warm moist air surrounding the cargo and replace it with cooler and drier air to minimize condensation onto the cold steelwork in the hold; or

(2) to remove fumigants.

5.2.2 Insofar as the prevention of ship sweat, ventilation will normally be required when the vessel transits from warmer to a cooler climate where a simultaneous reduction in sea temperature results.

5.3 Condensation due to "sweat"

5.3.1 *Definition of sweat*. "Sweat" is the formation of condensation within a ship's hold. There are two types of sweat:

(a) *Ship sweat*. Moisture that forms on the ship's structure is known as "ship sweat".

(b) *Cargo sweat*. Moisture that forms on the cargo itself is known as "cargo sweat".

5.3.2 *Ship sweat*. Ship sweat occurs when a vessel loads cargo in a warm, moist atmosphere, and then sails into locations with much cooler weather. As the ship's steelwork cools, moisture from the humid atmosphere in the holds will condense.

5.3.2.1 In general, ship sweat only forms in significant quantities when a vessel is carrying a hygroscopic cargo (i.e. a cargo which has its own inherent moisture content – such as rice).

5.3.2.2 Ship sweat appears as tiny beads of moisture condensing onto the ship's metal work. This phenomenon typically occurs on the sides of the hold when the sea temperature is lower than the ambient temperature in the cargo hold. This results in the reduction of the temperature of the adjacent metal to a value below the "dew point" of the surrounding air.

5.3.3 *Cargo sweat*. Cargo sweat forms under precisely the opposite circumstances than ship sweat. Cargo sweat forms on the surface of the cargo when its temperature is below the dew point of the air adjacent to it.

5.3.3.1 *An example of cargo sweat*. A vessel loads a cargo in cool weather and the cargo is itself cool in temperature. Thereafter, the vessel transits into warmer weather locations with higher humidity. If an attempt is made to ventilate at that time, then moisture from the ventilating air condenses onto the cargo.

5.3.4 Cargo sweat can affect both *hygroscopic* (i.e. readily takes up and retains moisture such as rice) and *non-hygroscopic* cargoes. Ship sweat is a more frequent problem and controlled by proper ventilation. In contrast, cargo sweat is generally caused by ventilating when it is inappropriate to do so.

5.4 Comparison of dew points

5.4.1 The scientific rule is that if the dew point of the outside air (the air used for ventilation) is lower than that in the hold, then it is appropriate to ventilate. If the ambient dew point is not lower than that of the cargo hold, it may be necessary to ventilate for other reasons such as when the cargo has been fumigated and timely ventilation of the fumigant is required.

5.4.2 A comparison of the dew points between the cargo hold and the external environment is usually made by taking readings from wet and drybulb thermometers on deck and in the hold. Obtaining the ambient readings is simple. Most ships have a box containing a pair of thermometers which may be hung in a shaded spot on the windward side of the bridge.

5.4.3 During the voyage, it may not be safe for the ship's personnel to enter the hold to obtain temperature readings. If the cargo has been fumigated after loading it certainly will not be safe, even if the compartment has been ventilated. If the wet-bulb thermometer is simply lowered into the hold from outside, there will be difficulty obtaining a sufficient air-flow across the thermometer's wick.

5.4.4 In the event that the crew is able to safely enter cargo holds to obtain meaningful readings, it may be necessary to stop ventilating to allow the in-hold atmosphere to stabilize. If this is not done, the crew will be measuring the parameters of the ventilating air rather than those of the true in-hold atmosphere. Unfortunately, suspending ventilation in this way negates the purpose of ventilating but may be the only means to obtain the readings at the time. If this is done, it should be properly noted in the "Remarks" section of the Humidity-Temperature-Cargo Ventilation Record Book (see **Table 5.2**).

5.4.5 In practice, measuring the dew point temperature inside a cargo hold can be problematic. One of the simplest methods is to use a "whirling psychrometer", which involves swinging the instrument inside the hold until the wet bulb temperature has stopped falling and remains steady.

5.4.6 All readings should be taken well away from any air inlets, ensuring that only hold air is tested. As an important safety precaution, enclosed space entry procedures should always be observed.

5.4.7 If the ship is taking spray across the ventilator openings or onto the hatch covers or coamings, whereby sea water enters the hold, ventilating the cargo should be delayed until conditions for ventilation are favorable even if comparison of dew points indicates ventilation is appropriate.

5.4.8 If access to the holds is impossible or undesirable, and provided there is no significant air flow, the hold dew point can be determined from traditional wet and dry bulb thermometers placed inside the trunking of an exhaust ventilator or similar pipe-work leading from the compartment. If done, it should be properly noted in the "Remarks" section of the Humidity-Temperature-Cargo Ventilation Record Book (see **Table 5.2**).

5.4.9 In many instances, it is impracticable to measure hold dew point temperatures accurately, or at all. Therefore, it is recommended that the "3º Celsius Rule" should be applied as described in **Section 6.2.6.3**.

5.5 Systems of ventilation

5.5.1 In general, there are three means of ventilation for shipboard cargoes:

(1) *Natural ventilation*. The natural air ventilation of cargo compartments is the most basic means. This can be supplemented by modified mechanized air circulation systems.

(2) *Temperature control system*. A temperature control system of circulating air within insulated compartments.

(3) *Mechanical ventilation*. The principle of most types of shipboard mechanical ventilation is to replace the warm air in the hold with colder ambient air. Proper mechanical ventilation will reduce the difference in temperature. Moreover, as a consequence of heating by the warm stow of the entering colder air, the entering cold ambient air will become warmer and drier, and will be capable of absorbing moisture emitted by the cargo, which will then be carried off by the exhausting air. Mechanical or portable ventilators can be fixed aboard the ship as practicable or as necessary.

