



BUNDLED PIPE UNITIZING GUIDELINES for Safe Handling at Lynnterm Terminals

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.

WESTERN STEVEDORING LYNNTERM EAST GATE & WEST GATE TERMINALS

Following the tragic fatality of a worker at Lynnterm West Gate Terminal Dillingham Steel Yard, a thorough investigation was conducted. **The conclusion of the investigation was that inadequate and poorly applied strapping was a major contributing factor.** The need for a revision to Safe Handling Procedures was identified.

Western Stevedoring contracted several expert consultants to test the strength of steel banding applied at ORIGIN as compared to similar sized Canadian supplied strapping. Further tests were conducted to determine the added strain placed on strapping when bundled pipe was stacked. This test simulated **Normal Yard Stacking Practices** and measured the strain on the straps of the bottom bundles. The results of these tests were analyzed by an expert consultant to produce **Safe Handling Procedures.**

All of these tests were conducted with the concurrence and under the guidance of HRSDC (Human Resources and Social Development Canada – Regulatory Agents of the Canada Labour Code) and the Site Health & Safety Committee (Management and ILWU Representatives). For additional reference, Stevedoring Operations falls under the Marine Occupational Safety Regulations and the Canada Shipping Act – Tackle Regulations which are administered by Transport Canada.

Safe Stowage Guidelines for Lynnterm East Gate and West Gate Terminals were developed



with the assistance of a consultant formerly with Transport Canada, who has been involved with the development of Unitized Cargo Standards for the Shipping Industry.

Some of the “Findings” of the tests conducted were as follows:

- Where straps were properly applied at ORIGIN, the Average Band Breaking Strength was approximately 2,500 lbs.
- Where Canadian supplied straps were applied at Lynnterm Terminals using strap of an identical size, the Average Breaking Strength was 5,100 lbs.
- Where foreign straps were poorly applied or seals were improperly crimped, the Breaking Strength was extremely inconsistent and seriously impaired the ability to provide bundle stability.

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.

The following examples demonstrate:

1. Recommended Strapping Application – Uniformity and Consistency
2. Poorly Applied Strapping and Seals
3. Correctly Applied and Crimped Seal
4. Improper or Inadequately Applied Crimped Seal (absence of dimple marks)

1. Uniform strap application with a total of 14 straps remaining intact throughout shipment process. 5 straps per end and 4 centrally located straps.

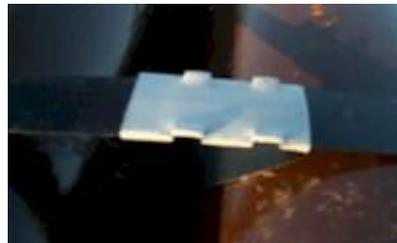




2. Poorly Applied Strapping and Seals



3. Correctly Applied and Crimped Seal



4. Improper or Inadequately Applied Crimped Seal



Western Stevedoring has coordinated the development of Safe Handling Procedures to ensure the ongoing safety of its employees. The **Minimum Strap Guidelines for Bundled Pipe Stacking** form an integral part of Lynnterm Terminals' Safe Handling Procedures and have been developed with every effort made to minimize the impact on customers of the Terminals.

We thank you for your attention on this important safety matter. We are confident that with proper application of sufficient, quality straps at ORIGIN, the impact on our valued customers will be minimal or non-existent.

Should you have any questions regarding these guidelines please do not hesitate to contact:

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