The following six points briefly summarize some important safety issues:

1. All users must be trained in sling selection, use, and inspection, to personnel, environmental effects and rigging practices.
2. Inspect slings for damage regularly, if the sling is damaged, remove it from service.
3. Protect slings from damage. ALWAYS protect slings in contact with edges, corners, protrusions, or abrasive surfaces with materials of sufficient strength, thickness, and construction to prevent damage.
4. Do not exceed a sling’s rated capacity. Always consider the effect of sling angle and tension on the sling’s rated capacity.
5. Do not stand on, under or near a load with the sling under tension. All personnel should be alert to dangers of falling and/or uncontrolled loads, sling tension, and the potential for snagging.
6. Maintain and store slings properly. Slings should be protected from mechanical, chemical, and environmental damage.

1. All Sling Users Must be Trained and Knowledgeable

All web sling users must be trained on the proper use of web slings. The American Society of Mechanical Engineers, Safety Standard for Slings (ASME B30.9) states:

“Synthetic webbing sling users shall be trained in the selection, inspection, cautions to personnel, effects of the environment and rigging practices as covered” by Chapter 9-5.

OSHA Guidance on Safe Sling Use (29 CFR 1910.184) states that a "qualified person" is one:

"who, by possession of a recognized degree or certificate of professional standing in an applicable field, or who, by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter and work."

It is important that all sling users be knowledgeable about the safe and proper use and application of slings and be thoroughly familiar with the manufacturer’s recommendations and safety materials provided with each product. In addition, all sling users need to be aware of their responsibilities as outlined in all applicable standards and regulations.

If you are unsure whether you are properly trained and knowledgeable, or if you are unsure of what the standards and regulations require of you, ask your employer for information and/or training—DO NOT use web slings until you are absolutely sure of what you are doing. Remember, when it comes to using web slings, lack of skill, knowledge, and care can result in severe INJURY or DEATH to you and others.

2. Slings Must Be Regularly and Properly Inspected

Even seemingly "minor" damage to a web sling can significantly reduce its capability to hold or lift objects and increases the chance that the sling will fail during use. For example, one sling manufacturer has shown that a 3/8" (9.5mm) cut (much smaller than the cut shown in Table 2) caused a sling to break under load at almost half its non-damaged capacity. Therefore, it is very important that web slings are regularly and properly inspected. If you are not sure whether a sling is damaged, DO NOT USE IT.

Table 1. Web sling removal from service criteria

The entire web sling must be inspected regularly and it shall be removed from service if ANY of the following are detected:

- If the sling identification tag is missing or not readable.
- Holes, tears, cuts, snags, or embedded materials.
- Broken or worn stitches in the load bearing splices.
- Knots in any part of the sling webbing.
- Acid or alkali burns.
- Melting, charring, or weld spatter on any part of the web sling.
- Excessive abrasive wear or crushed webbing.
- Signs of Ultraviolet (UV) light degradation.
- Distortion, excessive pitting, corrosion, or other damage to fittings.
- If provided, exposed red core yarn. However if damage is present and red yarns are not exposed DO NOT USE the sling.
- Any conditions which cause doubt as to the strength of the web sling.
2c. How often to inspect slings
A three-stage procedure is recommended to help ensure that web slings are inspected with appropriate frequency:

Initial Inspection—Whenever a sling is initially received, it must be inspected by a designated person to help ensure that the correct web sling has been received and is undamaged and that the web sling meets applicable requirements for its intended use.

Frequent Inspection—The entire sling must be inspected before each shift or day in Normal service and before each use in Severe service applications.

Periodic Inspection—Every sling must be inspected “periodically” by a qualified and designated person. In order to validate the frequent level of inspection, the periodic inspection should be performed by someone other than the individual(s) who most commonly performs the frequent inspection. The frequency of periodic inspections is based on the sling’s actual or expected frequency of use, severity of service conditions, the nature of the work performed with the sling and experience gained during the inspection of other slings used in similar circumstances. General guidelines for the frequency of periodic inspections are:

- Normal service—yearly
- Severe service—monthly to quarterly
- Special service—as recommended by a qualified person

Periodic inspections intervals must not exceed one year.

Written records are not required for frequent inspections, but WSTDA WS-1 or ASME B30.9 require that a written record of the most recent periodic inspection be maintained. See WSTDA WS-1 or ASME B30.9 for more information about definitions of Normal, Severe and Special service conditions.

3. Slings Must be Adequately Protected from Damage

3a. Avoid environmental degradation
Environmental factors such as an exposure to sunlight, dirt or gritty-type matter and cyclical changes in temperature and humidity, can result in an accelerated deterioration of web slings. The rate of this deterioration will vary with the level of exposure to these conditions and with the thickness of the sling material. For example, single ply slings will generally degrade more rapidly with this exposure than multiple ply slings. Web slings that are used outdoors regularly should generally be permanently removed from service within a period of 2 to 4 years. All web slings that are exposed to these conditions should be highly scrutinized during their inspections.

