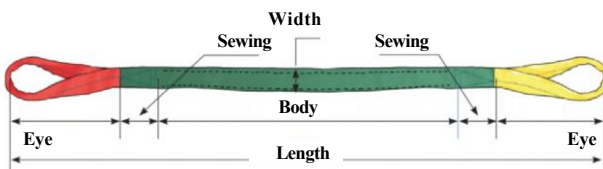


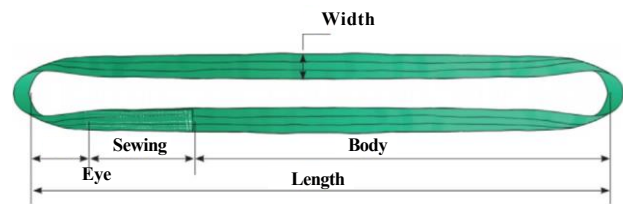


What is a belt sling?

A belt sling (flat woven webbing sling) comprises sewn web elements for attaching cargo to a crane hook or other hoisting device. Eye-to-eye belt slings and endless belt slings are widely used in shipyards and loading docks to prevent the slipping of steel pipes or stainless steel or damage to products. Although belt slings are lighter, easier to handle, and more flexible than wire ropes or chains, they are relatively weaker, so care must be taken when handling them.



[Eye-to-Eye Belt Sling]



[Endless Belt Sling]

● How belt slings are used





Standards for Disposing Belt Slings

Guide for
Safe Work
with Belt
Slings



● KOSHA Guide (G-132-2023 Technical Guidelines for Using and Inspecting Belt Slings, etc.)

Eye

- ✓ If the eye's sewing line is worn and the white part inside is exposed or if the longitudinal thread is damaged;
- ✓ If there is a significant cut, friction damage, tear damage, etc., in the eye;
- ✓ If the sewing thread is cut and the shape of the eye collapses,

Sewing

- ✓ If any damage appears due to cutting or friction
If the sewing thread is cut in several places, and
- ✓ the overlapped sewing is torn to any extent

Body

- ✓ If the fabric is damaged along the entire width of the sling surface and the longitudinal threads are damaged
- ✓ If the rope fibers are worn, so that they are not exposed, and the hairs are lifted
- ✓ If the belt is damaged to the extent of one-third of the thickness direction
- ✓ If the belt is worn or damaged in the width direction



Major Hazards

✓ Risk of suspended cargo falling because the belt sling is damaged

Belt slings may break, and suspended cargo may fall when:

- Cargo is handled without protecting its sharp edges due to friction;
- Damaged products are used without considering the decrease in strength and the safe working load is exceeded;
- Those made of synthetic fiber are used after being left outdoors, and their strength is decreased due to extended exposure to sunlight; or
- The safety factors are not considered adequately according to working conditions, work method, and purpose, and consequently, the safe working load is exceeded;



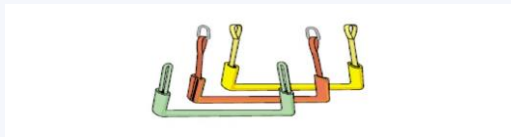
Safety Measures

✓ Fall prevention

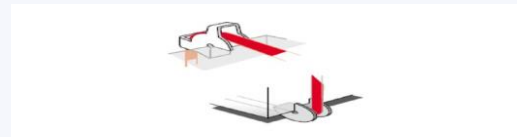
- Attach protectors to the edges before hoisting products with edges or plates, depending on the cargo.



Protective covering made of polyurethane



Protective covering for rigging with leather straps and plates



Device for flat rigging

- Synthetic fiber ropes deteriorate under direct sunlight; cover them with a tent to block sunlight when storing them indoors or outdoors
- Use within the range of the standard operating load multiplied by the mode coefficient (M). Check the rigging method, number

Vertical	Choker		Basket	
M=1	M=0,8	M=2	M=1,4	M=1
				

[Safety load for different hoisting methods]

0°	30°	45°	60°	90°	120°
100%	95%	90%	85%	70%	50%
					

[Safe load of different rigging angles]



Risk Assessment Table

Guide for
Safe Work
with Belt
Slings



(checklist method applied)

