BUNDLED PIPE UNITIZING GUIDELINES

Manufacturing Mills, Importers and Carriers

Responsibility for ensuring that steel bundled pipe has the appropriate numbers of bands and that the bands are of sufficient strength rests solely with the manufacturing mills and must be based upon the size and weight of the bundle and the mode of transportation that they choose to use. Responsibility for ensuring that the steel band fasteners on each bundle are crimped properly, prior to and during shipment, rests solely with the manufacturing mills.

The Parties have a shared responsibility for ensuring that steel bundled pipe that has broken bands, prior to being loaded onto a vessel or railcar or truck, are repaired as discovered.

Requirements for Safe Stowage of Bundled Pipe at Lynnterm

In the absence of defined, approved standards, these test results were used to establish **Safe Handling Procedures for Lynnterm East Gate and West Gate Terminals.** This was as agreed to by Site Management, the Site Health & Safety Committee Representatives and the Regulatory Parties involved.

Based upon the above conducted tests and the assumption that the steel mills will continue to use strapping of similar breaking strength (approx 2,500 lbs breaking strength), Western Stevedoring has developed the following **Minimum Strap Guidelines for Bundled Pipe Stacking** at its facilities.

The Minimum Band Requirements are based upon 4 Tier and 3 Tier Stacking of Bundled Steel Pipe, where the Maximum Bundled Pipe Weight is 3 Metric Tonnes (6,600 lbs):

- **18 - 26 foot bundled pipe – Minimum 8 straps required – with a Minimum of 3 Straps per End.**
- **28 - 45 foot bundled pipe – Minimum 10 straps required – with a Minimum of 3 Straps per End.**
- **All seals must be properly applied and crimped.**

Where strapping and/or seals are improperly applied or an inadequate number of straps are apparent upon receipt of bundled pipe at Lynnterm Terminals, the bundles must be handled in the following manner:

- **Bundles must be restrapped to meet the Lynnterm Terminals' Guidelines during vessel discharge where practical; *OR***
- **Bundles must be set aside for later determination of actions including:**
  - **Restrapping to meet Minimum Safe Stowage Guidelines; *OR***
  - **Cutting of straps and shipment of the product as loose pipe, subject to customer approval and a practical loading method**.

Additional Recommendations for Manufacturing Mills, Importers and Carriers

Following the investigation and extensive testing and review of strapping methods, the following additional recommendations are encouraged to help make shipments suitable for safe stowage and handling:

- **Straps, in addition to the required minimum, should be added at ORIGIN to allow for breakage during the shipment process and to assist in the retention of bundle integrity.**
- **In addition to the straps at each end, straps centrally located on pipe bundles were shown to provide additional bundle stability and integrity.**
- **Application of straps and crimping of seals must be closely monitored to ensure proper application. Poorly applied crimping of the joint seals was the main cause of loss of breaking strength during testing.**
- **The number of straps applied should be standardized for each shipment and size of pipe.**
- **The number of pieces per bundle should be standardized for each shipment and size of pipe. Non-uniformity of bundle sizes creates an inability to safely stow the product throughout the transportation chain.**