

# Proper Use of Choker Hitches

For riggers, there's more than one correct way to choke a load.

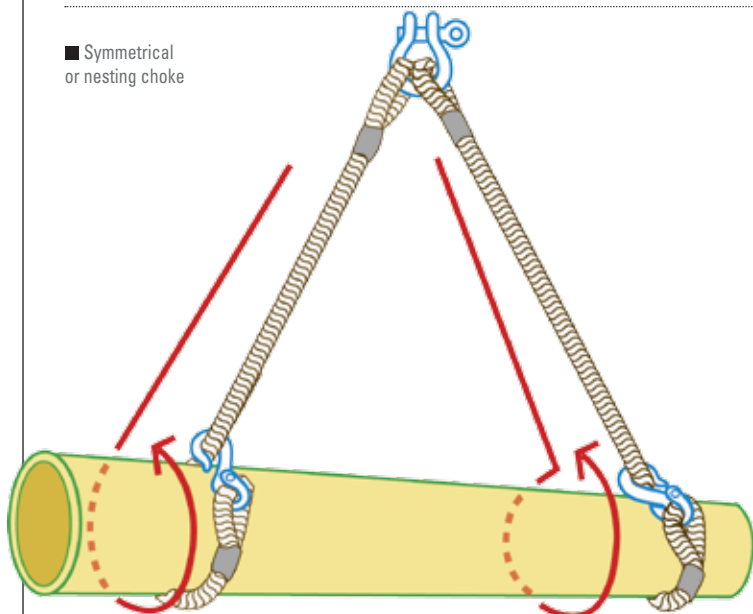
By Dan Cashin

■ Dan Cashin is a rigging instructor and subject-matter expert for the development of the Rigger Level 1 certification program offered by the National Commission for the Certification of Crane Operators. Among the

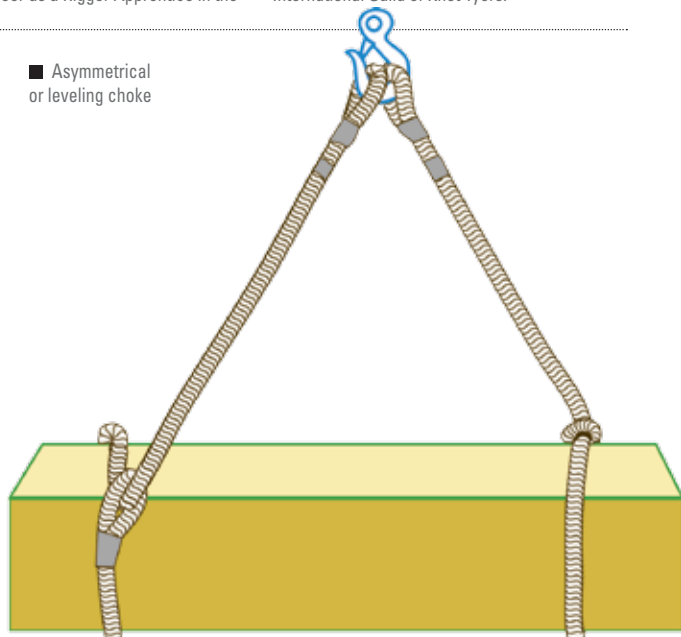
organizations he has worked for are Atlantic Crane Inspection Service, Bensalem, Pa.; the Philadelphia College Consortium for Workforce Development; and AmQuip, Treviso, Pa. He began his career as a Rigger Apprentice in the

U.S. Navy, at its Philadelphia Yard, and later became a Training Leader. He was responsible for rigging training for more than 300 riggers. In addition, he is proud to be a member of the International Guild of Knot Tyers.

■ Symmetrical or nesting choke



■ Asymmetrical or leveling choke



**NOTHING STIRS UP** heated discussions among riggers more than the proper use of the choker hitch. If you put an ironworker and an industrial rigger together on the same job, they'll get along famously until they need to choke a load. The ironworker will probably insist that the eyes must be counter to each other without the use of shackles, while the industrial rigger will be adamant about the opposite. The reason for the difference of opinion? The ironworker's main goal is to lift a piece square, while the rigger is looking to control the location of the choke points.

