

PRODUCT CATALOG

TRI  STAR

DESIGN & MANUFACTURING, INC.

www.tristardesign.com

Safer - Faster - Smarter

TRISTAR

DESIGN & MANUFACTURING, INC.

THE RIGHT TOOLS TO GET THE JOB DONE

SAFER, FASTER, SMARTER.

CRUSHER TOOLING

CRUSHER MAINTENANCE

SPIDER LIFTERS

SHACKLES

BELT TOOLING

CUSTOM DESIGN ENGINEERING

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Safer - Faster - Smarter

SAFER. FASTER. SMARTER



Tri Star Design & Manufacturing, Inc. has been providing custom solutions worldwide since 1991. We work directly with our clients in developing unique products and services that are highly creative and meet exact constraints and requirements. Each solution is designed to be SAFER, FASTER, and SMARTER; satisfying the needs of all areas, from the top-level executive to the hourly employee.

We specialize in designing and manufacturing maintenance and process tooling for the mining industry. Through the years, we have developed an extensive line of crusher, conveyor, and mobile maintenance tools. Our design expertise and commitment to delivering high quality products ensure that our clients are always using “the right tooling for the job”.

EZ NUT - GYRATORY

Gyratory crushers are the heart of your operation, and every minute of downtime is costly. You can reduce rebuild time and eliminate hazards with our EZ Nut for Gyratory Crushers.

No more ramming and banging to tighten the head nut, or countless hours spent burning the burn rings. Simply screw the nut into place and tighten the push rods with an impact wrench; achieving more holding pressure than the old OEM styles and virtually eliminating spun mantles.

The EZ Nut can be rebuilt or refurbished to extend life and save money. Hard facing is available upon request.



The **EZ Nut** uses Torque Bolt technology for easy installation with torque wrenches. No more cutting burn rings, nuts, and damage to threads.

Push Rods are driven with an impact wrench to provide downward pressure on the mantle.

Threaded Inserts are easily replaced if rods become damaged or stripped.

The **Thrust Ring** provides even pressure to the mantle and eliminates mantle spinning.



Our EZ Nuts are designed to work as a direct replacement for **Metso® Superior™** series, **FLSmidth®**, **Fuller™**, **Traylor™**, **Krupp™**, **Nordberg®**, and every other make and model available.

Item	Product Lifespan
EZ Nut Assembly	2 to 4 Mantles
EZ Nut Thrust Ring	2 to 4 Mantles
EZ Nut Rebuild Kit	1 to 3 Mantles

EZ NUT - CONE

Eliminate hazards and wasted time while installing or removing our Torque Bolt Crusher Nut. No more ramming and banging to tighten, or countless hours spend burning the burn rings. Simply screw the nut into place, tighten the threaded push rods with an impact wrench, and you can achieve more holding pressure than the old OEM styles.

The safer, faster, and smarter way to replace the Mantle.

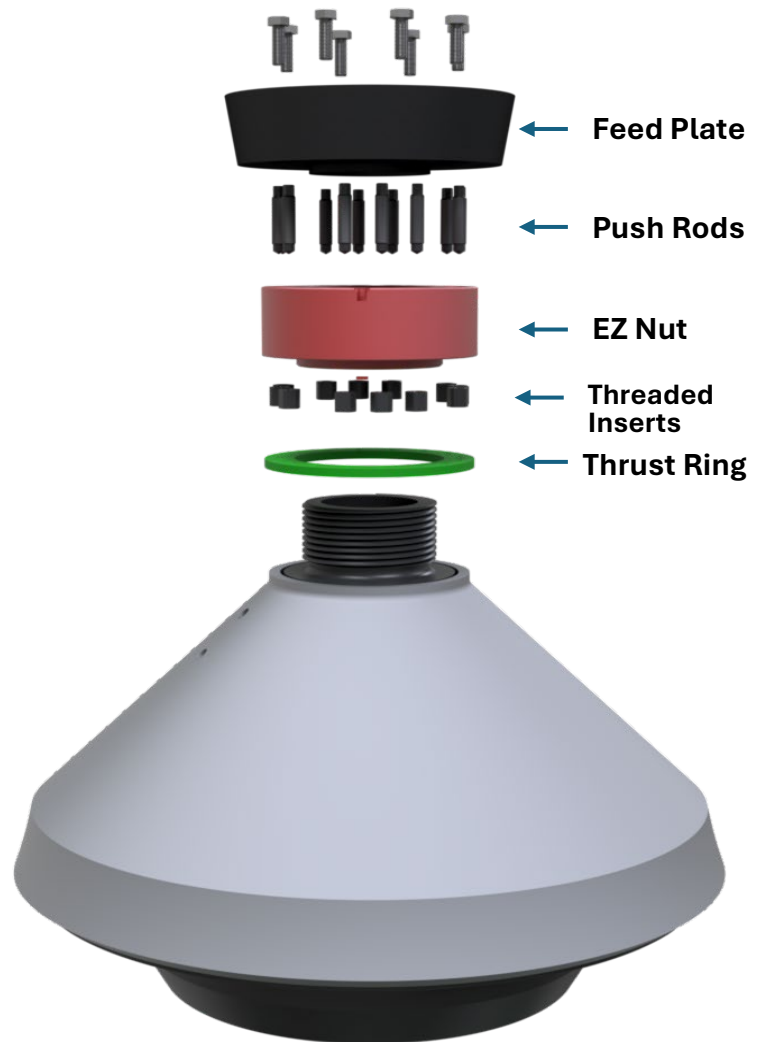


The **EZ Nut** uses Torque Bolt technology for easy installation with torque wrenches. No more cutting burn rings, nuts, and damage to threads.

