Cut Protection

Slingmax® Dealer Conference 2019

San Diego, CA

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On July 15, 2017, at the Stanford Linear Accelerator Center, a bridge crane girder dropped 15 feet during a lift by a mobile crane. Slings slipped off softeners during the lift because dynamic forces applied during the lift increased the horizontal force on the slings, which overcame the force of friction on the softener. The slings failed when they contacted the edge of the load. (See photos below.) There were no injuries. The girder and the concrete floor were damaged when the load dropped. (ORPS Report SC--SSO-SU-SLAC-2017-0003)

Photos showing sling failure that caused girder to drop

Failure of Strap Is Suspected in Crane Collapse

By WILLIAM NEUMAN MARCH 18, 2008

A ragged nylon strap was hanging from the topmost of the crane's three collars on Saturday.
Robert Stolarik for The New York Times

A prime suspect in Saturday's East Side crane collapse — a spectacular disaster across two Manhattan blocks that has now claimed seven lives and is expected to cost untold millions — is a $50 piece of nylon webbing that investigators suspect may have broken while hoisting a six-ton piece of steel.

Home » Source: NYC Crane Accident in May Caused by Cut Sling

Safety Health

Source: NYC Crane Accident in May Caused by Cut Sling

June 24, 2015

Peter Maloney

Reprints

No Comments

Photo by AP Wide World

A dropped load fell 30 stories, ricocheting off the step-backed building and landing on Madison Avenue. No one was seriously injured.

Enlarge

Graphic by ENR Art Dept.

A cut sling was the cause of the dropped load accident in Midtown Manhattan last month, believes a confidential source familiar with the investigation.

The accident highlights a vulnerability in rigging procedures. Federal Occupational Safety and Health Administration regulations identify the point of vulnerability, but the agency does not

Sling Cutting

- Often said to be the most common cause of sling failures
- Most users (but not all) educated on sling protection requirements
- Judgement calls (training)

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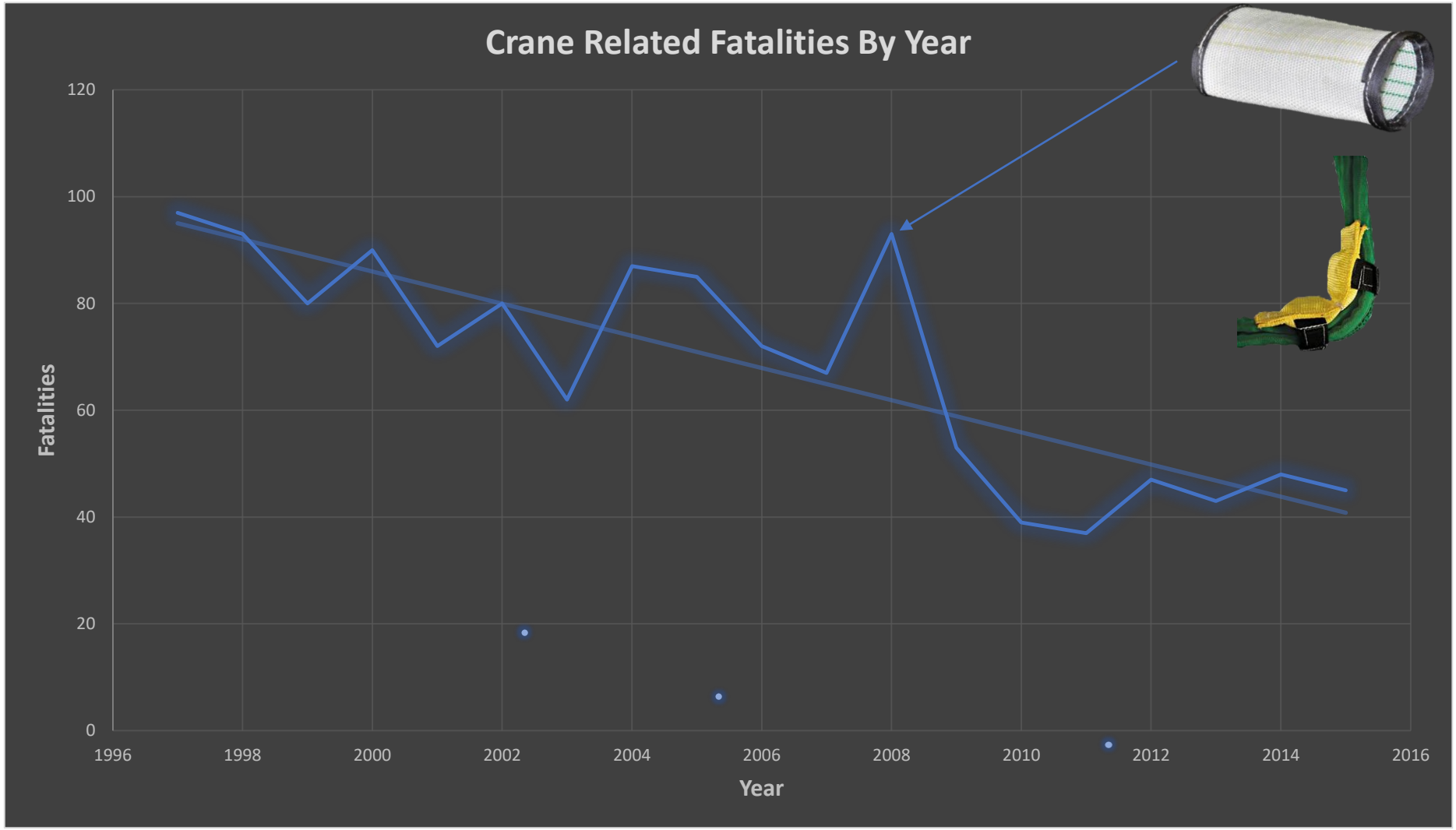
Accidents and Cut Protection