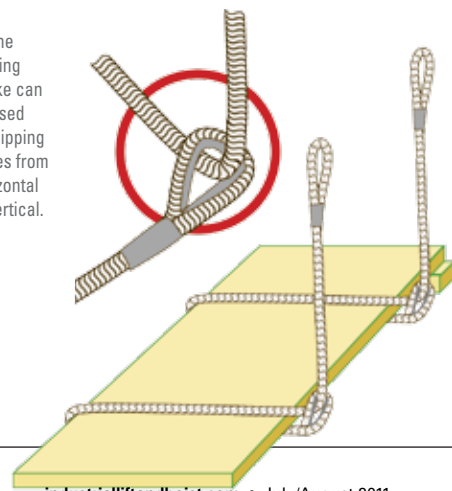
The two also will likely differ on the use of shackles when choking. The ironworker needs to be able to disconnect with a minimum of body motions. Using shackles increases the difficulty of unhooking so the ironworker prefers to rig the sling wire-through-eye. The damage to the wire rope caused by not using shackles is a price paid to increase body-positioning safety on the high

steel. However, the gear needs to be inspected and replaced at a much greater frequency than "normal." The rigger, on the other hand, might be looking for more strength and protection of the gear. He'll usually use a nesting choke with shackles while the ironworker will use the leveling choke without shackles.

Which way is right? They both are. It just depends on what you want from your sling configuration. To start, the choker is the most useful arrangement if you need grip. The heavier the load, the tighter the grip. However, the heavier the load, the weaker the sling becomes. Depending on the shape of the object being wrapped around, some charts reduce the working load limit (WLL) of a choked sling by as much as 50 percent of single-leg WLL. This reduction is due to bending and pinching of the sling body. Another disadvantage is the need for a constant strain being applied to keep the grip tight. If you get sudden deceleration,

there is a good chance the choker will lose its grip and slide away from the spot where you placed it. The introduction of sling angles on multi-leg chokers can tend to pull the sling off position. The grip itself can even be a disadvantage; if the load is delicate a choker could crush it.

■ The nesting choke can be used for flipping plates from horizontal to vertical.