Push Rods are driven with an impact wrench to provide downward pressure on the mantle.

Threaded Inserts are easily replaced if rods become damaged or stripped.


The **Thrust Ring** provides even pressure to the mantle and eliminates mantle spinning.



Our EZ Nuts are designed to work as a direct replacement for **Nordberg MP series, Raptor, Sandvik** and others.

Item	Product Lifespan
EZ Nut Assembly	4 to 6 Mantles
EZ Nut Feed Plate	6 to 10 Mantles
EZ Nut Thrust Ring	3 to 5 Mantles
EZ Nut Rebuild Kit	1 to 3 Mantles

MANTLE CLAMP

 Custom made
for your crusher!

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The Mantle Clamp is a must have for all safety conscious crusher maintenance personnel. When compared to the old-styled crusher nuts provided by the OEM, the safety improvements and decreased downtime offered by the Mantle Clamp makes your decision easy.

Eliminate the risk of sprains, strains, or impact injuries by eliminating the swinging a heavy weight from the crane.

The Mantle Clamp does not need the burn ring cut off. You can use an impact wrench to loosen the clamp. Eliminate the metal-to-metal impact caused by swinging the large weight from the crane to tighten and loosen the nut. The Mantle Clamp can be tightened with impact wrenches.

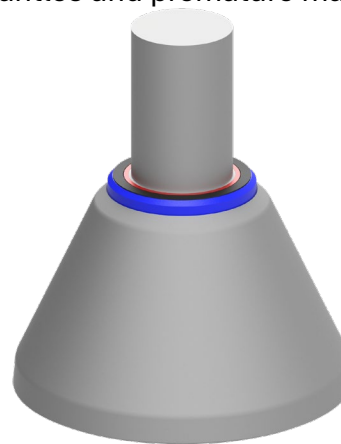
Eliminate the need to install a temporary pour nut for pouring backing material. Once installed, the Mantle Clamp can be poured in place.

Reduce potential for tripping while unscrewing the large nut. The Mantle clamp does not screw on and off, it is unbolted and lifted with a crane.

Better backing material installation. Because there is no pour nut, once the mantle is tightened and poured, it stays. You are not disturbing the backing material by removing a pour nut and then installing the permanent nut.

Greatly reduce mantle failures. The Mantle Clamp provides a much stronger and consistent hold down force. The torque is accurate every time. The current OEM nut is tightened until workers are tired of swinging the weight. You will have much fewer spun mantles and premature mantle failures when compared to the OEM nut.

Rebuild Times		
	OEM	Tri Star
Burn torch ring/cut mantle	2:00	0:00
Split the Head nut	4:00	0:10
Hammer the nut loose	3:00	0:30
Remove the nut (weld lifting lugs)	0:30	0:05
Remove the mantle	0:10	0:10
Repair gouges in head	1:00	0:00
Repair head threads	1:00	0:00
Clean and prepare head	0:30	0:30
Set mantle	0:10	0:10
Install head nut	0:30	0:20
Tightening head nut	0:30	0:10
Pour Backing	0:30	0:30
Total rebuild (head downtime)	13h 50 m	2h 35 m



