Sheet Piling

Operations Procedures

Document #:	Title:	Version #
PRO-027	Operations Procedures Steel Sheet pile	1.0

Reviewed By: H&S Committee	**Date Reviewed:** 06 September, 2019
Approved By: H&S Committee	**Date Approved:** 06 September, 2019
Issue Date:	**06 September, 2019**

Table of Contents

1.0 Purpose

This document provides operation procedures for handling all sizes of sheet piling with the intention to minimize the risk of injury and product damage.

2.0 Overview

Squamish Terminals handles a wide variety of steel products: pipe (loose and bundled), structural (I-beam, channel, angles), sheet pile, rebar, and coiled sheet and wire rod. Stored and handled properly, steel products present a low risk of injury and remain free from damage. However, unitizing materials can be damaged during transit or handling, causing packages to lose integrity, which could compromise the package's ability to support others in a stockpile. Also, if individual pieces are handled or stored improperly, cargo damage can occur and stockpiles can collapse resulting in loss of productivity, serious injury or death.

The primary hazard in steel stockpiling is pile stability. Some products, like sheet pile, are inherently stable. Other commodities, like pipe, have a rounded surface that allows it to roll. Even a pile of the most stable product could fail if the center of gravity is high, off-center, or suddenly shifts. Consequently, these guidelines focus on maintaining pile stability and protecting a worker in the event the product moves unexpectedly. A risk analysis should be undertaken to determine if the potential for movement of a stockpile exists. If so, workers on foot in the vicinity should be protected from unintentional movement of the commodity. Of course, any strategies to prevent unintentional movement or collapse will also protect the product from damage.

3.0 Legislation and Literature

Part XIV of the Canadian Occupational Safety and Health (COSH) Regulations addresses Materials Handling, which requires operators of motorized equipment to be protected from falling objects (s. 14.4), restricts non-authorized workers from a materials handling area (s. 14.38), and most importantly, requires that, "…all materials…must be stored in a manner so that there is no risk to the health and safety of any employee". (s. 14.50 (f)). Of course, COSH regulations, Part XIX, (Hazard Prevention Programs) require employers to implement and monitor a program to prevent hazards.

Other than the general references in the CLC, no regulatory standards directly address steel handling and storage, nor do any industry standards exist. The American Association of Railroads (AAR) impose extensive requirements for loading steel products on railcars, and the National Safety Code for Motor Carriers addresses loading steel coils and concrete pipe on trucks. However helpful, those standards deal with load securement while moving. A website hosted by German marine insurance agencies, *Transportation Information Service* (http://www.tis-gdv.de) references steel products directly, but mostly in the context of cargo loss and stowage. One local stevedoring company has developed written safe work procedures regarding steel pipe, based on best practices, professional testing and consultation. These guidelines draw upon all these resources.

4.0 Receiving and Stockpiling

4.1. Dunnage

Typically made from wood, dunnage allows the commodity, when sitting on the ground, to be accessed by a lift truck, and separates tiers of commodities in a pile. Dunnage also unitizes and distributes the load of individual pieces. Each layer of dunnage must support the distributed load of all commodities above it, which might total many tonnes. Consequently, dunnage should be well supported and of substantial quality and size.

Guidelines

- Dunnage should be free from rot, cracks, splits and crushed areas. Inspect regularly and dispose of any suspect material
- For steel products, dunnage should be a minimum of 4 in. x 4 in. Rough 4x4 is recommended. Planed, nominal 4x4 lumber is significantly smaller than rough ($4^{1/8}$ x $4^{1/8}$) and more prone to damage
- For structural strength, dunnage should be high quality structural grade and species. Dunnage should be #2 and better Hem/Fir, or ideally, #2 and better Douglas fir. Avoid softwood, like cedar, and utility or landscape grade wood
- Each piece of dunnage should be level and fully supported by the ground or the commodities it rests upon. Fill voids with short longitudinal pieces so that the dunnage is in effective contact with the ground or commodity below it
- Dunnage should be placed at each end, dunnage should be placed at each end of the commodity and every ten feet in between, with, of course, a minimum of two pieces per tier.
- Dunnage should be vertically aligned as each tier is stowed on top of the one below.

5.0 Cargo Description

Squamish Terminals handles various sizes in length, width and thickness of steel sheet pile. Operational procedures contained in this document cover:

- Stevedoring
- Receiving from vessel
- Delivery to truck

6.0 Receiving from Vessel

6.1. Preparation

Ensure all equipment is operational and ready, including:

- Various capacity forklifts with 8 foot general cargo forks.
- Utility forklifts for moving dunnage.
- Tractor trailers with proper dunnage on trailers.

- Personal Protection Equipment (PPE) – minimum requirement includes safety vests and steel toed boots.