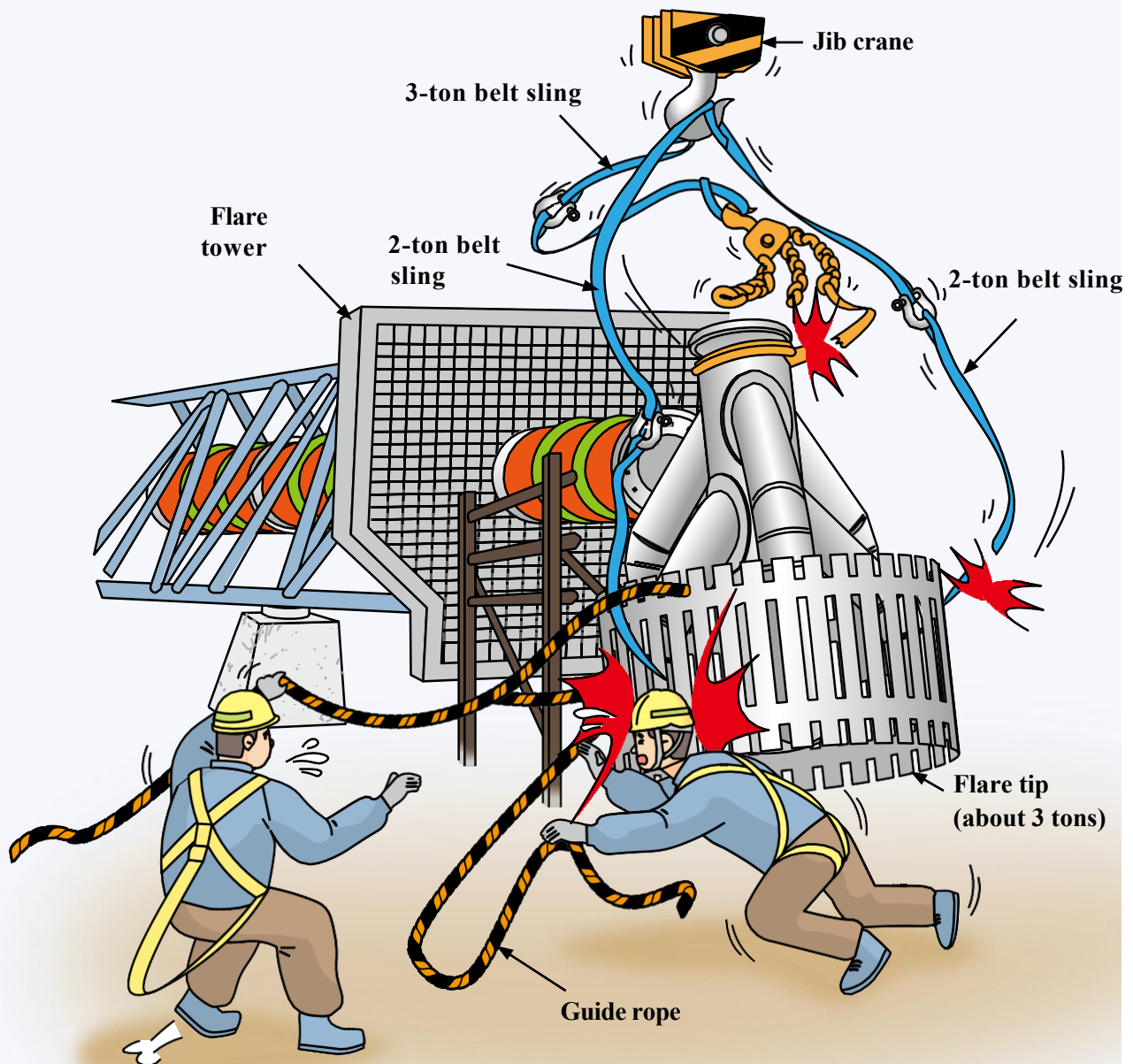
Examples of rigging with belt slings

Identification of harms/hazards (checklist)	Results			Necessary measures	Relevant codes
	Appropriate	Action required	N/A		
Are the belt slings passing through the sharp edges of the cargo?				Install guards at the corners to prevent the belt sling from directly contacting the corners.	
Is there any surface damage to the belt sling?				Inspect before work and determine whether to use or discard damaged belt slings according to disposal standards.	Article 63-2 (9) of the Rules on Occupational Safety and Health Standards
Has the safety load been determined and observed according to the the rigging method, number of strands, and rigging angle?				Ensure the cargo is less than the maximum load based on the safety factor for each work situation.	Article 163 of the Rules on Occupational Safety and Health Standards
Has the maximum load on the rope been determined and observed according to the safety factor and breaking load?					
Has it been confirmed that the sling was not twisted before hoisting?				Consider the center of gravity of the heavy object with no unbalanced load.	
Has it been confirmed the cargo was balanced before hoisting?					
When moving after hoisting, has it been confirmed that no workers or obstacles may interfere with the cargo movement?				Avoid direct contact with cargo or structures when working with heavy objects.	
Has the safety load been exceeded due to abrupt ascending or descending?				Hoist the heavy object slowly to avoid excessive shaking.	
Has a work leader appropriately been placed?				Ensure a designated work leader directs the work in accordance with the work plan for handling heavy objects.	
Are any workers accessing the area under the suspended cargo?				Ensure a designated work leader directs the work in accordance with the work plan for handling heavy objects.	Article 20 of the Rules on Occupational Safety and Health Standards

*Article 35-2 (Inspection Before Work by Supervisors), 38-1 (11) (Work Plan for Handling Heavy Objects), 39 (Work Leader), 40 (Signals) of the Rules on Occupational Safety and Health Standards applies to all hazards.

Outline

The victim and a fellow worker were hoisting the flare tip* (approximately 3 tons) bound with three belt slings (one 3-ton, two 2-ton) using a jib crane to load it onto the flare tower. The belt sling broke, and the flare tip fell approximately 2.5 meters, killing the victim who was holding the guide rope at the bottom of the dock.



* A flare tip is installed at the top of a flare tower to maintain the burning flame, which incinerates waste gases generated while refining crude oil extracted from oil drilling ships.



Cause of the accident

■ Workers are placed under heavy objects being lifted.

- The victim was placed under the flare tip being lifted by the jib crane and was struck by the falling flare tip when the belt sling broke.

■ Neglected work method

- The belt sling tied to lift the flare tip was not properly protected and broke in contact with the edge of sharp metal.

Preventive measures

■ Prohibit workers from accessing the area under the cargo being lifted.

- When lifting heavy objects such as flare tips using a jib crane, arrange workers so the cargo does not move over the workers.

■ Improve work methods

- When using fiber rigging on heavy objects with sharp edges, take protective measures on the edges before work to prevent the rope from being damaged.

■ Prepare a work plan for heavy objects

- When handling heavy objects, prepare a work plan regarding safety measures to prevent risks such as falling and tipping and ensure relevant workers understand the work plan. The work plan should include the type and shape of heavy objects, handling methods and procedures, and the dimensions and structural conditions of the work area.