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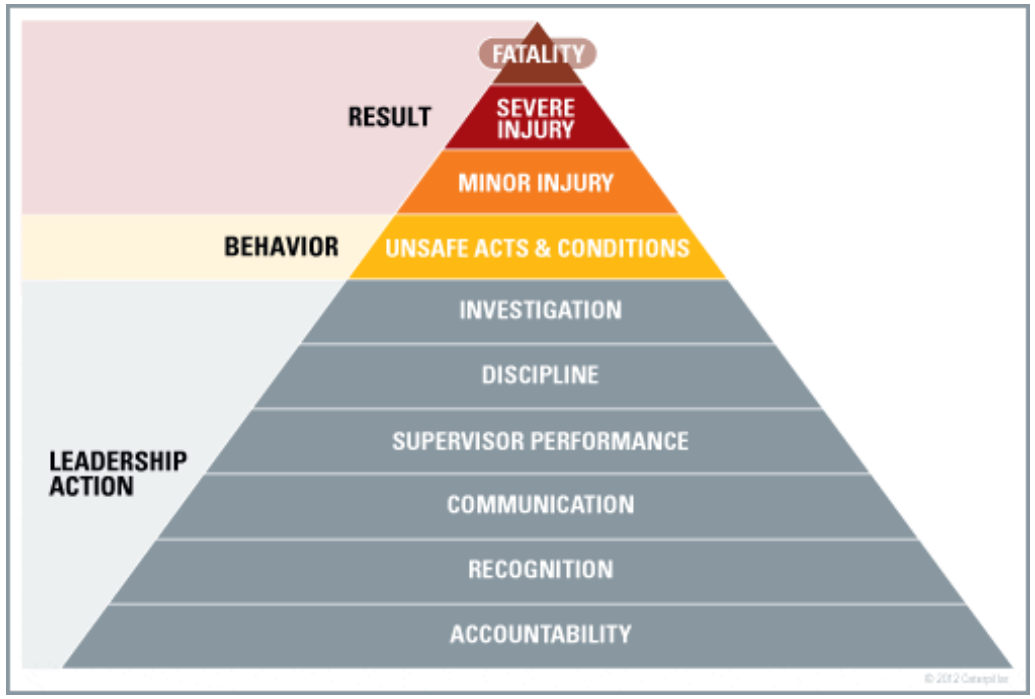
The Numbers

- Fatality reductions – Down 50% in the past decade (BLS)
- Near misses
- Property damage
- Unknowns in available data



Heinrich Accident Triangle - Revised

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Cut Protection – CornerMax® Sleeve

- From 2015 to 2018: Doubling of sales (growing market)
- Customers want/demand rated protection
- Can be used in endless applications (opportunities)
- Add-on appeal