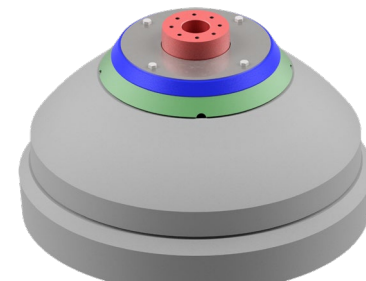
Hydrocone



Symons Standard




Bolt Style



Symons Shorhead

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MANTLE CLAMP

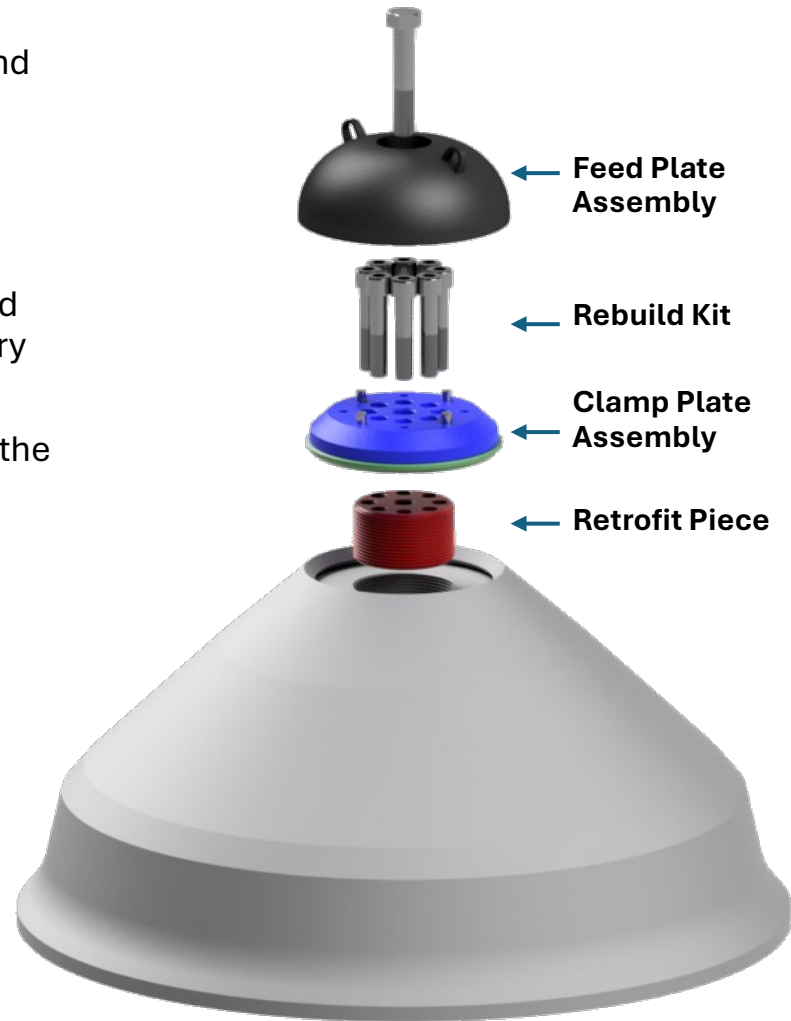
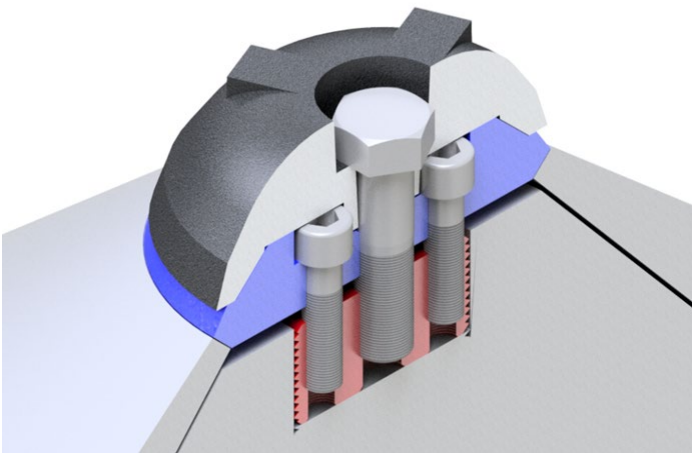
 Custom made
for your crusher!

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MANTLE CLAMP – BOLT STYLE

This Mantle Clamp design eliminates many installation hazards, decreases work time, and improves hold down pressure. Installation of liners no longer requires hammering of antiquated oversized nuts to ensure proper seating. Our Clamp Plate and Clamp Bolts ensure proper torque every time. The Clamp Plate allows for backing material to be poured directly behind the nut. No need for temporary pour nuts.


The safer, faster, and smarter way to replace the Mantle.



These Mantle Clamps are designed to work as a direct replacement for Nordberg® HP Series™, Kodiak®, and Raptor®.

Item	Product Lifespan
Mantle Clamp, Full Assembly	4 to 6 Mantles
Mantle Clamp, Feed Plate Assembly	4 to 6 Mantles
Mantle Clamp, Clamp Plate Assembly	6 to 10 Mantles
Mantle Clamp, Wear Ring (Optional)	2 to 4 Mantles
Mantle Clamp, Rebuild Kit	1 to 3 Mantles

MANTLE CLAMP

 Custom made
for your crusher!

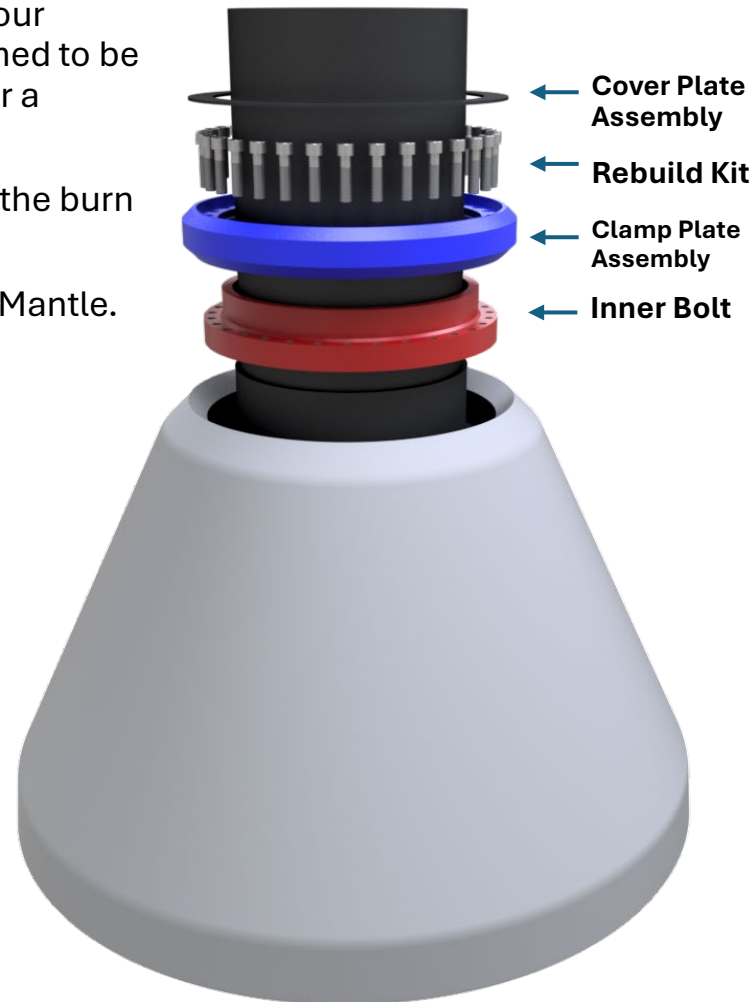
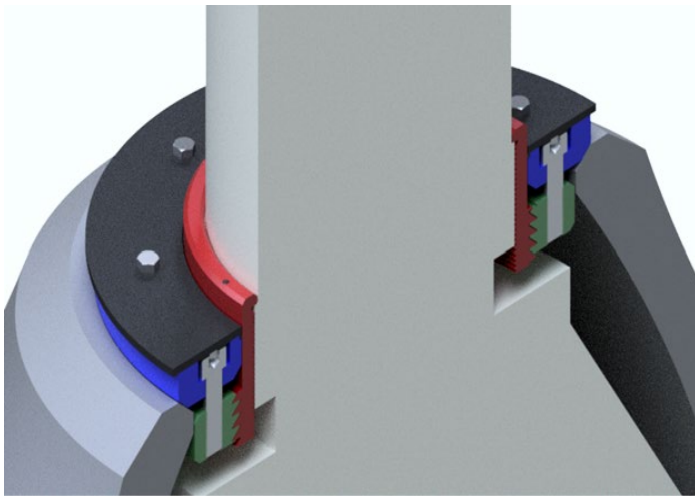
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MANTLE CLAMP – HYDROCONE