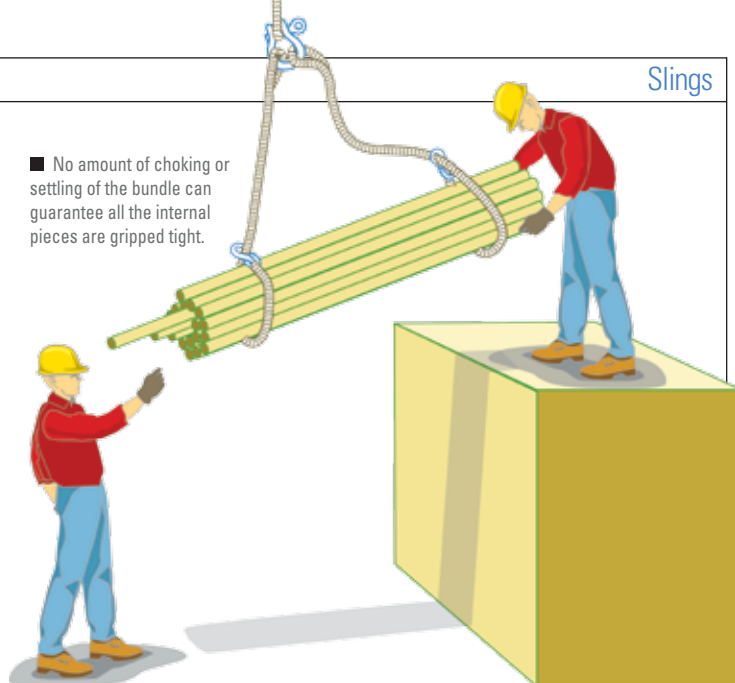


## Characteristics of chokers

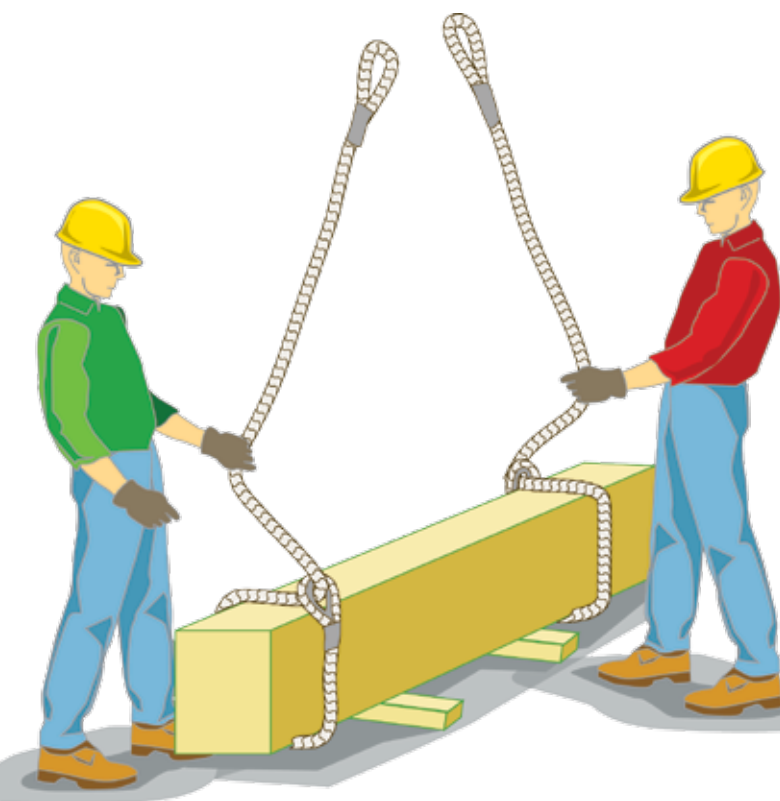
To better understand the nature of chokers, I've identified several common characteristics of this sling configuration.

With a nesting choke, the slings pass under the load from the same direction. One advantage of this technique is the ability of a single worker to hold the choke tight and in place as the slings tighten. This technique is particularly good for nesting a bundle of pipe or structural members that are spread out on their dunnage but need to be consolidated into a single bundle. But be careful, bundled pieces can pinch. Another appropriate use of this configuration is for flipping plates from horizontal to vertical. Both chokes grab at the same time as the strain is applied. A third application is for rolling round pieces one quarter or less of a turn. Words of warning: Trying to go further than that could cause the piece to roll uncontrollably. Use a round turn if possible.

■ No amount of choking or settling of the bundle can guarantee all the internal pieces are gripped tight.



With a stopped choke, the slings are held in place by the structure of the load. Several safety considerations must be understood here. First, the part of the piece that stops the choke must be strong enough to withstand the lifting force of the sling and the sliding pressure the sling puts on the piece. The lifter must avoid pinch points, which act like shears and will damage or cut through the sling. The sling must be protected from sharp edges. For a stopped choke you can get away with slightly tighter sling angles since there is a positive stop on the choke sliding into the center of the load. You can usually rely on sling angles down to 45°, and with careful stress calculations and gear protectors, you can go tighter. But do not go below 30°!



■ The leveling choke allows square pieces to be lifted level. However, if the choke points are not anchored on the edges of the piece, the piece can roll in either direction, and one of the chokes is sure to go slack.

With a leveling choke, the slings pass under the load from opposite directions. The advantage of this technique is the ability to lift square pieces level. The disadvantage is the need for two workers to hold correct choke position and tightness as the slings tighten. In addition it is difficult to get the two slings to share the weight evenly.

With a sliding choke, the slings are held in place only by the friction of the load. Because the choke depends on friction and grip to hold its position, any relaxation of either can result in one or both of the chokes sliding out of position. Ultimately, the load could be lost. With this configuration, it's best to keep the horizontal sling angle at a minimum. As the horizontal sling angle increases you will be putting more pulling stress on the choke. It's best to keep your sling angle above 60° off the horizontal. Do not go below 45°!