5.5.2 Most vessels loading full cargoes of rice in locations such as Thailand have either natural or electrical ventilations as described in **Section 5.5.1(1)**. Vessels using ventilation systems as described in **Sections 5.5.1(2) or 5.5.1(3)** are not normally engaged in this trade. In practice, for voyages to colder climatic regions, natural ventilation **Section 5.5.1(1)** maybe insufficient for safe carriage of a full cargo of rice. Vessels carrying full cargoes of rice should be equipped with a proper functioning mechanical ventilation system with sufficient capacity of between 15 – 25 air changes per hour (calculated on basis of empty hold space). Furthermore, all fans need to be checked to ensure that they run properly in the correct direction. Where the ship is not fitted with fixed mechanical ventilation, then the shipowner may consider supplying portable blowers, if necessary.

5.6 Ventilation of bagged rice

5.6.1 Rice normally contains, at most, about 15% moisture. If the surrounding air is humid, rice will absorb moisture from the air. If the surrounding air is dry, rice will release moisture to the air. Ventilation with colder ambient air in combination of heating of the air by the cargo will result in the drying of the air. Consequently, moisture is released by the rice to the air and carried off from the exhausting air.

5.6.2 It is important to note again that the goal of ventilation is not to cool the rice cargo. Ventilating dissipates the natural buildup of water vapor to minimize the differences in temperature between the air in the hold and vessel's steel structure to prevent condensation build up on the ship's steel parts in the cargo hold.

5.6.3 The periphery of the stow, directly influenced by the passing cooler ventilation air, will become cooler as well. This process also reduces the difference in temperature between the cargo and vessel's steel structure. Consequently, the periphery of the stow becomes drier and cooler resulting in moisture migration away from the center of the stow. Thus, the moisture content of the rice will be reduced.

5.6.4 When the weather and the dew point are within acceptable parameters to ventilate, the hatches can be opened during the voyage to allow appropriate surface cooling. If possible, this type of ventilation should also be carried out in port until completion of loading or unloading.

5.6.5 During periods of heavy weather, steps should be taken to prevent rain and spray from entering the cargo spaces. This may mean, if necessary, suspending ventilation until conditions improve. However, during rain or fog, ventilation can be continued as long as dew point temperature of the ambient air is lower than the dew point temperature of the air inside the hold. Any such conditions and actions taken should be recorded in the Deck Log Book and in the "Remarks" section of the Humidity-Temperature-Cargo Ventilation Record Book (see **Table 5.2**).

5.6.6 Ventilation can be done at night if the readings indicate that ventilation is appropriate bearing in mind that ambient temperatures are usually lower at night. Therefore, the risk of developing ship sweat is more likely during the hours of darkness so ventilation should be continued if conditions permit. If ventilating at night, the crew should be particularly diligent at monitoring the weather conditions as set out in **Section 6.2.1**.

5.6.7 When ventilating, it is a good practice to replace the kraft paper covering the cargo with fresh drier kraft paper as condensation can accumulate on the inside or underside of the hatch covers and will drip onto the cargo holds when opened and closed again after ventilating. This practice should be considered only as weather conditions permit.

5.6.8 In addition to ventilating the cargo holds, it is important that cargo holds inspections are regularly made, preferably as often as once a day. This need not necessarily involve direct entry into the cargo holds. For example, ship sweat may be seen forming on the underside of manhole covers. In such instances, and especially at night, the cargo should be ventilated irrespective of the dew point or "3º Celsius Rule" (see **Section 6.2.6.3**), weather permitting.

5.7 Cargo humidity and ventilation testing: Example of best practices

5.7.1 During the vessel's voyage, the crew should obtain regular ventilation reports using the following basic principles to determine if ventilation is required and favorable. Applying the good practice of taking records in a daily log during carriage is an effective measure to help establish that the shipowner has applied prudent practices to protect the cargo from unnecessary damage. Some examples of best practices are:

(1) *Temperature readings*. Wet bulb and dry bulb temperature readings of each hold and a control position should be taken at least once a watch and the dew point is ascertained from the scale as shown in **Table 5.1**. The control position thermometer should be kept outside near the bridge. It should be exposed to the weather in open air, but out of contact with direct sunlight, reflected heat, exhaust ventilators or any other heat source. The thermometers in the hold should be waved in the air for a few moments until the temperature of the wet bulb remains steady. It is important to note that false temperature readings may be observed if this approach is not followed. It is also good practice to take original temperature readings prior to commencement of the voyage as a benchmark to making further readings during the voyage.

(2) *Entry of cargo hold temperature into the Cargo Record Book*. Once the temperatures have been measured and the dew points of all cargo holds and the control position has been ascertained, the information should be entered into the Cargo Record Book's Cargo Humidity-Temperature-Ventilation Table as shown in **Table 5.2**.

(3) *Entries into the Cargo Humidity-Temperature-Ventilation Table*. Under the heading "VENTING", indicate "Yes" or "No" as the case may be. Under "GENERAL REMARKS", it is important to indicate such events as any reasons for not ventilating, times of opening and closing of hatches, times of operating electrical ventilation systems if the vessel is fitted with such equipment, etc. Under "WEATHER CONDITIONS", brief remarks should be provided on weather conditions over a 24 hour time period particularly if there are periods of rain, fog, water or spray on the deck and/or hatches, etc.