Eliminate installation and removal hazards with our mantle clamp designs. Mantle clamps are designed to be installed with torque wrenches, not hammers, for a perfect tight fit every time.

Easily remove the Mantle Clamp without cutting the burn ring or splitting the nut.


The safer, faster, and smarter way to replace the Mantle.



These Mantle Clamps are designed to work as a direct replacement for **Sandvik® cone crushers**.

Item	Product Lifespan
Mantle Clamp, Full Assembly	4 to 6 Mantles
Mantle Clamp, Cover Plate Assembly	4 to 6 Mantles
Mantle Clamp, Clamp Plate Assembly	2 to 4 Mantles
Mantle Clamp, Rebuild Kit	4 to 6 Mantles

MANTLE CLAMP

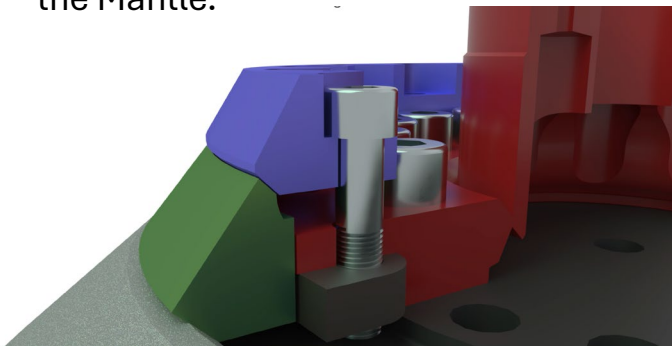
 Custom made for your crusher!

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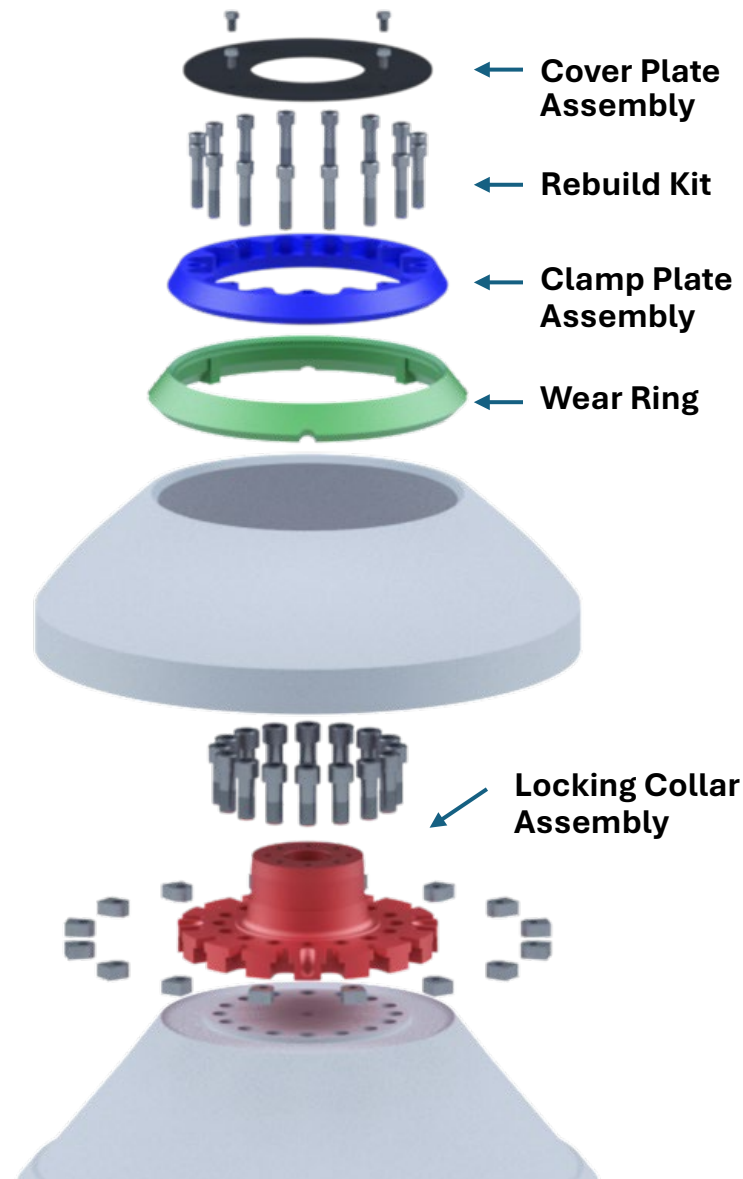
MANTLE CLAMP – SYMONS SHORthead

Eliminate installation and removal hazards with our mantle clamp designs. Mantle clamps are designed to be installed with torque wrenches, not hammers, for a perfect tight fit every time. Easily remove the Mantle Clamp without cutting the burn ring or splitting the nut.