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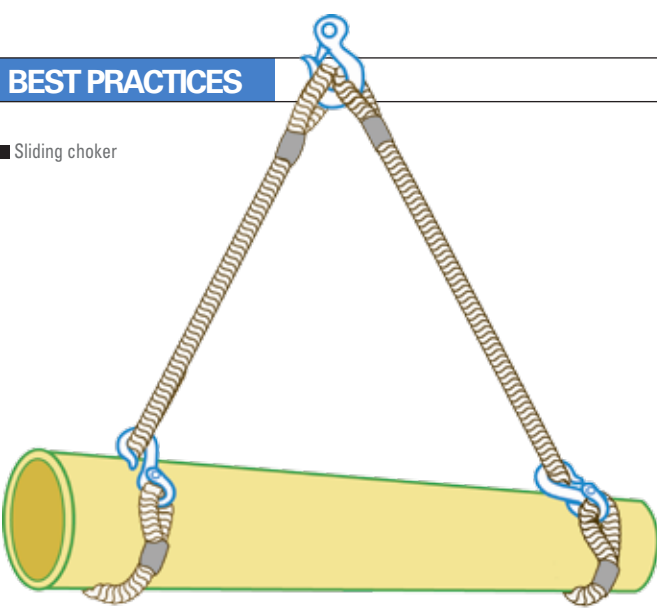
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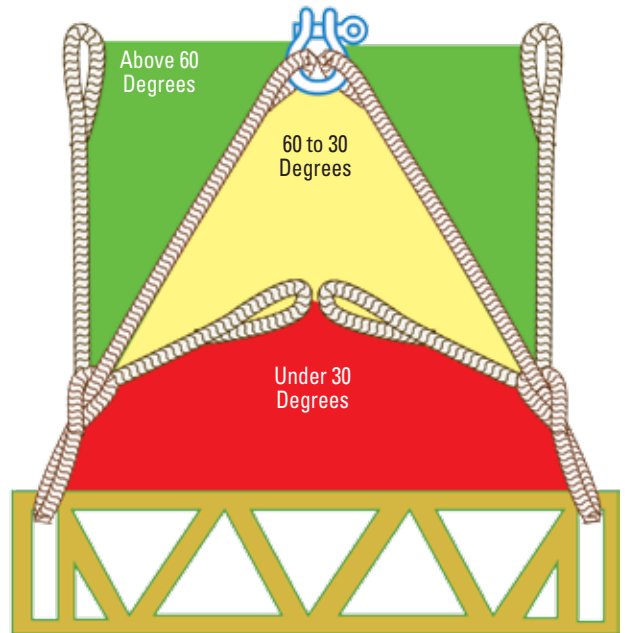
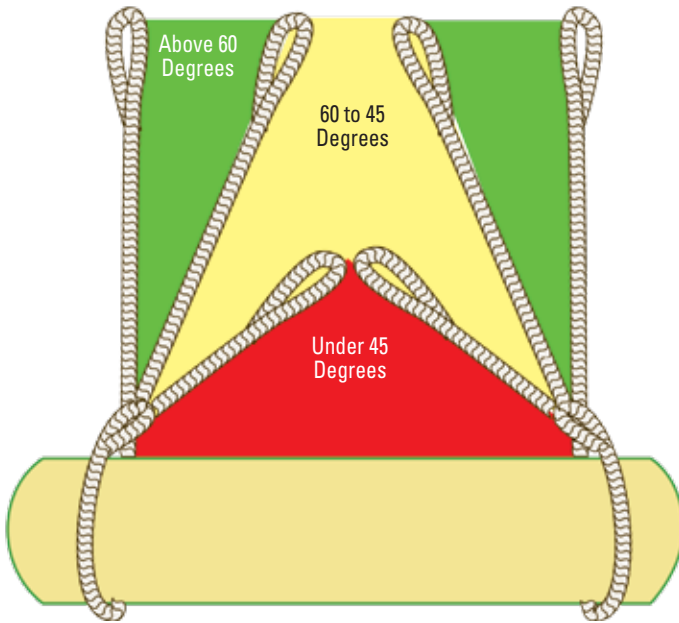
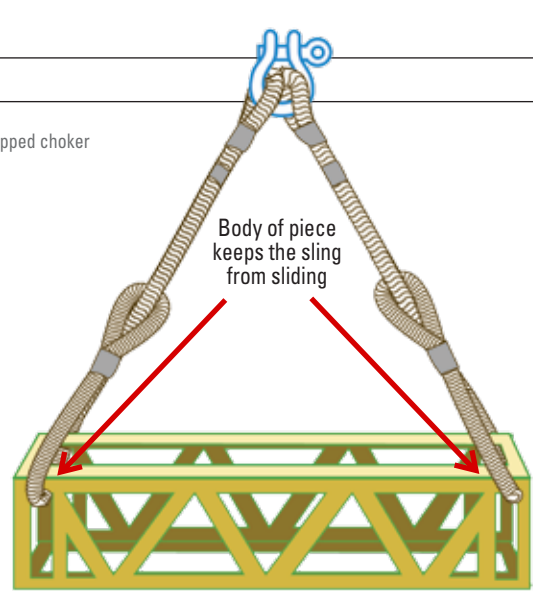
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■ Sliding choker