Table 5.1: Dew Point Table

Dry-Bulb Temperatures (°C)	Difference Between Wet-Bulb and Dry-Bulb Temperatures (°C)															
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
-20	-20	-33														
-18	-18	-28														
-16	-16	-24														
-14	-14	-21	-36													
-12	-12	-18	-28													
-10	-10	-14	-22													
-8	-8	-12	-18	-29												
-6	-6	-10	-14	-22												
-4	-4	-7	-12	-17	-29											
-2	-2	-5	-8	-13	-20											
0	0	-3	-6	-9	-15	-24										
2	2	-1	-3	-6	-11	-17										
4	4	1	-1	-4	-7	-11	-19									
6	6	4	1	-1	-4	-7	-13	-21								
8	8	6	3	1	-2	-5	-9	-14								
10	10	8	6	4	1	-2	-5	-9	-14	-28						
12	12	10	8	6	4	1	-2	-5	-9	-16						
14	12	12	11	9	6	4	1	-2	-5	-10	-17					
16	16	14	13	11	9	7	4	1	-1	-6	-10	-17				
18	18	16	15	13	11	9	7	4	2	-2	-5	-10	-19			
20	20	19	17	15	14	12	10	7	4	2	-2	-5	-10	-19		
22	22	21	19	17	16	14	12	10	8	5	3	-1	-5	-10	-19	
24	24	23	21	20	18	16	14	12	10	8	6	2	-1	-5	-10	-18
26	26	25	23	22	20	18	17	15	13	11	9	6	3	0	-4	-9
28	28	27	25	24	22	21	19	17	16	14	11	9	7	4	1	-3
30	30	28	27	26	24	23	21	19	18	16	14	12	10	8	5	1

Table 5.2: Humidity-Temperature-Cargo Ventilation Record Book

Vessel Name: M/V___________________________

Date	Time	Outside Air			Hold No.: ____________			Hold No.: ____________			Venting (Y or N)	Sea Temp	Remarks
		Wet Bulb	Dry Bulb	Dew Point	Wet Bulb	Dry Bulb	Dew Point	Wet Bulb	Dry Bulb	Dew Point			
	0000												
	0400												
	0800												
	1200												
	1600												
	2000												
	0000												
	0400												
	0800												
	1200												
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	0800												
	1200												
	1600												
	2000												
	0000												
	0400												
	0800												
	1200												
	1600												
	2000												

Average cargo temperature at loading: ________ C/F Master's Signature/Date: ______________________ Chief Officer's Signature/Date: ___________________________

6. Precautions during loading, transit and discharge

6.1 Objectives: *To ensure that proper precautions, protective actions and monitoring cargo of operations are taken while: (1) loading of bagged rice onto the vessel; (2) the carriage of cargo; and (3) the discharging of bagged rice from the vessel.*

6.2 Cargo operations procedures

6.2.1 *Weather monitoring (load port, transit and discharge port)*

6.2.1.1 *Procedures for inclement weather during cargo operations*. Shipowners should be mindful of the tasks to be performed if inclement weather is experienced during cargo operations. Such preparations should include allowing for sufficient time to fully close the cargo hatch covers to prevent damage to the bagged rice.

6.2.1.2 *Weather watch keeping prior to and during cargo operations*. When the cargo hatch covers are open, the cargo may be exposed to potential adverse weather conditions. During loading and discharging operations, the Master and crew members on station on the bridge should monitor weather conditions that may require the closing of the cargo hatch covers. Means of monitoring include visual observation, shipboard radar and via the Internet on local meteorological sites that show shower activity on actual radar/satellite pictures. Rain letters alone may not be sufficient and should be supplemented with additional sources.

6.2.1.3 *Ensuring the hatch covers are working*. Prior to loading and discharging bagged rice, the Master and crew should determine whether the hatch covers are in good working order (as specified in **Section 2.3**). The crew should be fully aware of the closing time for every hatch cover prior to the commencement of cargo operations.

6.2.1.4 *Use of tarpaulins*. Tarpaulins can be considered as an additional measure of cargo protection. if used, tarpaulins should be properly shaped and sized for their specified use otherwise their effectiveness may be limited.

6.2.1.5 *Weather monitoring during the voyage*. If hatch covers are opened during the voyage to ventilate the cargo, changes in the atmospheric weather conditions as well as sea state conditions, may lead to the ingress of sea water spray into the cargo holds or through the ship's cargo ventilators. Sea state and weather conditions should be regularly monitored to ensure that hatch covers are closed and ventilation suspended if necessary until weather and sea state conditions permit.

6.2.2 *Stevedore monitoring (load port and discharge port)*

6.2.2.1 During loading and discharge operations, the Master and crew should be aware of the particular risks associated with stevedores loading and discharging of bagged rice cargoes, such as, but not limited to to the following:

(1) theft and pilferage where consideration should be given to sealing the hold accesses between cargo operations;

(2) rough or mishandling of rice cargo bags that can lead to tearing and other damages. For example, stevedores should never use steel hooks for cargo handling;

(3) the lowering and lifting of heavy slings of bagged rice cargo should be monitored to ensure that cargo is properly handled;

a. For example, the lowering and lifting of heavy slings of cargo too fast on to cargo already in stowage may be responsible for damage, which often goes un detected until discharge. Similarly, forcefully dragging cargo out that is wedged by other cargo or even over-stowed can be another source of damage.

(4) improper placement of bags of rice associated with the cargo hold and dunnage configurations by not taking into account proper stowage principles as presented in **Section 4.2.3.3**;

(5) improper stowage that prevents proper cargo ventilation; and

(6) urination and defecation in cargo hold areas due to lack of sufficient sanitary facilities for stevedores while working onboard the ship.

