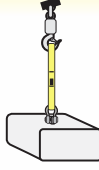

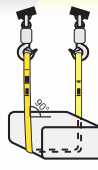

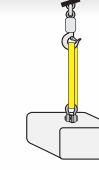
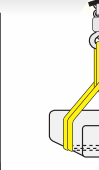
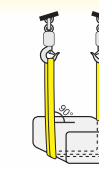
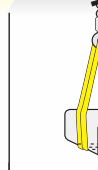


# WEB SLINGS WORKING LOAD LIMITS

Web Width Inches Design Factor 5:1	Ply								
		Vertical	120° Choke	90° Basket	60° Basket	Vertical	120° Choke	90° Basket	60° Basket
		Type 3 & 4 Eye & Eye				Type 5 Endless			
1	1	1,600 lbs	1,280 lbs	3,200 lbs	2,750 lbs	3,200 lbs	2,600 lbs	6,400 lbs	5,400 lbs
2	1	3,100 lbs	2,480 lbs	6,200 lbs	5,330 lbs	6,200 lbs	5,000 lbs	12,800 lbs	10,600 lbs
3	1	4,700 lbs	3,760 lbs	9,400 lbs	8,080 lbs	9,400 lbs	7,600 lbs	18,800 lbs	16,000 lbs
4	1	6,200 lbs	4,960 lbs	12,400 lbs	10,600 lbs	12,400 lbs	10,000 lbs	24,800 lbs	21,200 lbs
6	1	9,300 lbs	7,440 lbs	18,600 lbs	16,000 lbs	18,600 lbs	14,800 lbs	37,200 lbs	31,800 lbs
8	1	11,800 lbs	9,440 lbs	23,600 lbs	20,300 lbs	23,600 lbs	18,800 lbs	47,200 lbs	40,400 lbs
10	1	14,700 lbs	11,760 lbs	29,400 lbs	25,300 lbs	29,400 lbs	23,600 lbs	58,800 lbs	50,400 lbs
12	1	17,650 lbs	14,080 lbs	35,300 lbs	30,200 lbs	35,200 lbs	28,200 lbs	70,400 lbs	60,400 lbs
		Vertical	120° Choke	90° Basket	60° Basket	Vertical	120° Choke	90° Basket	60° Basket
1	2	3,100 lbs	2,480 lbs	6,200 lbs	5,200 lbs	6,200 lbs	5,000 lbs	12,400 lbs	10,600 lbs
2	2	6,200 lbs	4,960 lbs	12,400 lbs	10,600 lbs	12,400 lbs	10,000 lbs	24,800 lbs	21,200 lbs
3	2	8,800 lbs	7,040 lbs	17,600 lbs	15,000 lbs	17,600 lbs	14,000 lbs	35,200 lbs	30,200 lbs
4	2	11,000 lbs	8,800 lbs	22,000 lbs	18,800 lbs	22,000 lbs	17,600 lbs	44,000 lbs	37,800 lbs
6	2	16,500 lbs	13,200 lbs	33,000 lbs	28,200 lbs	33,000 lbs	26,400 lbs	66,000 lbs	56,600 lbs
8	2	22,700 lbs	18,160 lbs	45,400 lbs	39,000 lbs	45,400 lbs	36,400 lbs	90,800 lbs	78,000 lbs
10	2	28,400 lbs	22,720 lbs	56,800 lbs	48,800 lbs	56,800 lbs	45,400 lbs	113,600 lbs	97,600 lbs
12	2	34,100 lbs	27,280 lbs	68,200 lbs	58,600 lbs	68,200 lbs	54,600 lbs	136,400 lbs	117,200 lbs