The safer, faster, and smarter way to replace the Mantle.




These Mantle Clamps are designed to work as a direct replacement for 5 ½' and 7' Symons Shorthead cone crushers.



Item	Product Lifespan
Mantle Clamp, Full Assembly	4 to 6 Mantles
Mantle Clamp, Cover Plate Assembly	4 to 6 Mantles
Mantle Clamp, Clamp Plate Assembly	One Time Purchase
Mantle Clamp, Wear Ring	2 to 4 Mantles
Mantle Clamp, Rebuild Kit	4 to 6 Mantles

MANTLE CLAMP

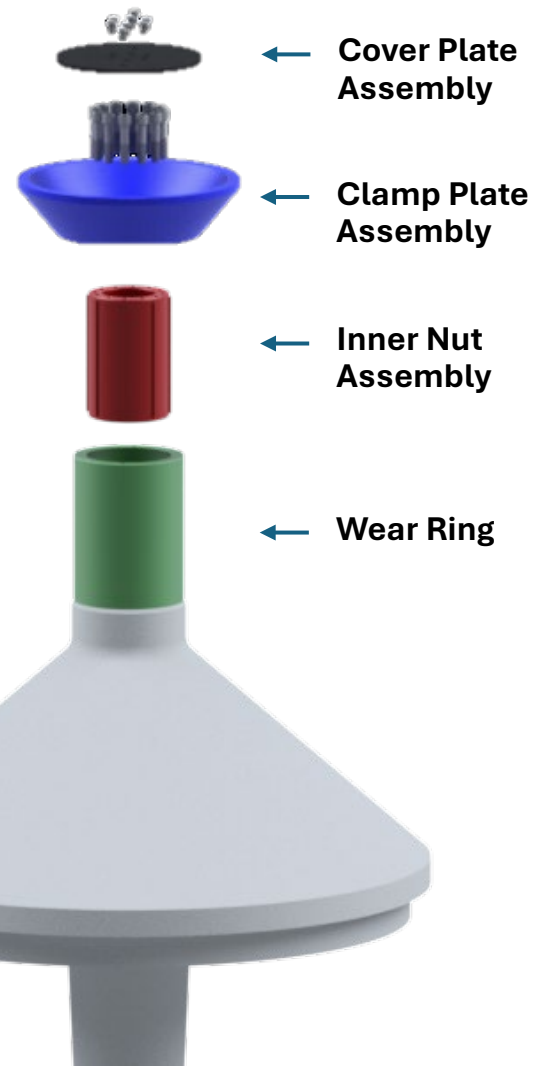
 Custom made for your crusher!

SAFER – FASTER - SMARTER

MANTLE CLAMP – SYMONS STANDARD

Eliminate installation and removal hazards with our mantle clamp designs. Mantle clamps are designed to be installed with torque wrenches, not hammers, for a perfect tight fit every time. Easily remove the Mantle Clamp without cutting the burn ring or splitting the nut.

The safer, faster, and smarter way to replace the Mantle.



Rebuild Kit

Includes: Cover Plate Bolts and Clamp Plate Bolts

These Mantle Clamps are designed to work as a direct replacement for 5 ½' and 7' **Symons Standard cone crushers.**

Item	Product Lifespan
Mantle Clamp, Full Assembly	4 to 6 Mantles
Mantle Clamp, Cover Plate Assembly	4 to 6 Mantles
Mantle Clamp, Clamp Plate Assembly	4 to 6 Mantles
Mantle Clamp, Wear Ring	2 to 4 Mantles
Mantle Clamp, Rebuild Kit	1 to 3 Mantles

CRUSHER MAINTENANCE

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DUMP PANS



Custom built for any crusher!

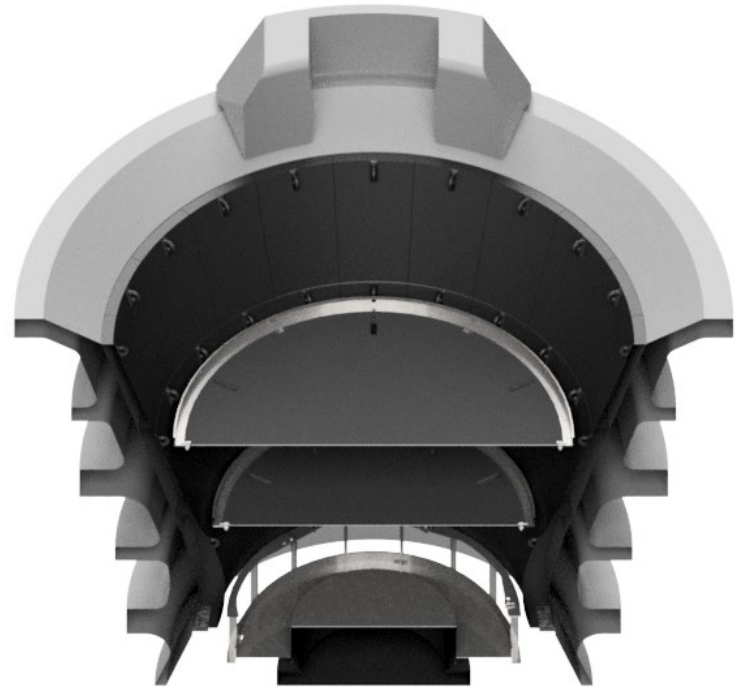
Our concave Dump Pans are specially designed to fit your requirements with many innovative features. The heavy-duty construction ensures many years of service. Each Dump Pan will usually hold the entire row of concaves.