6.2.2.2 The Master should consider holding a pre-loading/discharge meeting with the stevedore's foreman in the presence of any inspectors and surveyors to:

(1) Agree on a procedure to be adopted if there is a threat of rain. For example, if the ship's cranes are being used to load or discharge cargo, it is important to prevent stevedores abandoning their stations and leaving bundled cargo hanging thus preventing the crew from closing the hatch covers;

(2) Ensure that stevedores must load/discharge cargo in a uniform manner throughout the hold and not leave high piles of cargo in the wings and hold corners which may then collapse which not only damages the cargo but also risks injury to people working in the holds; and

(3) Communicate that, in the case of rampant pilferage in certain ports by stevedores and/or other unauthorized persons in the ship's holds, he will be obliged to suspend discharge and close the hatch covers.

6.2.2.3 The Master should consider stationing crew members at key locations during cargo loading or discharge operations to visually monitor stevedore activities. Crew members on cargo operation duties should be stationed at the following areas:

(1) embarkation and disembarkation points for stevedores and surveyors to prevent against theft and pilferage of cargo;

(2) above each and every cargo hold where cargo loading or discharge operations are underway whereby being able to visually scan and observe the activities of all stevedores and surveyors working in the cargo holds; and

(3) any other locations where cargo may be loaded onto or discharged from the ship, where stevedores are engaged in cargo operations, or where any other visiting non-crew personnel are allowed access.

6.2.2.4 The Master and crew should have procedures and record and document any incidents, such as those specified in **Section 6.2.2.1**. In the event of such incidents:

(1) the crew should notify the Master and/or officer on watch of any and all observed activities of concern by third parties aboard ship;

(2) the Master or officer on watch should log the details of the incidents in the vessel's Cargo Log Book and/or in some other contemporaneous written record;

(3) the Master and/or officer on watch should collect all relevant evidence (film, pictures, statements from witnesses and physical evidence of the incident, if applicable) as practicable to be kept as a record of the incident;

(4) the Master should ensure that the Mate's Receipt clearly states the details of the exact condition of the cargo, any pilferage or theft, receiving of damaged bagged rice upon loading (i.e. prior to arriving aboard ship); improper stowage of cargoes, etc.; and

(5) the Master should issue protest letters to charterers and/or cargo receivers if stevedores do not load, stow or discharge the cargo as instructed.

6.2.3 *Surveyor monitoring and interaction (load port and discharge port)*

6.2.3.1 It is recommended that shipowners arrange for independent surveyors to ensure proper care of the cargo during loading, stowage and discharge of the cargo and conduct proper precautionary surveys, tallies and draft surveys to protect the shipowner's interests (see **Sections 9.2 through 9.4**).

6.2.3.2 The credentials and identification of any cargo surveyor who arrives to perform bagged rice cargo surveys should be checked and verified before any such surveying work is allowed to commence.

6.2.3.3 As with stevedores, the vessel's Master, chief officer and any other crew responsible for monitoring cargo operations should be aware of the specific tasks to be performed by the individual surveyor (e.g. tally, stowage, etc.). The scope of work to be performed by the surveyor should be communicated in writing and discussed prior to taking on his duties with the vessel's Master and/or officer on watch.

6.2.3.4 The crew should regularly monitor and ensure that surveyors are performing their assigned survey tasks that include, but may not be limited to the following:

(1) the proper tallying of the number of bags of rice coming aboard the vessel;

(2) a visual survey of all bundles of bagged rice to ensure they are undamaged as they are coming onboard;

(3) checking that cargo is properly stowed as to charterer's or shipper's instructions, as well as the condition and handling by stevedores of individual bags of cargo while being stowed;

(4) monitoring and attendance of any other surveyor instructed by cargo interests, charterers or third parties; and

(5) perform a draft survey before and after cargo operations.

6.2.3.5 It is important to note that draft surveys are not allowed in certain ports. Shipowners should check with the local agent in advance of arrival to load or discharge cargo to ascertain whether draft surveys are allowed.

6.2.4 *Hatch covers operability (load port, transit and discharge port)*

See **Sections 2.3 and 6.2.1.3**.

6.2.5 *Pre-arrival of cargo to the vessel (load port)*

See **Section 4.3**.

6.2.6 *Cargo monitoring (load port, transit and discharge port)*

6.2.6.1 The vessel's Master and chief officer should ensure that the cargo is tested for moisture content as it arrives onboard ship as shown in **Figure 4.3**. The maximum humidity content for rice to be shipped is 14% to 14.5% (see **Section 4.3.3**). If the cargo moisture is found to be in excess of that amount, there is a significantly higher chance of damage occurring from condensation (e.g. caking, mold, etc.).

6.2.6.2 It is important to acquire cargo certificates of quality from the shipper if possible. However, shipowners should not rely solely upon the results of such certificates. The local agent may not be the best person to approach in obtaining such analyses as his allegiance could very likely be with charterers. Frequently, the vessel's agents are appointed by charterers upon the recommendation of shippers. Consequently, it is recommended that the shipowner should approach its P&I club for advice and contact the local P&I club correspondent to assist (see **Section 9.2**).

6.2.6.3 *Cargo temperature and humidity monitoring and control: The 3º Celsius Rule*. A convenient alternative, which removes the need to measure the in-hold dew point, is to apply what is called the "3º Celsius Rule". This states that, if the temperature of the outside air is at least 3º Celsius cooler than the air in the hold, then the cargo should be ventilated (see **Section 5.6**).

6.2.6.4 It is recommended that temperature readings of the outside air are taken at least once per watch. It may be difficult to obtain reliable in-hold temperatures during the voyage, though it is normal to obtain the temperature of the cargo at the time of loading. Generally speaking, the temperature of a large mass of cargo will not change much over the course of a voyage. Therefore, it is easier to compare the initial temperature of the cargo with the current temperature.

