

IMPROVING TECHNOLOGY OF RAILWAY TRANSPORTATION OF BULK CARGO

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When loading bulk cargoes in rail wagons from the shipper requires the following conditions:

- placement on the floor and on full height walls and doors of the car cardboard or the use of various sealants or plastic film that prevents spillage of cargo through constructive gaps and door space wagons, and precluding contact of the product with metal elements of car body's;

- do cover the entire surface of the cargo in the wagon with plastic wrap to exclude moisture.

However, these requirements may not ensure full safety of the goods transported and, as a rule, for transportation of bulk cargo in open rolling-stock there is a shortage of product due to spillage through constructive gaps cars, blowing counter-flow of air and the shedding of pile caps.

Another important factor is the increased corrosion of metal parts of car bodies at the points of contact with the product. Studies have found that when transported in bulk, such as mineral fertilizers in cars, the corrosion of the walls can reach 0,1 mm in the year. Resource exploitation such cars in adverse conditions is able to decrease two to three times the regulatory period in 22-24 years.

In addition, the problem of excess or deficiency of rolling stock for transportation of bulk cargoes has not only quantitative but also qualitative aspect. With the beginning of the so-called off-season, to cover the costs from downtime of the rolling stock, the railroad sometimes make loading wagons of non-core goods, for example, widespread use of grain-hoppers wagons for transportation of cement. However, even after washing these wagons with the sender of the grain are not in high demand and are often treated as a forced option for sending.

Therefore the actual creation of these technologies cover the goods in the wagon, which would isolate it from the external environment, preventing any chemical reaction of the product with the environment and parts of the train, its "natural" wastage due to spillage or blowing. In addition, the bulk transport it is necessary to prevent or hamper unauthorized access to cargo from the open gondola body, and also to exclude the moisture of the load under the action of rainfall.

One of the promising technologies for securing transportation of bulk cargo are transported to universal gondola cars and rail cars with wagon liners (car bag, wagon liner protective, liner wagon soft single) [1, 2].

Wagon liner is a self-contained package and fully prevents the loss of bulk cargoes during railway transportation. This liner protects the cargo from spillage in the event of leakage through the body of the car, from crumbling, from unauthorized access to cargo from the open gondola body, blowing counter-flow of air from contact with the surface of the gondola.

Today tested and widely applied a few basic designs of gondola wagon liners in the protective cover depending on the type of transported goods and the requirements for its protection from external factors.

Wagon liner into railroad gondola also protects the cargo from environmental influences: from wet, freezing, heating and so on. Thanks to the liner in a gondola car is greatly simplified and the process of unloading.

The construction of the liner may be selected according to customer requirements, the characteristics of the used rolling stock, and depending on the character of the cargo.

As the cost of liner is currently slightly higher than the cost of funds, which are traditionally used to protect goods from loss, their use is justified primarily when transporting valuable bulk cargo. Although the cost of polypropylene liners with the development of technologies of their manufacture and competition of producers is constantly decreasing.

Technology the use of wagon liners in the gondola is quite simple: at the bottom of the gondola is placed the liner and unfold it. Side and end elements of rectangular form spread up the wall of the gondola to the level of the screen capacity with the formation of a box with hinged side and end caps that spill over the walls of the gondola and ribbons are fixed to the outer elements at the time of loading of product.

The product is loaded into the gondola at the specified liner and level the surface. Then the end elements are placed on the cargo and make the connection between the ribbons sewn to the edges. The side parts are placed on the surface of the load overlapping and connecting the edges by connecting the free ends of the ribbons sewn along the edge, to loops sewn to the outer side of the opposite side of the element. Linking to produce in such a way as to exclude the possibility of sail area (Fig.1).

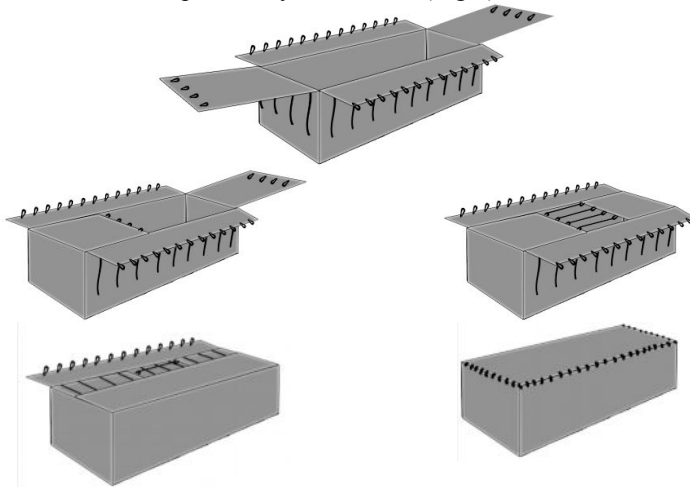


Fig. 1. Sequence linking lids of wagon liner

Unloading of bulk cargo is done through the lower open valves liner or by cutting cloth of the liner in the absence of the latter.

The use of railcar liners for the carriage of bulk cargoes in open-top allows to obtain the following advantages over traditional technologies [1, 2]:

- the possibility of to use for transportation of the most common and readily available kinds of rolling stock (universal gondola cars) instead of special cars (grain-hoppers and hoppers);
- cheaper to transport goods through lower tariff compared to the specialized railcars;
 - reducing the time of preparation of the wagon for loading;
 - a minimum additional costs for loading - is just the cost of one wagon liner;
 - no costs for cleaning of wagons after unloading;
 - ensuring the protection of cargo during transport from pollution, environmental action, from caking and freezing
 - except blow the cargo from gondola counter flow of air when driving and a loss of goods through constructive cracks gondola;
 - protect cargo from contact with the walls of the car, simplifying the process of discharge - no sticking of the product to the walls of the gondola
 - no pollution as the cargo and rolling stock.

References:

1. Flexible PP Bag Bulk Container Liner for Railway Open Gondola Wagon Liner [Electronic resource]//Access mode: www.uniqpack-bulkbags.com.
2. Insert in gondola cars (wagon-bags) [Electronic resource]//Access mode: <http://www.delis-prof.com/produkciaen.php>.