Reactive Customers

Proactive Customers

Cut Protection - Fundamentals

- Any surface or edge can be of concern during loading
- Synthetic slings should always be used with protection
  - Abrasive surfaces
  - Edges
  - Corners
  - Protrusions
  - Hardware

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Fundamentals - Abrasion vs. Cutting

Abrasion

Damage from frictional interaction

Surface quality/material

Motion or vibration

Cutting

Damage from applied, concentrated pressure

Load features

- Corners
- Edges

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Cut Protection – Customer Option 1

- Improvised cut protection
  - Gloves
  - Old Slings
  - Firehose
  - Rubber
- Proven to be ineffective
- Highly dependent on riggers in field to determine what to use
- Not designed for sling type
- Should be tested before use

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Cut Protection – Customer Option 2

- Engineered cut protection
- Rated protection backed by testing
- Designed specifically for sling
- Simple– minimizes risk of misuse

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Engineered Cut Protection Advantages

- Minimizes their risk
- Protects their investment
- Reduces downtime and costs
- Best practice and peace of mind

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CornerMax Sleeve

- Engineered protection for irregular surfaces or limited space
- Rated: 25,000 lb. per inch of sling width
- Proprietary cut resistant sleeve construction

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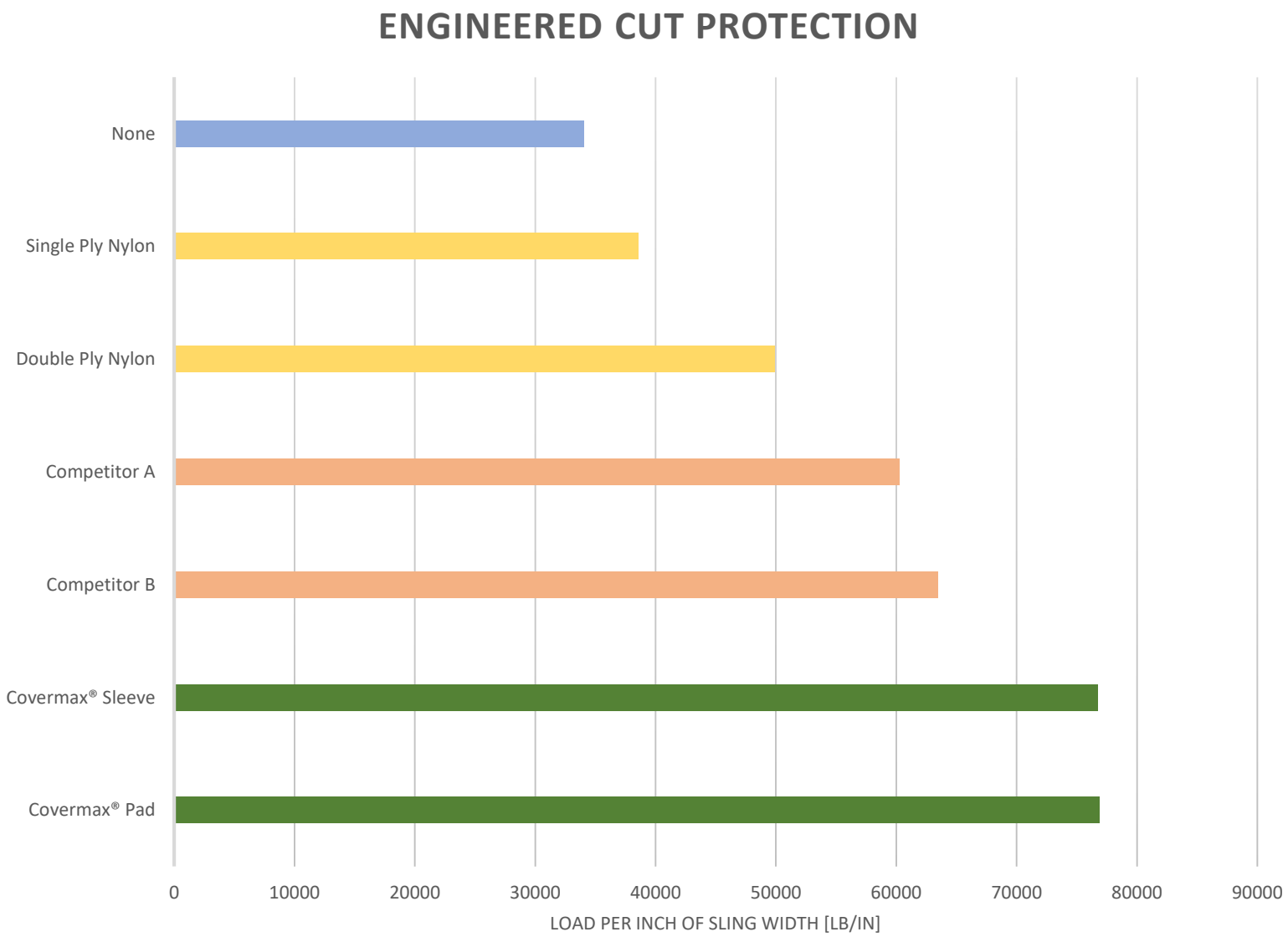