Organize materials and documentation, including:

- Bunks for receiving from to vessel
- Dunnage - 8ft 4x4's (lengths may vary), larger dunnage for trailers if necessary
- Site Map (See Appendix A for Sample)
- Various Forms (Check Sheets, Damage Reports, Summaries)
- Vessel Line up (distributed from Traffic)

6.2. Handling Sheet Pile

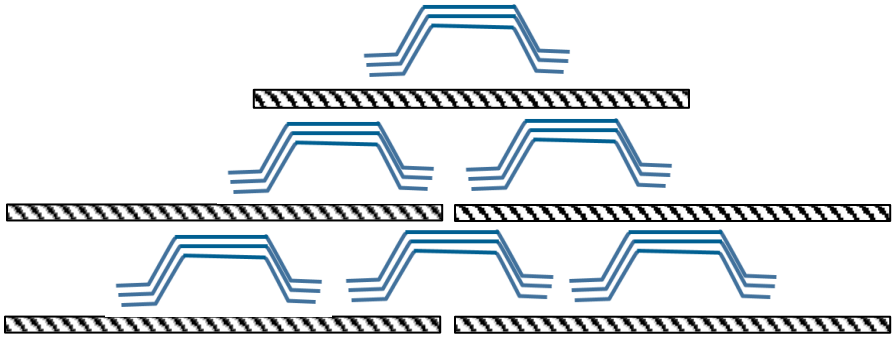
1) Crew is dispatched to "starting area" and Foreman discuss sheet piling receiving/delivery operational plan with crew to ensure Longshoremen understand operation, safety and PPE. Depending on volume of sheet piles there may be more than one "starting area".
2) When receiving from vessel, Drivers deliver 4x4's to "starting areas" where sheet piling will be. Dunnage should be placed to minimize warping and avoid product damage. Due regard should be given to pile placed onsite (also known as "sections" or "lay down areas") for the purpose of aligning the piles height and stability, and placing dunnage on snow or ice. Any suspect dunnage is to be disposed of in bins provided (e.g. large cracks, rot, broken, etc.).
3) Sheet piling can be received from the vessel one of three ways:
    - The sheet pile can be landed directly from vessel onto our trailers for delivery to lay down area.
    - The sheet pile can be landed to bunks from vessel, and then loaded onto trailer to be moved to laydown area.
    - The sheet pile can be landed to bunks from vessel, and then moved to laydown area by forklifts.
4) Prior to landing sheet piles on trailers, sufficient dunnage is to be placed across the width of each trailer to support the sheet pile and allow access by forks.
5) Once trailer is loaded, Tractor Driver will pull the load to the designated lay down area where the Labourer will have laid 4x4 dunnage for resting the sheet pile on. Again based on weight and dimensions, 1 or 2 forklifts will lift the sheet pile up from the trailer. The trailer will then pull away and the forklifts will move the sheet piles into place on the preset dunnage.
6) If handling by forklift, then bunks are placed alongside vessel for sheet pile to be loaded onto from the vessel. The Operator lifts sheet pile and tilts back to remove sheet pile from shipside bunk to their assigned laydown area on site. Amount of sheet pile taken by forklift is based on size and weight of sheet pile. Sheet pile is laid onto dunnage prepared by Labourer at designated laydown area.
7) For secondary lift onto pile, load is lowered at one end allowing one driver to remove forks and then proceed to the end of the pile to assist remaining driver in removing their forks.
8) Lift truck drivers must ensure an even load distribution to prevent the load from slipping off forks.
9) When stacking sheet pile, there are three options: stacked staggered, stacked pre-slung, or a pyramid formation. Each tier above the bottom tier must be supported by a tier of equal or greater

dimensions. Piles should be level and straight with all supporting dunnage for each tier directly above the dunnage on the tier below.

10) When stacking up to 30 high, each lift must be staggered at the ends approximately 2 feet so that a fork lift (when delivering to truck) can access each lift with a fork or sling from the ends. Once end is lifted, it is raised high enough to allow dunnage to be placed between lifts, thus allowing access for forks to elevate the lift.
11) When stacking up to 30 high, when space is limited and staggering is not possible, pre-slings can be left one end of each lift in a stacked pile for loading to truck.
12) For pyramid stacking, each tier needs to be equal height and piece count.

Stacked – up to 30 high

Pyramid – 3 high



= 4x4 Dunnage

13) **Caution to Labourers:** No dunnage is to be placed or removed from under sheet pile as it is being moved or lifted. Have dunnage placed prior to forklift putting sheet pile in place. Always keep eye contact with Operator so both the Driver and you know each other's intentions.
14) **Caution to Tractor Trailer Driver:** Ensure sheet piles are not brought out from ships hold over your head while parked under hook. If sheet piles must come out and pass over tractor be sure you are out of tractor and in a safe area as this occurs.

6.3. Checker Duties

The Checker performs the following duties for their gang/crew:

- Counts & records sheet pile

- Records storage location
- Record any damage (on Check Sheet or Damage Report)
- Report any damage (to Foreman proactively during shift to prevent further damage from occurring)
- Submit Check Sheet (to Foreman at end of shift). Foreman to record daily production on Vessel Loading Summary Sheet

Types of damage the Checker should look for includes, but is not limited to the following:

- Any flaws in sheet pile such as gouges, dents, tears, scaring.
- Any damage to the ends, any bent or warped sheet piles.