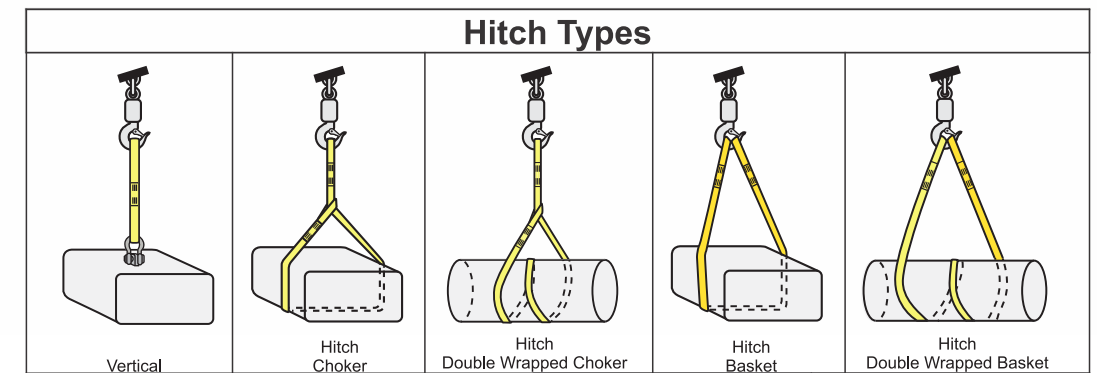
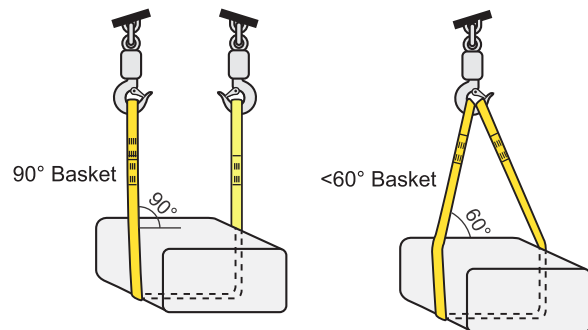
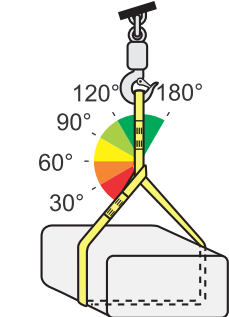


Table 5. Increased sling tension as a function of sling-to-load angle in a basket



Capacity Reduction		Sling Tension	
Angle/Deg	Loss Factor	Angle/Deg	Tension Factor
Horizontal		Horizontal	
90	1.000	90	1.000
80	0.985	80	1.015
70	0.940	70	1.064
60	0.866	60	1.155
50	0.766	50	1.305
45	0.707	45	1.414
35	0.574	35	1.742
30	0.500	30	2.000

Table 6. Increased sling tension as a function of sling-to-load angle in a basket



Choker Hitches	
Angle of Choke (degrees)	Sling rated capacity factor as percentage of single leg choker hitch capacity
120-180	100 %
90-120	87 %
60-89	74 %
30-59	62 %
0-29	49 %

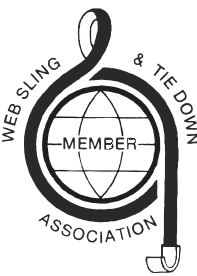
**WARNING!** NEVER EXCEED THE WORKING LOAD LIMIT. ALWAYS CHECK THE IDENTIFICATION TAG TO DETERMINE IF THE SLINGS RATED CAPACITY IS APPROPRIATE FOR THE LIFT. RATINGS LISTED ARE FOR NEW SLINGS ONLY AND APPLY ONLY TO SUPER SLINGS PRODUCTS. ALWAYS INSPECT THE SLING BEFORE USE.

Super Slings Inc. - [www.superslings.ca](http://www.superslings.ca)



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**A thorough inspection of slings and attachments should be done prior to use. Items to look for include:**

- Missing or illegible sling identification, ASME Section 9-5.7.1 requires that each sling be marked to show the following:
  - name or trademark of the manufacturer
  - manufacturer's code or stock number
  - rated load for at least one hitch type and the angle upon which it is based
  - type of synthetic material
  - number of legs, if more than one
  - Acid or caustic burns.
  - Melting or charring of any part of the sling.
- Holes, tears, cuts or snags.
- Broken or worn stitching in the load bearing splices.
- Excessive abrasive wear.
- Knots in any part of the sling.
- Discoloration and brittle or stiff areas on any part of the sling, which may mean chemical or ultraviolet/ sunlight damage.
- Fittings that are pitted, corroded, cracked, bent, twisted, gouged or broken.
- Other conditions, including visible damage, that cause doubt as to the continued use of the sling.

All web slings manufactured by Super Slings Inc. are done so in accordance with ASME B30.9-1 in conjunction with Alberta Occupational Health & Safety standards. For a copy of these standards and requirements please visit [www.asme.org](http://www.asme.org) or [work.alberta.ca/occupational-health-safety.html](http://work.alberta.ca/occupational-health-safety.html)