Empty Dump Pans can double as a platform where workers can stand to help prepare the crusher shell before installing new concave liners. Protect your air tower from dirt and damage while working!



The Dump Pans will all be placed in the crusher before beginning liner removal.

Each Dump Pan will usually hold the entire row of used concave liner castings and is easily removed, exposing the next row Dump Pan. This next Dump Pan is empty and ready to go.



The Dump Pans are constructed of steel to withstand heavy loading and ensure many years of safe service.



Row 3

Row 2

Row 1



Easy to store. Save time by stacking the Dump Pans as you use the,. Next time you go to use them, they are ready for your team to install.

CRUSHER MAINTENANCE

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SETTING FIXTURES



Custom built for any crusher!

Our Setting Fixtures are uniquely designed for each customer and each concave row in the Crusher. Designed to hold and transport all the concaves for one Row of the Crusher in one trip.

Multi-sectioned assembly that can be selectively removed to leave working platforms at each concave level of the Crusher.

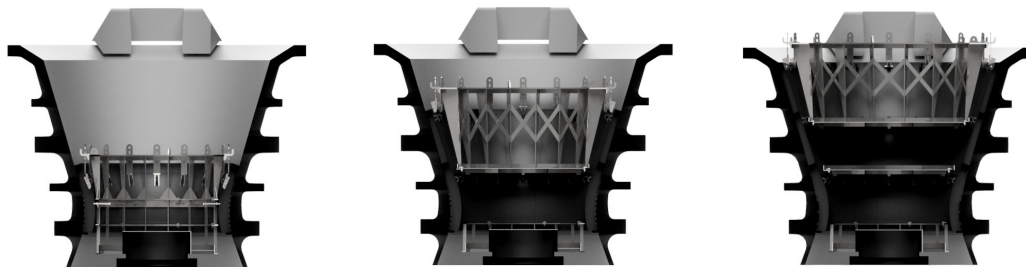
Available in 2, 3, or 4 Rows.

Save time and money by:

Setting a complete row of concave liners in one crane pick.

Loading the fixtures in off peak hours will minimize crusher down time.

Multi-sectioned assembly that can be selectively removed to leave working platforms at each concave level of the Crusher.

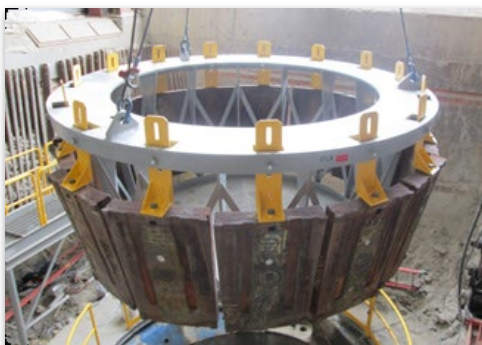


Row 1

Row 2

Row 3

Each row includes a platform that disconnects to provide a safe workspace.



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BURN PLATFORMS



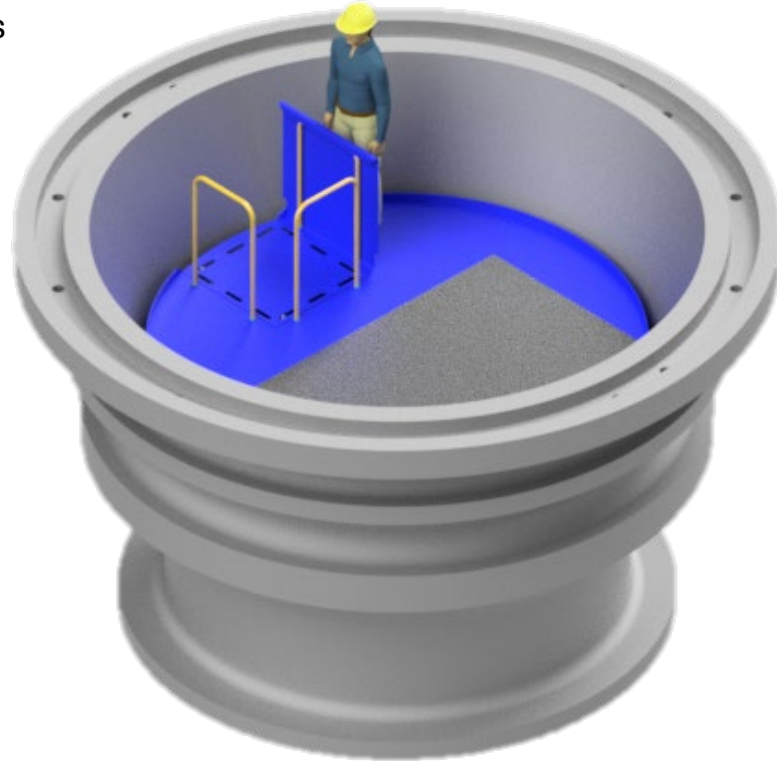
Custom built for any crusher!

Our Burn Platforms make it easy to access areas where burning is required and eliminates the need to tie off. The design increases efficiency and decreases risk of potential injury.

Mitigate the risks of removing concaves and provide a safer work environment with our portable Burn Platforms.

No more worrying about burning bars, sparks, potential for injury, or risk of falling.

A safer, faster, and smarter way to remove concaves!



The Burn Platforms are designed specifically for your site.