7.0 Delivery to Truck

7.1. Preparation

Ensure all equipment is operational and ready, including:

- Various capacity forklifts with 8 foot general cargo forks.
- Utility forklifts for moving dunnage.
- Personal Protection Equipment (PPE) – minimum requirement includes safety vests and steel toed boots.

Organize materials and documentation, including:

- Site Map (See Appendix A for Sample)
- Various Forms (Check Sheets, Damage Reports, Truck Paperwork, Summaries)
- Line ups for receiving or loading out (supplied by traffic).

7.2. Handling Sheet pile – delivering to truck.

Generally, sheet pile moving to or from our terminal by land, does so by truck. The procedures below outlined how Squamish Terminals delivers sheet pile to trucks.

1) Foreman discuss sheet pile operational plan with crew to ensure Longshoremen understand operation, safety and PPE. Crew is dispatched to section for delivery.
2) Handling of sheet pile for this process is done by forklift. The dimensions and weight of the sheet pile will determine the number of forklifts required.
3) For loading to truck from a stacked pile, lifts need to be moved from the piles. One forklift will lift the end of a lift either with the forks or sling, the other fork lift will insert his forks under the lift at the same end, the first forklift lowers forks and repositions to the other end of the lift ready for lift. Operator(s) will lift sheet pile (within the forklifts capacity) from the designated loading area, tilt back mast and drive towards the truck to be loaded, or back away from pile and have truck drive under the lift. The truck operator will have sufficient dunnage placed on the truck deck prior to Forklift Operator approaching the truck. Forklift Operator will advance to the side to the truck, lower load onto dunnage, tilt forward, lower forks and slowly back up from truck.

4) Full lifts can be pre-made on the ground and lifted to truck either in tandem or in a single lift using one forklift.
5) When loading to truck from a pyramid pile, each lift is taken and loaded to truck, or pre-loads can be made and then lifted to the truck.
6) When binning and delivering to truck, sheet piles should be loaded onto forklifts level with both flanges of the sheet pile on forks, not hanging by one flange.
7) Truck Operator secures load prior to leaving site.
8) Labourer removes 4x4 dunnage from each sheet pile section as it becomes available, stacking 4x4's neatly. Once a pile of 4x4's is complete the Labourer bands it and the driver moves it to a storage area.

Safety Notes:

- Lift truck drivers should avoid overloading one or both forks at all times.
- Truck driver is solely responsible for placing and adjusting dunnage on trailer, no worker shall participate in the placement and adjustment of dunnage.
- Load weight as per trailer capacity under direction of the truck driver, if anyone feels the load is unsafe, report to supervisor.
- All loads to leave site in a safe manner (correct weight, even stow and properly secured).
- The Foreman, Labourer, Checker and Truck Operator are not to stand on the sides of the truck or on the deck as it is being loaded. If direction is to be given to the Forklift Operator it is to be given from a safe position.

7.3. Checker Duties

The Checker performs the following duties for each truck:

- Counts & Records Sheet pile (on Check Sheet, noting truck # and other pertinent details)
- Records weight formulas to determine maximum load
- Record Any Damage (on Check Sheet)
- Report Any Damage (to Foreman proactively during shift to prevent further damage from occurring)
- Submit Check Sheet (to Foreman at end of shift). Foreman to record production on Vessel Loading Summary Sheet.

Types of damage the Checker should look for includes, but is not limited to the following:

- Any flaws in sheet pile such as gouges, dents, tears, scaring.
- Any damage to the ends, any bent or warped sheet piles.

8.0 Hazards

As outlined in the Squamish Terminals (SQT) Health and Safety Policy, SQT is committed to providing a safe place of work for all employees, visitors and contractors. SQT is committed to the development, implementations and maintenance of a hazard prevention program (HPP) and methodology for managing hazards related to all activities at SQT.

As such, a Hazard and Risk Analysis has been completed for the Sheet Piling Procedure. Hazards are detailed below:

- Slips, Trips, Falls on slippery / uneven surfaces
- Pedestrians exposure to being struck by site traffic
- Site vehicles / materials handling equipment striking other vehicles or stationary obstacles / equipment
- Poor ergonomics while working with dunnage – overexertion, musculoskeletal injuries
- Falling objects (equipment, cargo, debris, broken equipment, tools) – risk of being struck or crushed
- Overhead hazards – hook, frame, slings, cargo, equipment, gear
- Collapsing load - risk of being struck or crushed
- Poor ergonomics while rigging, lifting, banding, pulling, pushing – overexertion, musculoskeletal injuries
- Falling objects (equipment, cargo, debris, broken equipment, tools) – risk of being struck or crushed
- Truck driver falling from deck of truck
- Materials handling equipment - unstable load – tipping/rolling
- Pinch Points
- Sharp edges / slivers
- Exposure to elements (wind, sunburn, heat index, cold, dust)

9.0 Appendices

Appendix A – Sample Site Plan

Appendix B – Photo Gallery

Appendix A – Sample Site Plan

Appendix B – Photo Gallery

10.0 Revision Record

Document	Rev	Date	Originator	Details of Change
PRO -027	1.0	06-Sept-2019	SQT	Original