■ Stopped choker



■ Recommended choking angles for sliding (left) and stopped (right) chokes

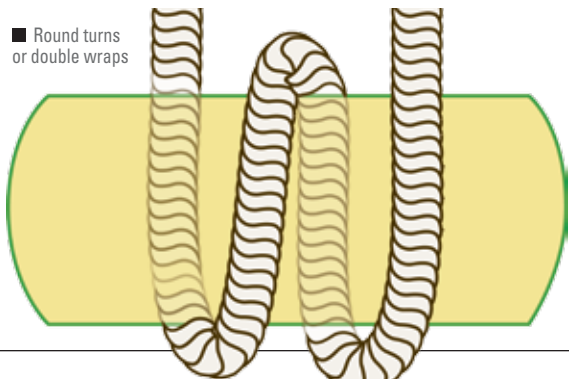
**Tips and techniques**

When positioning the choke, it is best to place the slings so that the load is picked up evenly with an equal weight distribution in the slings and the body of the load. Each sling should be one quarter in from the ends of a uniformly weighted piece. This puts each sling in the middle of its half of the piece. In addition, it helps to have dunnage just inside the one-quarter mark. When you are placing your wraps around the load, the dunnage keeps it from sliding past that point.

Working the choke means tightening or loosening the sling. The direction you pull the standing part in relation to the bearing point of the choke has an effect on how the choke tightens or loosens. The more you break the standing part back over the eye, the tighter the choke gets. In reverse, the more you pull into the throat of the eye, the looser the choke gets.

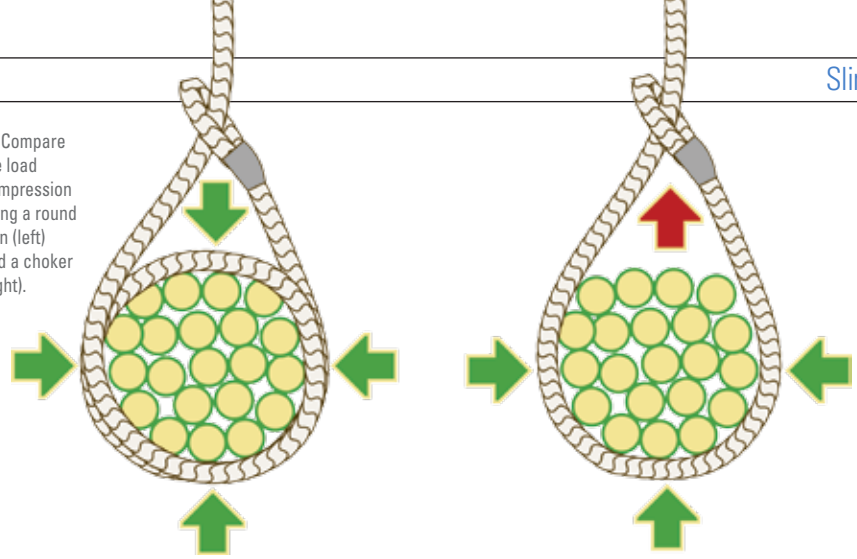
There is no purpose to forcing the choke by bashing it with anything other than your hand. The little extra grip you think you get with this brutal technique is paid for by extreme damage to the standing part of your sling. If you need more grip use a round turn.