Table 2. Types of damage you should look for in web slings

<table>
<thead>
<tr>
<th>Damage Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cuts or tears</td>
<td>Abrasion or cuts visible on the webbing</td>
</tr>
<tr>
<td>Snags</td>
<td>Abrasion or cuts visible on the webbing</td>
</tr>
<tr>
<td>Holes/punctures</td>
<td>Abrasion or punctures visible on the webbing</td>
</tr>
<tr>
<td>Melting or charring</td>
<td>Heat damage visible on the webbing</td>
</tr>
<tr>
<td>Weld spatter</td>
<td>Weld spatter visible on the webbing</td>
</tr>
<tr>
<td>Acid/alkali burns</td>
<td>Chemical burns visible on the webbing</td>
</tr>
<tr>
<td>Broken/worn stitches</td>
<td>Worn or broken stitches visible on the webbing</td>
</tr>
<tr>
<td>Crushed webbing</td>
<td>Crushing or distortion visible on the webbing</td>
</tr>
<tr>
<td>Knots</td>
<td>Knots visible on the webbing</td>
</tr>
<tr>
<td>Embedded materials</td>
<td>Materials embedded in the webbing</td>
</tr>
<tr>
<td>UV degradation</td>
<td>UV degradation visible on the webbing</td>
</tr>
<tr>
<td>Exposed red core yarns</td>
<td>Core yarns exposed on the webbing</td>
</tr>
<tr>
<td>Excessive abrasive wear</td>
<td>Abrasive damage visible on the webbing</td>
</tr>
</tbody>
</table>

Visible indications of such deterioration can include the following:
- Fading of webbing color.
- Uneven or disoriented surface yarn of the webbing.
- Shortening of the sling length.
- Reduction in elasticity and strength of the sling material due to an exposure to sunlight, often evident by an accelerated abrasive damage to the surface yarn of the sling.
- Breakage or damage to yarn fibers, often evident by a fuzzy appearance of the web.
- Stiffening of the web, which can become particularly evident when web slings are exposed to outdoor conditions without being used or cyclically tensioned.

3b. Avoid actions that cause damage to slings
You should always avoid any action that causes the types of damage identified in the previous section of this Safety Bulletin, including (but not limited to):

- Dropping or dragging slings on the ground, floor or over abrasive surfaces.
- Pulling slings from under loads when the load is resting on the sling—place blocks under load if feasible.
- Shortening or adjusting sling using methods not approved by the sling manufacturer or qualified person.
- Twisting, kinking or knotting the sling.
- Exposing slings to damaging acids or alkalis.
- Exposing slings to sources of heat damage or weld spatter.
- Using slings or allowing exposure to temperatures above 194°F (90°C) or below -40°F (-40°C).
- “Tip loading” a sling on a hook instead of centering it in the base or “bowl” of the hook.
- Using hooks, shackles or other hardware that have edges or surfaces that could damage sling.
- Running/driving over slings with a vehicle or other equipment.

Synthetic slings are affected by some chemicals ranging from little to total degradation. Time, temperature and concentration factors affect the degradation. For specific applications, consult the manufacturer. In addition, water absorption can decrease the strength of nylon web slings by as much as 10–15% (its strength returns when the sling dries completely). For specific applications, consult the manufacturer.

3c. Safeguard slings with sufficient protection
Synthetic web slings can be damaged, abraded or cut as tension and compression between the sling, the connection points and the load develops. Surfaces in contact with the sling do not have to be very
4. Always Use Slings Properly

When lifting loads, a trained, qualified and knowledgeable user must take into account the factors and issues addressed in this bulletin, as well as considering any other relevant factors not addressed herein (see Table 4). Among the factors related specifically to web slings, users must perform several activities, including (but not limited to) those discussed in the following subsections.

### 4a. Assess the load

Determine the weight of the load and make sure it does not exceed the sling’s rated capacity or the capacity of any of the components of the rigging system. Users must also determine the load’s center of gravity (CG) to make sure the rigging system used will be able to retain and control the load once lifted.

### 4b. Select an appropriate sling/configuration

Select a sling having suitable characteristics for the type, size and weight of the load, the type of hitch (see Table 3) and the environment. The sling must be securely attached to the load and rigged in a manner to provide for load control to prevent slipping, sliding and/or loss of the load. A trained, qualified and knowledgeable user must determine the most appropriate method of rigging to help ensure a safe lift and control of the load.