CornerMax Cut Protection

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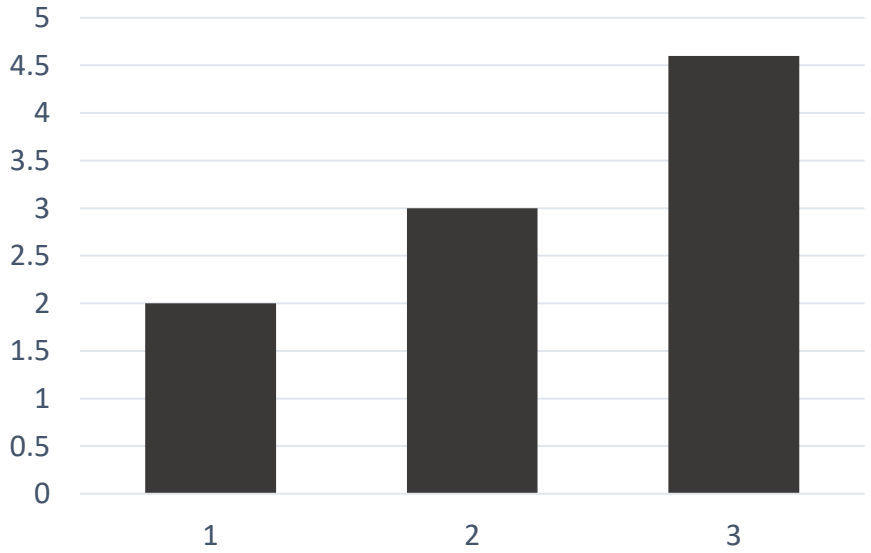
Testing Conclusions – On Edges

- Tested on steel blocks with sharp edges
- Maximizes synthetic sling performance
- No damage shown at and above rated load



Testing Conclusions - Comparisons

CornerMax Sleeve

- More than 20% higher break strength over 90 deg edge

Competition

- Practical shortcomings (flexibility, etc.)
- Comparable protection to nylon web

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Testing Conclusions – Sling Type

- Synthetic slings with protection outperform competition
- Cut protection helps sell synthetic slings

Sling	TPXC 1000	TPXC 1000 w/ CMS	SP900	½" FE	½" FE w/ CMS	½" FE Control
Hitch	Basket	Basket	Basket	Basket	Basket	Basket
WLL	20,000 lb	20,000 lb	18,000 lb	10,200 lb	10,200 lb	10,200 lb
MBF	100,000 lb	100,000 lb	90,000 lb	51,000 lb	51,000 lb	51,000 lb
BF	60,070 lb	92,800 lb	35,590 lb	32,513 lb	41,170 lb	49,620 lb
DF	**3.0:1**	**4.6:1**	**2.0:1**	**3.2:1**	**4.0:1**	**4.9:1**

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Standards and Guidelines

- Industry standards and guidelines call for sling protection:
  - WSTDA-RS-1HP
  - ASME B30.9
  - CI-1905
  - Other Standards (OSHA 1910.184, NAVFAC P-307, NASA-STD-8719.9B, etc.)
- *“Slings in contact with edges, corners, protrusions, abrasive surfaces, or connecting hardware shall be protected with a material of sufficient strength, thickness and construction…”**

**ASME B30.9-2018*

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Customer Priorities

Safety

- Safety benefits
- Superiority

Cost

- Liability
- Marginal Cost

Timeline

- Risk
- Downtime

Procedural

- Compliance
- Prior Data

Field

- Applications
- Anecdotes

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Thank You

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