6.2.6.5 For more details on cargo temperature and humidity testing and monitoring, see **Section 5.7**.

7. Cargo surveying

7.1 Objectives: *To utilize qualified third party surveyors to properly, efficiently and effectively represent the interests of the shipowner in the performance of survey duties related to the loading, stowing and discharging of bagged rice.*

7.2 General

7.2.1 Shipowners should ensure that the surveyors hired on their behalf are properly qualified and are given specific instructions regarding the duties they are to perform. See **Section 6.2.3** for additional guidance on interacting with and monitoring the activities of the cargo surveyor(s) while onboard ship (see also **Sections 9.2 through 9.4**).

7.2.2 Responsibility for properly loading, stowing and dunnaging and/or discharging the cargo is dependent upon the terms of the governing charter party or bill of lading. Accordingly, the scope of appointment and attendance of the surveyor is dependent upon whether such responsibilities lie with the shipowner or charterer. The following provisions should be read with this context in mind.

7.3 Cargo hold conditions

7.3.1 Surveyors instructed on behalf of charterers or cargo interests inspect the condition of the vessel's cargo holds prior to loading to attest that they are clean, dry and are free of loose corrosion/rust scale.

7.3.2 Ventilation systems should be confirmed to be operational and able to close to ensure weather tightness.

7.3.3 Hatch covers and sealing arrangement should be closely inspected and confirmed to be weather tight. Ultrasonic hatch testing is the most reliable means of testing the water-tight integrity of the hatch covers.

7.3.4 Such cargo appointed surveyors may also ask to see if the bilges are in a satisfactory operational condition and that bilge plates have been sufficiently covered with burlap to prevent loose rice from entering/blocking the bilge.

7.3.5 Such surveyors may also, if possible and prior to loading, ask to have all ballast tanks in way of each cargo hold pressed up to confirm the integrity of ballast tank structures and vents.

7.4 Tally surveying

7.4.1 During loading, a tally surveyor should be positioned at each cargo hold to record the quantity of bags loaded and to liaise with tally clerks representing the shippers interests to agree on the quantity that will ultimately be noted on the Mate's Receipt.

7.5 Draft surveying

7.5.1 Draft surveyors representing shipowner and shipper's interests should jointly carry out draft surveys before and after loading to agree on the quantity of cargo loaded. It has to be taken in to consideration that at the discharge port, the weight of the cargo on board may be significantly less than the weight at the load port, as a result of loss of moisture from the cargo during the voyage caused by continuous ventilation, whereby moisture from the cargo is carried off.

7.5.1.1 For example, if the average moisture content in the rice decreases from 14% to 13%, the total weight will also be reduced by 1%.

7.6 Cargo stowage

7.6.1 The attending surveyor should monitor the cargo being loaded to ensure that it is properly stowed with due consideration to adequate/sufficient dunnaging. The stow should have unobstructed ventilation channels if and as instructed by the charterer or shipper.

7.6.2 The surveyor should also confirm that the cargo:

(1) is not in direct contact with vessel's steel structure;

(2) is stowed with sufficient overhead space to avoid any restriction of ventilation air;

(3) has been properly loaded and dunnaged; and

(4) is stacked in stable condition to prevent shifting during the voyage.

7.6.3 The cargo surveyor should monitor and ensure that the cargo is properly handled by stevedores using of approved slinging arrangements. Preferably, bagged rice cargo should be lifted via web slings or trays. Rope slings and cargo hooks should be avoided, if possible, as they can damage the rice bags.

7.7 Cargo condition

7.7.1 The attending surveyor and/or its designated representatives should be positioned at each hold to monitor and record the condition of the cargo as it comes onboard and during its handling by stevedores in order to reject on behalf of the shipowner any bags that are caked, moldy, wet, torn, stained, discolored or odor contaminated.

7.7.2 The surveyor should reject any cargo which appear to be infested by vermin. The surveyor should issue his recommendations concerning the cargo's condition for inclusion into the Mate's Receipt.

7.7.3 At the discharge port, the surveyor should ensure that all empty torn bags and partially spilled torn bags are included in the cargo tally to minimize short and defend against potential allegations of delivery.

8. Charter party and bill of lading considerations

8.1 Objectives: *To ensure that the relevant transport documentation is prepared in a manner that either averts or minimizes the shipowner's potential exposures and risks associated with the carriage of bagged rice.*

8.2 Charter party considerations

8.2.1 General

8.2.1.1 As discussed above, most alleged cargo claims involving the carriage of bagged rice entail:

(1) rough handling by stevedores at either the load port and/or discharge ports;

(2) alleged condensation or wet damage (e.g. moldy bags) at the discharge port due to improper stowage and/or dunnaging of cargo; and/or

(3) pilferage or theft of cargo.

8.2.1.2 In order to best protect its interests, the shipowner should, as a matter of generally accepted best practices, ensure that the governing fixture or charter party is appropriately worded to allocate the risks and responsibilities of properly loading, stowing, dunnaging and/or discharging the cargo upon the charterer, and that the fixture includes sufficient wordings to preserve any rights of indemnity or contribution from charterer for the breach of any such responsibilities. In the case of a sub-charter, the disponent owner should also make best efforts to do so.

8.2.1.3 For example, Clause 8 of a standard New York Produce Exchange Form (NYPE) form charter partyprovides for and allocates the risk and responsibility of loading, stowing, dunnaging and discharging upon the charterer. However, if Clause 8 is amended with the words "and responsibility", the risk and responsibility for these tasks shift to the shipowner. Such an amendment would have significant impact upon the shipowner's risk exposure when carrying bagged rice or any other cargo destined for jurisdictions where cargo claims are prevalent.