Round turns or double wrapping increases grip and lessens the chance of sliding. It provides more surface contact between the sling and the load. However, there is a price to pay for using this technique. The sling length is effectively shortened by the length of the round turn. This can result in tighter sling angles. Also, care should be taken that the sling is not pinched or trapped by itself. It should be free to render around the piece until a strain is taken.

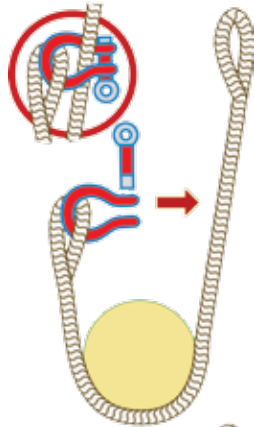


Hooks can also be used to choke. For a round turn, wrap the slings so that the standing part is toward the center of the load. This will prevent the standing part from bearing down on the round turn and possibly trapping some slack in the round turn. The throat opening of the hook must face outwards or away from the center of the piece. This causes the standing part to bear more fully into the throat of the hook. Don't rely on the safety latch to hold the sling in the hook. They only have enough strength to keep a slack sling from jumping out of a hook.

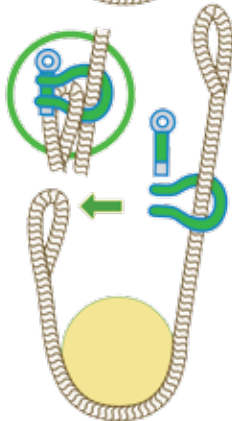
■ Compare the load compression using a round turn (left) and a choker (right).



■ Bad example of using shackles when choking with wire rope.



■ Good example



Finally, it is a really good idea to use shackles or hard eyes when choking with wire rope. If you don't, your wire rope will start to look like a bad-hair-day spring. (Synthetics and chain don't usually need a shackle.) When using a shackle to connect an eye to the standing part in a choke, you must be careful which direction you place the shackle. Look at the two pictures above. Can you see why? If you place the shackle as found in the top picture you will have the pin running against the standing part. As the choke is pulled tight there is the possibility of the shackle pin spinning and coming unscrewed.

Armed with this information, hopefully jobsite arguments about the best way to choke a load will be settled and riggers and ironworkers will be able to select the best configuration for their situation. The ultimate goal is to rig a load in the safest, most practical way. ///

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To enhance safety, the boom will not deploy if all four outriggers are not touching the ground and detecting ground pressure. Also, if the outriggers are deployed but the machine is not level within 2°, the boom cannot be elevated. Automatic-leveling systems are available as an option but not encouraged by the company.

To achieve narrow configuration, the undercarriage will retract to 31 inches, which brings down the height to 6'3". The outrigger pads can be removed to achieve its narrow width.

The 18.90 is powered by either a Honda gasoline engine or a 19-amp, 110V electric motor. Each system powers its own hydraulic pumps, making the power systems redundant in case there is a failure. If the machine is hooked up to a 110V outlet, power is also available in the platform. Two hoses that run through the boom supply air, water, or hydraulics to the basket.

When the 18.90 climbs a severe grade, the lowest point of the machine could come into contact with the ground when the trailing boom section angles downward. To prevent the boom from damaging delicate surfaces, a roller is located on the lowest point on the boom.

To protect the cylinders, Platform Basket incorporates a heavy shield to prevent damage caused by falling objects or paint, concrete, stucco, or other building materials that could harm the piston or cylinder seals. Other sensitive components such as the engine, electric motor, valve block, and relay box have steel shielding.

Optional equipment includes white rubber trucks, larger outrigger pads, and biodegradable oil.