#### Table 3. Common types of sling hitches

<table>
<thead>
<tr>
<th>Hitch</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical Hitch</td>
<td>One end is placed on the hook, while the other end is attached directly to the load. A tagline should be used to prevent load rotation.</td>
</tr>
<tr>
<td>Choker Hitch</td>
<td>Sling passes through one end around the load and the other end is placed on the hook. Rated capacity is normally 80% of that for a vertical hitch. Load control is limited with only one sling rigged in a choker hitch. Also, the choke point should always be on the sling body—not on the sling eye, fitting, base of the eye or fitting, splice or tag.</td>
</tr>
<tr>
<td>Basket Hitch</td>
<td>The sling cradles the load while both ends are attached overhead. The rated capacity for a basket hitch is twice that for a vertical hitch. As with the choker hitch, more than one sling rigged in a basket hitch (or some other means) may be necessary to help ensure load control.</td>
</tr>
</tbody>
</table>

### Table 4. Issues and Factors to consider when handling, lifting and manipulating materials and loads

<table>
<thead>
<tr>
<th>Categories</th>
<th>Issues/Factors to Consider</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment</td>
<td>Environment temperature, Object temperature, Chemical conditions and exposure</td>
</tr>
<tr>
<td>Load</td>
<td>Weight, Dimensions, Center of Gravity (CG), Attachment point integrity, SUSceptibility to crushing/compression, Loose parts that could fall from load</td>
</tr>
<tr>
<td>Equipment/Lift</td>
<td>Single/multiple cranes/hoists, Maximum/planned operating radius, Allowable load, Ratio of lift to allowable load</td>
</tr>
<tr>
<td>Rigging</td>
<td>Sling selection, Load control, Lift point (over the CG), Positive sling-to-load engagement, Coefficient of friction: Sling-to-load, Appropriate hitch (for CG and load control), Load is free to move and is not snagged, Coordination of multiple slings</td>
</tr>
<tr>
<td>Personnel</td>
<td>Area clear of unnecessary personnel, Personnel are trained and qualified, Pre-lift plan and meeting, Tag lines/spotter requirements</td>
</tr>
</tbody>
</table>
Another important consideration is the sling-to-load angle—the angle formed between a horizontal line and the sling leg or body. This angle is very important and can have a dramatic effect on the rated capacity of the sling. When the sling-to-load angle decreases, the load on each leg increases. This principle applies in a number of conditions, including when one sling is used to lift at an angle and when a basket hitch or multi-legged bridle sling is used. Table 5 provides information about increased tension as a function of sling-to-load angle (assuming equally-loaded sling legs). Sling angles of less than 30 degrees are not recommended.

Similarly, when the angle of choke is less than 120 degrees, the sling choker hitch capacity decreases. To determine the actual sling capacity at a given angle of choke, multiply the sling capacity rating (for a choker hitch) by the appropriate reduction factor determined from Table 6.

4c. Do not misuse the sling

Avoid accelerating or decelerating the load too quickly (i.e., “shock loading”). Do not use slings to pull on stuck or snagged objects and do not use slings for towing purposes. A web sling should only be used for lifting loads.

5. Make Sure All Personnel are Clear of Loads and Alert to Risks

Even if you account for all of the factors/issues discussed in this Safety Bulletin, things can still go wrong. Therefore, all personnel must stand clear of lifted loads and never be under, on or near suspended loads.

When using slings, no part of the body should be placed between the sling and load or between the sling and lifting hook. In addition, personnel must be alert to the potential for the sling to become snagged during a lift. Never use a web sling to pull on objects in a snagged or constrained condition.

6. Properly Store and Maintain Slings

In order to prevent damage to slings when not in use, you should store slings in a cool, dry and dark location. Slings should be stored in an area free from environmental or mechanical sources of damage, such as: weld spatter, splinters from grinding or machining, heat sources, chemical exposure, etc. Also, keep slings clean and free of dirt, grime and foreign materials.

If slings are cleaned, use only mild soap and water. Rinse sling thoroughly and let it dry completely before placing the sling back into storage or use. Do not machine wash slings. Machine washing results in significant loss of sling strength.

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**Where to Find Additional Information**

This bulletin does not provide you with all the information you need to know in order to be considered trained and knowledgeable about rigging and lifting loads, but it does provide important information about the use of web slings within a rigging system. If you need more information about web slings and rigging practices or your responsibilities according to regulations and standards, talk to your employer. You and your employer can consult a number of sources of information to help ensure that you are properly trained and knowledgeable when using web slings, including (but not limited to):

- ASME B30.9—Synthetic Webbing Slings: Selection, Use and Maintenance.
- Rigging handbooks.
- Manufacturer’s catalog, manual, website, bulletins, etc.
- Formal training provided by manufacturers or other outside entities.