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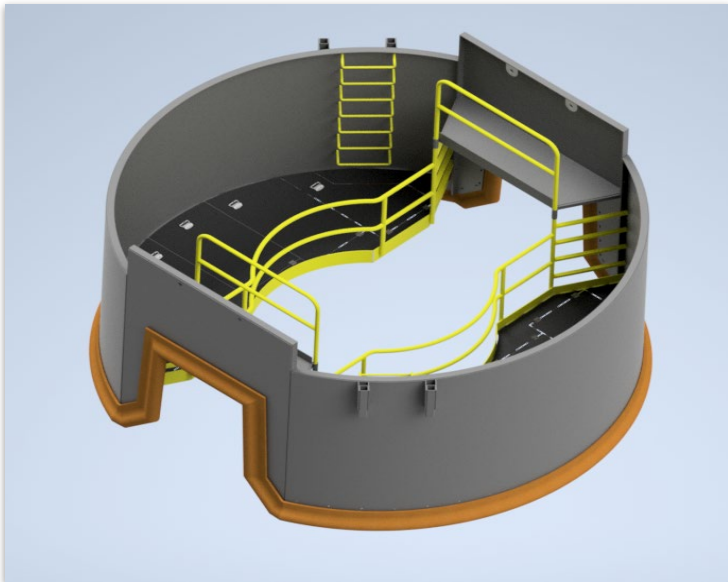
SAFETY CHAMBER



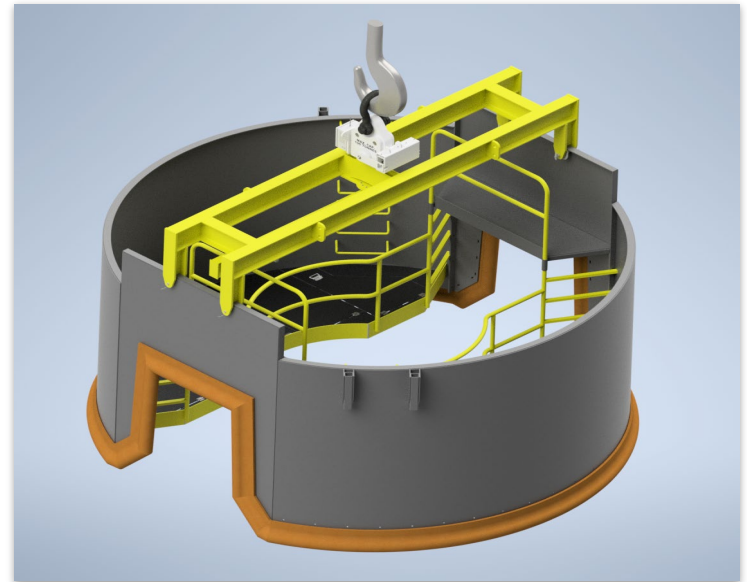
Custom built for any crusher!

Drop in 360-degree protection with removable access stair and rubber seal, polar hoist beam, and reinforced flooring for protection during tramp removal.

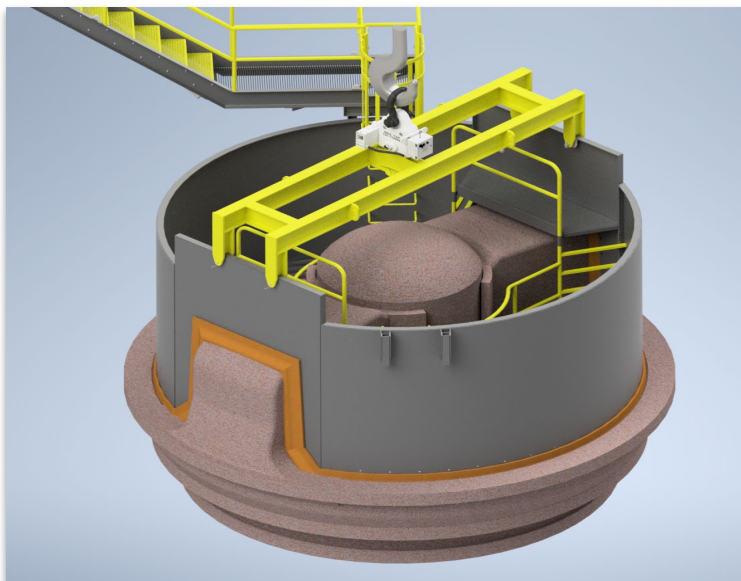
Our Safety Chamber can be set in place in minutes, without cleaning out the dump pocket. This tooling is typically used to cut out tramp metal, replace wear liners or weekly inspections.



Safety Chamber

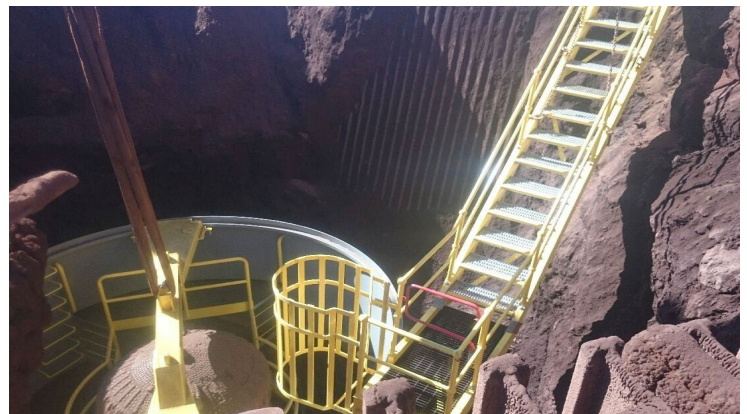


Safety Chamber with polar hoist.