### Reachmaster Falcon FS105-Z

Introduced in 2010, the Reachmaster Falcon FS105-Z from Skako Lift Inc., Kingwood, Texas, features 99 feet of platform height and 52 feet of outreach. The unit retracts to a surprisingly compact 39 inches wide and

climbs an 18° slope, fitting the compact aerial lift criteria.

As a dual-powered unit, the FS105-Z runs on four maintenance-free gel batteries or a Kubota water-cooled diesel engine. When it is engine powered, it has a separate hydraulic pump, providing more power for driving, operation, and climbing steep grades. If the machine needs to be used in an area where diesel fumes are not permitted or inside areas on floors capable of supporting the 11,000-pound machine, it can be operated on battery power or plugged into a 110V outlet. When plugged into an outlet, 110V power is available to the operator in the platform.

To operate the machine, the outriggers are deployed by removing a safety latch. For safety, outriggers cannot be operated until all four have been manually swung to the deployed position. Note the boom must be completely stowed for the outriggers to operate. Once the boom comes off the safety switch, only the expandable track system can extend and retract.

If an outrigger becomes light while the FS105-Z is elevated, weight sensors on the outriggers will illuminate. At that point, boom outreach will be limited, and machine operation will prevent further movement in an unsafe direction. The machine currently does not have an outrigger auto-level system, but it may be available as an option in the future.

Other safety features include dual-holding valves on cylinders with positive and negative movement. As the machine is operated, there is a slight delay so pressure can build up in the supply line to the cylinder and sufficiently release the holding valve. This eliminates any chance of back pressure when the valve opens, thus providing a more positive control response. Controls are electric over hydraulic, and the joystick is proportional. Push buttons are used for each function. The lift can be driven from the platform, but outriggers can only be deployed from the ground controls. ■■■

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# What's Under Your Hook?

Lift your load correctly with the right rigging gear, lifting devices, and attachments.

**PROPER HANDLING** is essential to safe crane operations, and for many crane users, accessories like under-hook attachments are necessary to perform the job. Handling coils and steel plates, for example, may require custom-built grabs to manage the load. Additionally, lifting devices like shackles eliminate crowding around the master link, which ultimately makes the work area safer. Read on for a roundup of products available to make your job easier, as well as company news from manufacturers and suppliers.

## News and New Products

### 30,000-Pound Gripping Tong for Work Rolls in a Steel Mill

Bushman AvonTec, Milwaukee, Wis., designed and built a 30,000-pound capacity gripping tong grab to handle work rolls in a steel mill. The tong includes chock stabilizers that prevent the top-heavy chocks on the ends of the roll from flipping over. Operation is mechanical, using Bushman AvonTec's automatic latching device.



In recent months, Bushman also has launched a motorized coil/pallet lifter that can lift both eye-horizontal coils and palletized vertical coils. The unit has fork assemblies to lift pallets and coil lifting saddles for lifting horizontal coils. The forks and lifting pads are motorized to permit changeover on-the-fly or when used with a cab-operated crane. When lifting coils on pallets, a set of motorized coil restrictors lowers to prevent tall coils from shifting on the pallet. Sensors detect when either type of load is lifted to prevent accidental opening of the legs while carrying a coil. Other sensors and indicator lights aid the operator in aligning the lifter with the coil or pallet. Numerous coil protection features are also included. One example has the motor control enclosure attached to the grab. This enclosure can also be mounted on the crane. Capacity for palletized coils is 33,000 pounds, and up to 100,000 pounds for eye-horizontal coils.

Additionally, the company has developed a coil grab for handling densely packed slit coils. Its customer, Coilplus-Berwick Steel, Columbus, Ohio, needed to find a way to insert and remove thin slit steel coils (down to 1 inch wide) from a storage rack. The coils are closely stacked in the rack with a narrow 1.5-inch space between them. The hooks are adjustable in two-inch increments to handle coils of varying thickness. "The main advantage of these lifters is that the feet rotate," said Larry Wood, maintenance and safety coordinator at Coilplus. To remove a coil, the hooks are lowered with the feet parallel to the coils. Once the feet are in the coil, they are turned 90 degrees so they can lift the coil without damaging it or neighboring coils. "Since it arrived," Wood said, "the Bushman AvonTec lifter has been doing a great job."

