

Safety Alert Bulletin

Chain Safety: The Weakest Link

A number of incidents throughout industry are the result of using defective or damaged chains to lift loads. Another problem area is the misuse of chains. Chains are valuable tool if used correctly. The weakest link may not be in the chain!

Use:

- Before use, inspect chain and attachments; remove defective chains or attachment from service and tag out
- Do not exceed working load limit (see Safety Handbook page VII-18)
- Free chain of all twists, knots, kinks
- Avoid sudden jerks when lifting and lowering
- Balance loads; avoid tipping
- Use pads around sharp corners
- Do not drop load on chains
- Match size and working load limit of attachments such as hooks or rings to size and working load limit of chain
- For overhead lifting, use only alloy chain and attachments (grade 80)
- Never stand in harms way when chains are under tension
- Use tag lines to steady or position loads

Inspection:

- Ensure chain is clean before inspecting to reveal marks, nicks, wear, other visible defects
- Inspect each link for twists, bends, nicks, gouges, excessive wear at bearing points, stretch, distorted or damaged master links or attachments, especially spread in throat opening of hooks

Chains must be removed from service if any of the following defects exist:

- Twists or bends
- Nicks or gouges
- Excessive wear at bearing points
- Stretched links
- Distorted or damaged master links, coupling links or attachments, especially spread in throat opening of hooks

EXAMPLES:



Chain with distorted link



Chain with wear & stretch



Chain with knot

**** For more information see your Safety Handbook Chapter VII – Materials Handling**

**** For even more information check out this website: www.safewaysling.com/safetychain.html**

REMEMBER – Chain Safety is ONLY as Good as the Weakest Link!

Chain Safety Information Tables

Table from TXU Mining Safety Handbook Chapter VII, page 18

ASTM Specifications (A56-30) for Chains (Factor of Safety 3-1/3)				
Diameter in Inches	Single Sling	Two Part Sling at 60 degree angle	Two Part Sling at 45 degree angle	Two Part Sling at 30 degree angle
1/4	1060	1835	1500	1060
5/16	1655	2865	2340	1655
3/8	2385	4130	3370	2385
7/16	3250	5630	4600	3250
1/2	4240	7345	6000	4240
9/16	5370	9300	7600	5370
5/8	6630	11,485	9375	6630
3/4	9540	16,525	13,500	9540
7/8	12,960	22,450	18,325	12,960
1	16,950	29,350	23,975	16,950
1-1/8	20,040	34,700	28,350	20,040
1-1/4	24,750	42,875	35,000	24,750

Table from Safeway Slings USA (www.safewaysling.com/safetychain.html)

Chain Size	Diameter	Maximum Allowable Wear	Minimum Allowable Wire Diameter
9/32"	.281	.046	.235
3/8"	.078	.078	.328
1/2"	.531	.109	.422
5/8"	.630	.140	.490
3/4"	.787	.156	.631
7/8"	.881	.171	.710
1"	1.000	.187	.813

Table from Safeway Slings USA (www.safewaysling.com/safetychain.html)

Temperature		Reduction of Working Load Limit WHILE AT Temperature	Reduction of Working Load Limit AFTER EXPOSURE At Temperature
(°F)	(°C)		
Below	Below		
400	204	None	None
400	204	10%	None
500	260	15%	None
600	316	20%	5%
700	371	30%	10%
800	427	40%	15%
900	482	50%	20%
1000	538	60%	25%
Over 1000	Over 538	OSHA 1910.184 requires all slings exposed to temperatures over 1000°F to be removed from service	