8.2.1.4 If the vessel is voyage chartered, the words "Free In Out Stowed and Trimmed", abbreviated to "F.I.O.S.T", should be used if possible.

8.2.1.5 *Inter-Club Agreement*. Another consideration during the charter party drafting and negotiation phase is the incorporation of the Inter-Club New York Produce Exchange Agreement (ICA) wording to the fixture. The ICA has provided a relatively simple mechanism for promptly and fairly apportioning liability for cargo claims arising under a NYPE time charter agreement. Any amendments that alter the shipowner's risk and responsibility, such as adding "and responsibility" to Clause 8 of the NYPE charter party, can increase a shipowner's cargo claims exposure even under the ICA.

8.2.2 *Jurisdiction and choice of law provisions*. Most charter parties provide for a specific and exclusive dispute resolution venue, such as arbitration in London or New York. Such provisions also specify the applicable law that will govern such disputes. The decision to arbitrate should not be taken lightly and it should be done in a clear and unambiguous manner, not just in the charter party itself, but also in any bills of lading to be issued in connection with the performance of the charter party.

8.2.2.1 Shipowners should always remember to:

(1) ensure that the bills of lading make express reference to, and incorporate, the relevant charter party;

(2) obtain a copy of the charter party incorporated in the bills of lading and place it on file as soon as possible after loading;

(3) make it a requirement that time charterers provide a copy of any sub-fixture within 7 days of being concluded as otherwise a copy may not be obtained later if needed; and

(4) physically attach a copy of the incorporated charter party to each original and each copy of the bill of lading.

8.2.3 *Delegation of the Master's duty to issue bills of lading*. Such provisions may be a pitfall for shipowners because when such duties are assigned to the charterer, a clean bill of lading may be issued by the charterer despite the existence of remarks in the Mate's Receipts which are inconsistent either with respect to the conditions, quality and/or quantity of cargo.

8.2.3.1 Whenever possible, the shipowner should not delegate this duty to best protect its interests and avoid unnecessary exposure to a paper cargo claim that, in essence, may accrue before the vessel even departs the load port limits. If a shipowner or disponent owner chooses to make the commercial decision to include such a term in its charter party agreement, it runs the risk of prejudicing its P&I cover for cargo claims that may arise with that voyage (see **Section 8.3.3.4**).

8.3 Bill of lading considerations

8.3.1 *Incorporation of charter party jurisdiction: Choice of law provision*. Incorporate the dispute resolution and/or jurisdiction and/or applicable law provisions to preserve the parties' conscious and deliberate decision to arbitrate and/or have all disputes under the charter party and/or under the bill of lading subject to the same jurisdiction and applicable law set forth in the governing charter party. By doing so, the shipowner or disponent owner can preserve jurisdictional arguments which may have a considerable bearing and influence as to:

(1) how a particular cargo claim is presented or prosecuted;

(2) the forum in which such claims are defended, including any vessel arrest proceedings; and

(3) the substantive law to govern all such disputes (see **Section 8.3.3**).

8.3.2 *Bills of lading form*. Whenever possible, bills of ladings should be issued on the Congenbill 1994 or 2007 form or similar. It is strongly recommended that the Congenbill 1978 form or similar should NOT be used. Otherwise the arbitration clause may not be validly incorporated into the bills of lading.

8.3.2.1 Whenever possible and depending on the arbitration/laws set forth in the governing charter party, bills of lading should have the words "LONDON/NEW YORK* ARBITRATION ENGLISH/U.S. LAW* APPLICABLE as per the charter party dated [date inserted here], copy attached. F.I.O.S.T" typed on the front, as relevant.

8.3.2.2 An example of an ideal bill of lading is provided in **Appendix 3**.

8.3.2.3 Only physically attaching a copy of the incorporated charter party to all original and to all copies of bills of lading before their release will ensure valid incorporation of the charter party clauses including the law and jurisdiction clauses in some civil law countries.

8.3.3 *Potential prejudice to P&I coverage for cargo claims*. Whenever possible, the shipowner should ensure that any decisions made in connection with the carriage of a cargo of bagged rice do not unnecessarily prejudice a shipowner's protection under the P&I insurance policy. All International Group (IG) clubs contain provisions in their P&I contract terms which provide that coverage for cargo related claims may be prejudiced under the following circumstances:

8.3.3.1 delivery of cargo to a port or place other than the port or place listed in the governing bills of lading or contract of carriage;

8.3.3.2 delivery of cargo without production of original bills of lading;

8.3.3.3 the issue of antedated or postdated bills of lading;

8.3.3.4 the issuance of a bill of lading issued with the knowledge of the shipowner or the Master of the insured vessel with an incorrect description of the cargo or its quantity or its condition; or

8.3.3.5 the failure to arrive or the late arrival of the insured vessel at a port of loading, or the failure to load any particular cargo in an insured vessel other than liabilities, loss and expenses arising under a bill of lading already issued.

9. Communicate with your P&I club

9.1 Objectives: *To ensure prompt and timely communication between the shipowner/Member and its P&I club to prevent or minimize the risk of potential cargo claims associated with bagged rice cargoes, and if such a claim is asserted against the Member and/or its vessel, to best coordinate their respective efforts to defend against any such claims.*

9.2 Precautionary preload survey arrangements

9.2.1 As soon as a contract of carriage or charter party concerning the carriage of a cargo of bagged rice has been fixed or confirmed and the details of the shipment are readily available, the shipowner or charterer should contact its P&I club to make the necessary arrangements for a precautionary preload survey.