■ [bushmanavontec.com](http://bushmanavontec.com)

### Delta Rigging & Tools Acquires Grizzly Wire Rope & Chain

Delta Rigging & Tools Inc., Pearland, Texas, has acquired Grizzly Wire Rope & Chain, Williston, N.D. The acquisition gives DR&T an established location in the center of the Bakken Oil Shale region, providing strategic growth opportunities to better serve the rapidly expanding oil and gas development activities across a multi-state area.

"We had been looking for a way to expand into the Bakken Shale area for some time," said Kevin Rodgers, CEO. "After a careful review, it became clear that taking a well-established and growing operation like Grizzly and making it a part of Delta Rigging

& Tools was the best strategic move for us, and the best way to serve our existing and new customers working in the Bakken."

Grizzly Wire Rope & Chain first opened in 2007 to serve the Williston Basin area. The company provides wire rope, chain, hardware, cordage, web slings, and associated services to customers working primarily in the oil and gas industry, but also in transportation, agriculture, and other areas. Over the next few months, Grizzly will officially begin trading as Delta Rigging & Tools, according to a DR&T statement. All of Grizzly's employees are expected to join Delta Rigging & Tools, and operations will be part of DR&T's Rocky Mountain Region, headquartered in Grand Junction, Colo.

■ [deltarigging.com](http://deltarigging.com)

### Eriez Introduces New Lifting Magnets

In the spring, Eriez, Erie, Pa., launched the SafeHold permanent lifting magnet line, which can lift and transfer steel and iron without slings, hooks, or cables. Available in several models to meet specific application demands, SafeHold magnets make quick work of difficult steel handling and require fewer operators. Eriez offers the SafeHold line of magnets with lifting capacities up to 10,000 pounds. This line of powerful magnets does not require any electricity, so power failures will not interrupt operation.

The SafeHold APL Series is ideal for quick and efficient handling of steel where access is limited. The APL series turn off and on automatically with the up and down movement of a crane or hoist to provide continuous operation for hundreds of lifting and positioning applications. The SafeHold EPL Series is specifically designed for machine shop use to carry semi-finished products such as machine parts, press molds and steel plates.

■ [eriez.com](http://eriez.com)

### Bishop Lifting Recognized for Safety Performance

Bishop Lifting Products, Houston, Texas, received the Crane & Rigging Support – Silver Award in the Houston Business Roundtable's Safety Excellence competition. Since 1988, the Houston Business Roundtable has recognized greater Houston area industrial contractors for outstanding safety performance. This award process has become a joint effort to improve on-site safety, eliminate accidents, and most importantly, reduce injuries to employees. After receiving the nomination from BP in the category of Crane & Rigging Support, forms were submitted including OSHA-required safety data for fatalities, lost workday cases, recordable injuries and illnesses, copies of safety policies and procedures, and documentation of safety best practices.



Following a formal review process, 33 companies were chosen to receive field audits to assess on-site safety programs. Topics under review included accident prevention plans, safety training and education, emergency evacuation plan, substance abuse control programs, and driver safety training, to name a few. The audit team also interviewed shop employees to ensure "what was written is being implemented" for all safety procedures.

"It was an extreme honor to be nominated by BP and to receive the silver safety award for Crane & Rigging Support," said Matthew Wilson, QHSE manager at Bishop Lifting Products. "Recognition should be given to every individual employee at Bishop, starting with the executive management who places such a great emphasis on safety, to all employees who follow the safe practices on a daily basis."

■ [lifting.com](http://lifting.com)

### Rigging Charts Available for iPhone

Drew Merschat has developed the RigIT mobile app to give instant access to all necessary rigging capacity chart information. Every chart in the app includes the three basic hitches and their load capacities. This includes vertical, choke, and basket hitches. Also included in the charts are screw pin shackles with working load limits and pin diameters.

■ [rigitapp.com](http://rigitapp.com)