# WEB SLING WARNINGS & USAGE



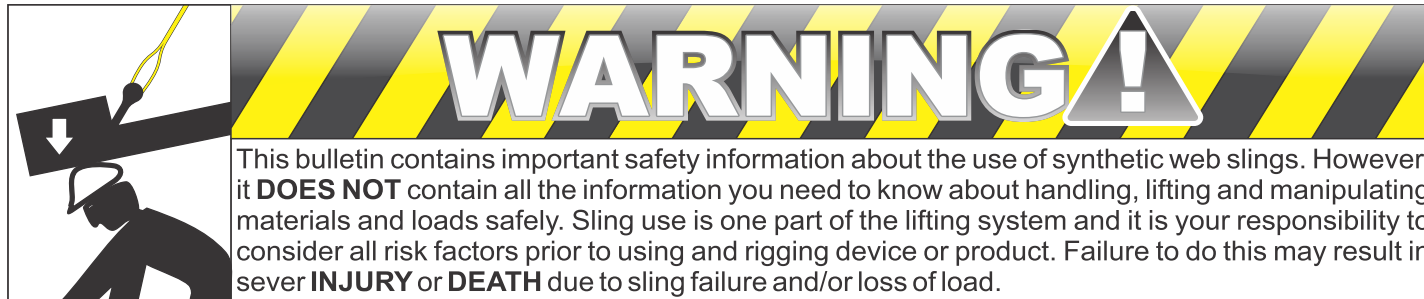
Super Slings Inc. - [www.superslings.ca](http://www.superslings.ca) - [sales@superslings.ca](mailto:sales@superslings.ca)

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This bulletin contains important safety information about the use of synthetic web slings. However, it **DOES NOT** contain all the information you need to know about handling, lifting and manipulating materials and loads safely. Sling use is one part of the lifting system and it is your responsibility to consider all risk factors prior to using and rigging device or product. Failure to do this may result in severe **INJURY** or **DEATH** due to sling failure and/or loss of load.

The following six points briefly summarize some important safety issues:

- 1 All users must be trained** in sling selection, use and inspection, cautions to personnel, environmental effects and rigging practices.
- 2 Inspect sling for damage** regularly, if the sling is damaged, remove it from service.
- 3 Protect sling 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 slings 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*

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 capacity 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.**

### 2a. How to inspect slings

To detect possible damage, you should perform a visual inspection of the entire sling and also feel along its entire length, as some damage may be felt more than seen. You should look and feel for any of the types of conditions listed in table 1. Table 2 shows examples of some of these types of damage, but note that

they are relatively extreme examples provided for illustration purposes only.

### 2b. What to do if you identify damage in a sling

If you identify any of these types of damage in a sling, **remove it from service immediately** even if the damage you feel or see is not as extensive as shown in the pictures in Table 2. Slings that are removed from service must be destroyed and rendered completely unusable unless they can be repaired and proof-tested by the slings's manufacturer or other qualified person. You should never ignore sling damage or attempt to perform temporary field repairs of damaged slings (e.g. tie knots in the webbing, etc.)

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 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 fitting(s).
  - 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 Inspections** - 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 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 expected frequency of use, severity of service conditions, the nature of work performed with the sling and experience gained during 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 inspection 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, or 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 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 than multiple ply slings. Web slings that are used outdoors regularly should generally be permanently removed from service within a 2 to 4 year period. All web slings that are exposed to these conditions should be highly scrutinized during their inspections.

Visible indications of such deterioration can include the following:

- Fading of webbing color.
- Uneven or disoriented surface yarn of the webbing.
- Shortening of 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 surface.
- Pulling slings from under loads when the load is resting on the sling - place blocks under the load if feasible.
- Shortening or adjusting the 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 the 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 damaged the 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 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 abrasive or have "razor" sharp edges in order to create conditions for sling failure. Therefore, web slings must **ALWAYS be protected from being cut or damaged by corners, edges, protrusions or abrasive surfaces with protection sufficient for the intended purpose.**

There are a variety of types of ways to protect slings from such damage. A qualified person might select and use appropriate engineered protectors/softeners - commercially available products (e.g., sleeves, wear pads, edge wraps, body wraps, corner protectors, etc.) specifically designed to protect slings from damage. A qualified person might also design and construct their own methods of protection so long as the sling is adequately protected from and/or kept off the damaging edge surface.

Regardless of the particular method chosen, the goal is to ensure that the sling, under tension, maintains its ability to securely lift the load while avoiding contact with damaging or abrasive surfaces under tension. A qualified person must carefully consider the most appropriate means to accomplish this goal. The protection used should not be makeshift (i.e., selecting and using cardboard, work gloves or other such items based solely on convenience or availability).

Regardless of the approach taken, a qualified person must ensure that the protection method chosen is appropriate for the types of damage to which the slings will be exposed. For instance, some protection provides abrasion resistance, but offers virtually no protection against cuts. Several "test" lifts, done in a non-consequence setting, may be necessary to determine the suitability of the protection device(s). After each "test" lift, the protection device(s) and slings(s) need to be inspected for damaged and suitability. You should keep in mind that no protection is "Cut-Proof" and you should always operate within the specified limits of the sling and its accessories (e.g., fixtures, hardware, protection).

# WEB SLING WARNINGS & USAGE

## 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 or knowledgeable user must determine the most appropriate method of rigging to help ensure a safe lift and control of the load. Another important consideration is the sling-to-load 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 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 be used for only 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 a mild soap or water. Rinse sling thoroughly and let it dry completely before placing it back into storage or use. **DO NOT** machine wash slings, machine washing results in significant loss of sling strength.