9.2.2 In order for the P&I club to contact its correspondent in a particular port and to make the necessary arrangements for the precautionary load port survey, the following basic information should be provided by the Member to its P&I club at least seven (7) days prior to the vessel's estimated arrival at the load port:

(1) full details of the vessel;

(2) the load port and/or terminal in question;

(3) the type and quantity of cargo to be loaded;

(4) the contact details of the vessel's local agent;

(5) the estimated time of arrival of the vessel at the load port;

(6) the type(s) of survey(s) being requested; and

(7) any other relevant information.

9.2.3 Copies of all load port surveys (tally survey, draft survey or other relevant survey) should be forwarded immediately to the P&I club, and should be maintained by the shipowner until the limitations period for cargo claims lapses.

9.3 Precautionary discharge survey arrangements

9.3.1 The shipowner or charter Member should also contact the P&I club in advance of any estimated time of arrival at the discharge port where the bagged rice cargoes will be discharged. Members should provide relevant details of the voyage/disports as soon as possible in order to obtain up to the minute information on particular practice of specific discharge ports.

9.3.2 The P&I club should be advised of proposed discharge ports as early as possible to address or mitigate any specific local concerns or problems related to the discharge of bagged rice cargoes.

9.4 Cargo claims

9.4.1 If a cargo claim is presented to the Master or the vessel owner, the Master, or the shipowner should immediately contact its P&I club and advise them of the allegations of cargo loss, damage or shortage so that the P&I club may instruct their local correspondent and/or lawyers to attend to the matter and protect the shipowner's interests as best as possible.

9.4.2 Prompt and timely communication, combined with close cooperation between the shipowner or charter Member and its P&I club will contribute greatly to an effective defense of any such asserted cargo claims, and preserve all avenues for potential indemnity claims against the charterer and/or any other responsible third parties.

9.4.3 *Demands for security*. If a demand for security is made to the shipowner or if the vessel is threatened with arrest or actually arrested, the shipowner should immediately contact its P&I club for assistance. The vessel owner should also refrain from communicating with cargo interests to ensure that it does not inadvertently waive any jurisdictional arguments.

9.4.4 *Anti-suit injunctions*. Should a shipowner find his vessel detained and/or arrested and cargo interests refuse security based on a London Arbitration Clause in the relevant charter party, which is incorporated in the relevant bills of lading, the shipowner should immediately contact its P&I club for consideration of using the anti-suit injunction mechanism to oppose cargo interest's unreasonable demands.

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APPENDIX 1: LIST OF DEFINITIONS

- **Dew point:** The temperature at which air becomes saturated and cannot hold all of the moisture in it and dew begins to form.
- **Dry bulb thermometer:** A thermometer used to measure the ambient temperature. The temperature recorded is considered identical to air temperature. One of the two thermometers that make up a psychrometer.
- **Dunnage:** loose materials used to support and protect cargo in a ship's hold. Examples of such materials include plywood, plastic/polythene sheets, cardboard, Styrofoam, rubber padding, kraft paper, bamboo, bamboo mats, timber, etc.
- **Mate's Receipt:** A receipt document signed by the ship's Master, acknowledging the condition and receipt of cargo by the vessel. The individual in possession of the Mate's Receipt is entitled to the bill of lading, which in due course is issued in exchange for that receipt.
- **Rice:** rice, rice products and bi-products including milled rice, brown rice, under-milled rice, parboiled rice, pre-cooked rice, rice flower, rice bran, rice polish, rice hulls, rice mill feed or any other rice product or bi-product. For further information regarding various forms of rice, a good reference can be found at the website **www.cargohandbook.com**.
- **Sweat:** The formation of condensation within a ship's hold. Sweat can be categorized into two types:
    - **Ship sweat**. Condensation that accumulates on a ship's steel structure in the cargo hold's side or deck when a ship sails from a warmer to cooler place and warm air in the cargo holds come into contact with the cooler ship's structure.
    - **Cargo sweat**. Condensation that accumulates on the surface of a cargo when its temperature is below the dew point of the air adjacent to it.
- **"3º Celsius Rule":** Rule of thumb for ventilating. If the temperature of the outside air is at least 3º Celsius cooler than the air in the hold, then the cargo should be ventilated.
- **Wet bulb thermometer:** A thermometer with a bulb that is covered with moist muslin and is used in a psychrometer to measure humidity.
- **Whirling psychrometer:** A psychrometer with a handle, which allows rapid rotation of mounted wet- and dry-bulb thermometers to ensure air flow around the bulbs.

APPENDIX 2: LIST OF IMPORTANT DOCUMENTS TO BE KEPT AND MAINTAINED

1. Bill of lading (see **Section 8**)
2. Mate's Receipt (see **Section 4.10.2, Section 6.2.2.3(4), Section 7.4, Section 7.7.2 and Section 8.2.3**)
3. Cargo Humidity-Temperature-Ventilation Record Book (see **Section 5.7, Table 5.1 and Table 5.2**)
4. Bilge sounding records
5. Stowage plan with exact stowage position of each consignment (see **Section 4.2**)
6. Hatch cover test report (see **Section 2.3**)
7. Certificate of the quality and moisture content per lot (see **Section 6.2.6.2**)
8. Certification of cleanliness of the cargo hold (see **Section 2.5.2.10**)
9. Documentation of any fumigants used (see **Section 4.8**)
10. Certificate of fumigation (see **Section 4.8.5**)
11. Tally survey records (see **Section 6.2.3.4 and Section 7.4**)
12. Draft survey records (see **Section 6.2.3.5**)
13. Cargo surveyor records (see **Section 7**)
14. Documentation of condition of cargo upon arrival onboard ship (see **Section 4.10**)
15. Letter of Protest (e.g. insufficient dunnage provided, damage to cargo, pilferage or theft of cargo)