**Table 2.** Types of damage you should look and feel for in Web Slings

				
Broken / Worn Stitches	Chemical Damage	Crushed Webbing	Snags	Cuts / Tears
				
Knots	Illegible Tag/Identification	Holes / Punctures	Heat Damage Damaged Fittings	Excessive Abrasive Wear
				
Melting or Charring	UV Damage	Weld Spatter		



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**Table 3. Common Types of Sling Hitches**

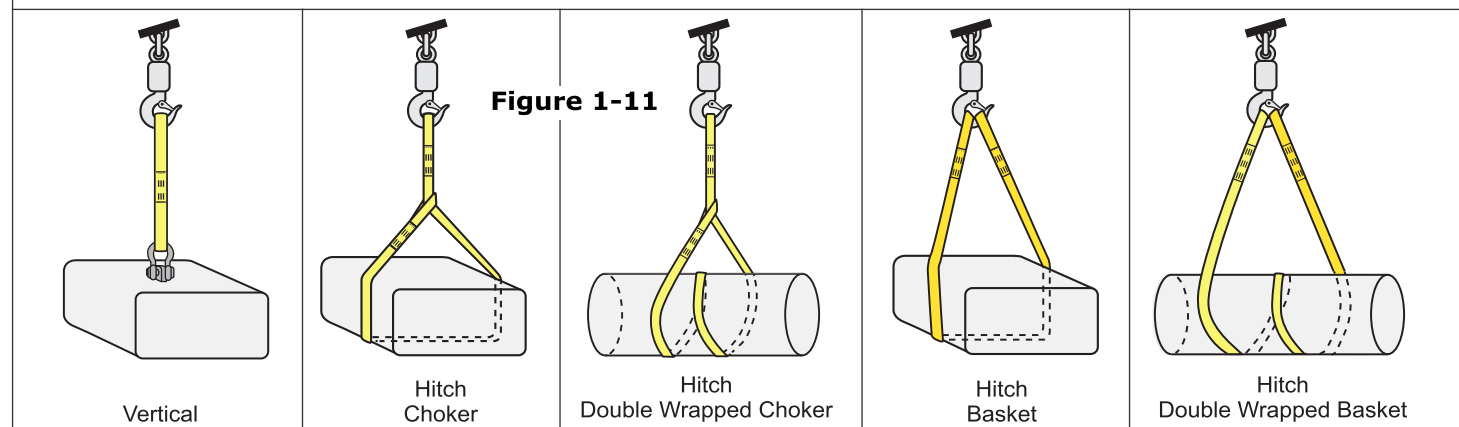
**Vertical Hitch** - A method of rigging in which the load is attached to one end of the web sling and the other end of the web sling is attached to the handling or lifting device. (See Figure 1-11).

**Choker Hitch** - A method of rigging in which the web sling is passed around the load, fed back through itself, and then attached to the handling or lifting device. (See Figure 1-11).

**Double Wrapped Choker Hitch** - A method of rigging similar to Hitch/Choker except that the web sling is passed around the load twice. (See Figure 1-11).

**Basket Hitch** - A method of rigging in which the web sling is passed around the load and both ends are attached to the handling or lifting device(s). (See Figure 1-11).

**Double Wrapped Basket Hitch** - A method of rigging similar to Hitch/Basket except that the web sling is passed around the load twice. (See Figure 1-11).



**Table 4. Issues and factors to consider when handling, lifting and manipulating materials and loads**

Categories			
Environment	Wind Weather Visibility	Environmental Temperature Object temperature Chemical Conditions & Exposure	Ground Stability Underground installations
Load	Weight Dimensions Center of Gravity (CG)	Attachment point integrity Susceptibility to crushing/compression Loose parts that could fall from load	Combination loads Damaging surfaces/edges Structural stability (bend/flex)
Equipment/Lift	Single/multiple cranes/hoists Maximum/planned operating radius	Ratio of lift to allowable load Clearance to surrounding facilities Power lines and other hazards Clearance between boom & lift	Emergency/contingency set down area Equipment inspection Ensure a clear path
Rigging	Sling selection Load control Lift point (over CG) Suitable Wear protection	Positive sling-to-load engagement Coefficient of friction: sling to load Appropriate hitch (for CG & load control) Coordination of multiple slings	Load is free to move and is not snagged Sling capacity is adequate for angle and tension
Personnel	Area Clear of unnecessary personnel Pre-Lift plan & meeting	Personnel are trained and qualified Signals: Visual, Audio, electronic, etc. Tag lines/Spotter requirements	Personnel away from load and other dangers