APPENDIX 3: AN EXAMPLE OF A BILL OF LADING

BILL OF LADING

TO BE USED WITH CHARTER-PARTIES
CODE NAME: "CONGENBILL"
EDITION 1994
ADOPTED BY
THE BALTIC AND INTERNATIONAL MARITIME COUNCIL (BIMCO)

Conditions of Carriage

(1) All terms and conditions, liberties and exceptions of the Charter Party, dated as overleaf, including the Law and Arbitration Clause/Dispute Resolution Clause, are herewith incorporated.

(2) General Paramount Clause

(a) The Hague Rules contained in the International Convention for the Unification of certain rules relating to Bills of Lading, dated Brussels the 25th August 1924 as enacted in the country of shipment, shall apply to this Bill of Lading. Where no such enactment is in force in the country of shipment, the corresponding legislation of the country of destination shall apply, but in respect of shipments to which no such enactments are compulsorily applicable, the terms of the said Convention shall apply.

(b) Trades where Hague-Visby Rules apply.
In trades where the International Brussels Convention 1924 as amended by the Protocol signed at Brussels on February 23rd 1968 – the Hague-Visby Rules – apply compulsorily, the provisions of the respective legislation shall apply to this Bill of Lading.

(c) The Carrier shall in no case be responsible for loss of or damage to the cargo, howsoever arising prior to loading into and after discharge from the Vessel or while the cargo is in the charge of another Carrier, nor in respect of deck cargo or live animals.

(3) General Average

General Average shall be adjusted, stated and settled according to York-Antwerp Rules 1994, or any subsequent modification thereof, in London unless another place is agreed in the Charter Party.

Cargo's contribution to General Average shall be paid to the Carrier even when such average is the result of a fault, neglect or error of the Master, Pilot or Crew. The Charterers, Shippers and Consignees expressly renounce the Belgian Commercial Code, Part II, Art. 148.

(4) New Jason Clause

In the event of accident, danger, damage or disaster before or after the commencement of the voyage, resulting from any cause whatsoever, whether due to negligence or not, for which, or for the consequence of which, the Carrier is not responsible, by statute, contract or otherwise, the cargo, shippers, consignees or the owners of the cargo shall contribute with the Carrier in General Average to the payment of any sacrifices, losses or expenses of a General Average nature that may be made or incurred and shall pay salvage and special charges incurred in respect of the cargo. If a salving vessel is owned or operated by the Carrier, salvage shall be paid for as fully as if the said sailing vessel or vessels belonged to strangers. Such deposit as the Carrier, or his agent, may deem sufficient to cover the estimated contribution of the goods and any salvage and special charges thereon shall, if required, be made by the cargo, shippers, consignees or owners of the goods to the Carrier before delivery.

(5) Both-to-Blame Collision Clause

If the Vessel comes into collision with another vessel as a result of the negligence of the other vessel and any act, neglect or default of the Master, Mariner, Pilot or the servants of the Carrier in the navigation or in the management of the Vessel, the owners of the cargo carried hereunder will indemnify the Carrier against all loss or liability to the other or non-carrying vessel or her owners in so far as such loss or liability represents loss or, or damage to, or any claim whatsoever of the owners of said cargo, paid or payable by the other or non-carrying vessel or her owners to the owners of said cargo and set-off, recouped or recovered by the other or non-carrying vessel or her owners as part of their claim against the carrying Vessel or the Carrier.

The foregoing provisions shall also apply where the owners, operators or those in charge of any vessel or vessels or objects other than, or in addition to, the colliding vessels or objects are at fault in respect of a collision or contact.

For particulars of cargo, freight, destination, etc., see overleaf.

CODE NAME: "CONGENBILL" EDITION 1994

BILL OF LADING

TO BE USED WITH CHARTER-PARTIES

Shipper

Consignee

Notify address

Vessel Port of loading

Port of discharge

B/L No.

Reference No.

Shipper's description of goods Gross weight

(of which on deck at Shipper's risk: the Carrier not being responsible for loss or damage howsoever arising)

Freight payable as per CHARTER-PARTY dated (copy attached)

ARBITRATION LONDON, ENGLISH LAW TO APPLY, FIOST

FREIGHT ADVANCE
Received on account of freight

Time used for loading days hours

SHIPPED at the Port of Loading in apparent good order and condition on board the Vessel for carriage to the Port of Discharge or so near thereto as she may safely get the goods specified above.

Weight, measure, quality, quantity, condition, contents and value unknown.

IT WITNESS whereof the Master or Agent of the said Vessel has signed the number of Bills of Lading indicated below all of this tenor and date, any one or which being accomplished the others shall be void.

FOR CONDITIONS OF CARRIAGE SEE OVERLEAF

Freight payable at	Place and date of issue
Number of original Bs/L	Signature

AMERICAN STEAMSHIP OWNERS MUTUAL PROTECTION & INDEMNITY ASSOCIATION, INC.

AMERICAN STEAMSHIP OWNERS MARINE INSURANCE COMPANY (EUROPE), LTD

SHIPOWNERS CLAIMS BUREAU, INC., MANAGER

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London EC3R 7LP U.K.

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EMAIL claims@scb-hellas.com

SHIPOWNERS CLAIMS BUREAU (HELLAS), INC.

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THE AMERICAN CLUB
1917