Safety Chamber with polar hoist and access stairs.

The Safety Chambers are designed specifically for your site.



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PRIMARY CORRAL



Custom built for any crusher!

This drop-in platform provides handrails and decking around the top opening of the crusher.

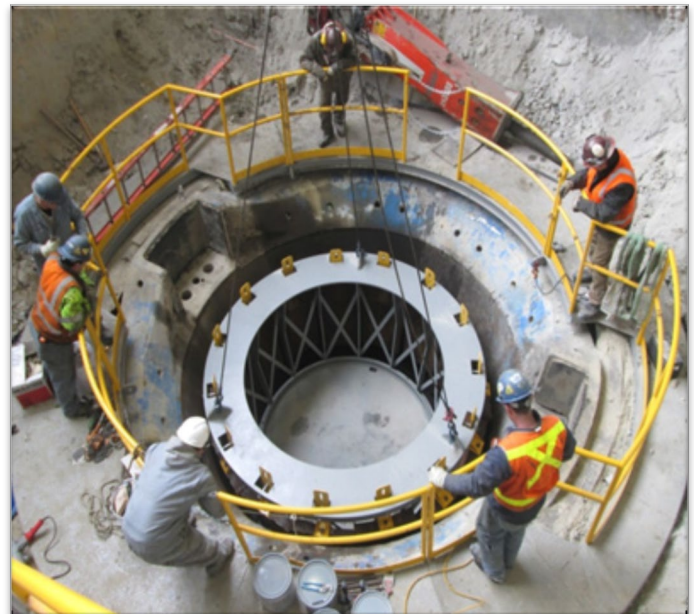
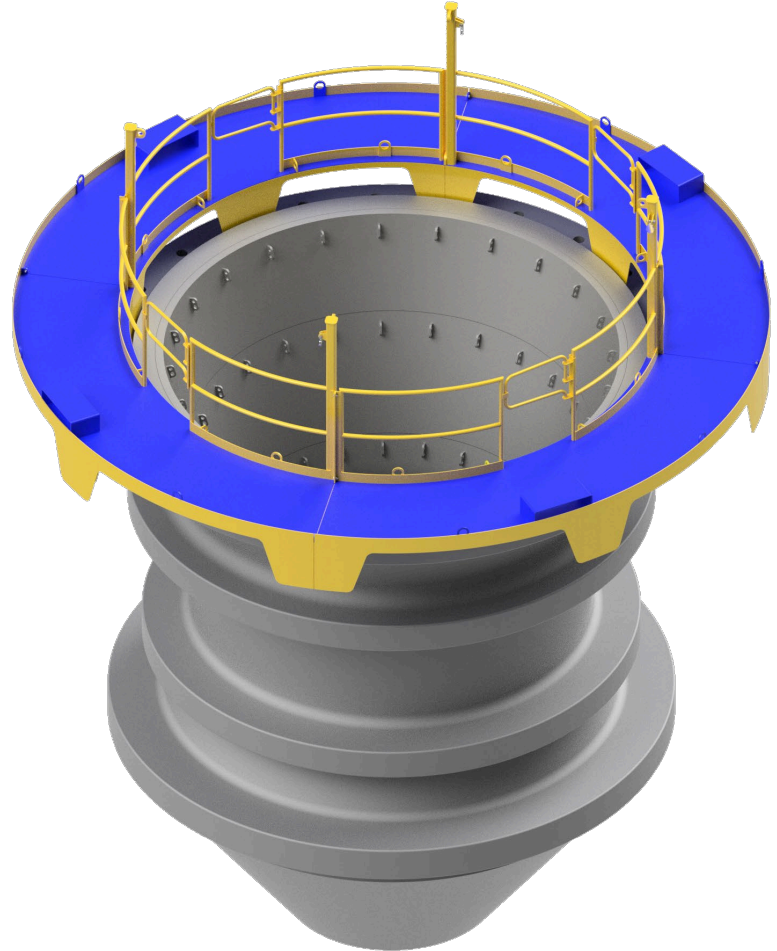
The Primary Corral is to be used during crusher maintenance when the pocket is clean and the spider has been removed.

With the Primary Corral in place, workers can be in the dump pocket without using any annoying lifelines.

All other Tri Star crusher rebuild tooling can be used while the Primary Corral is in place.

Features:

- Easily assembled inside or outside the dump pocket.
- MSHA approved handrails.
- Tie-off points can be used while working inside of the crusher.
- Four stackable sections for easy storage.



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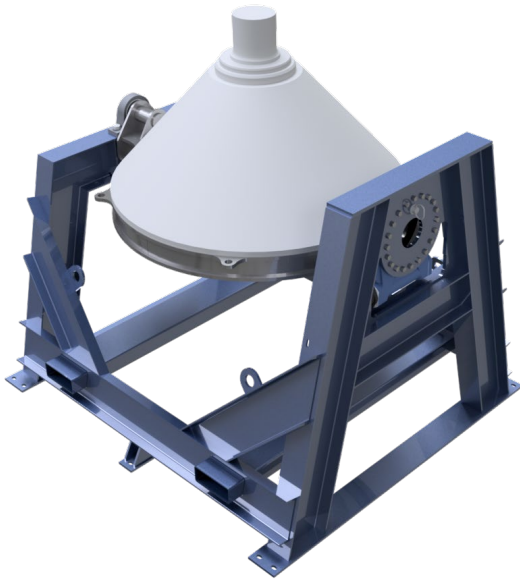
HEAD MAINTENANCE TOOLS



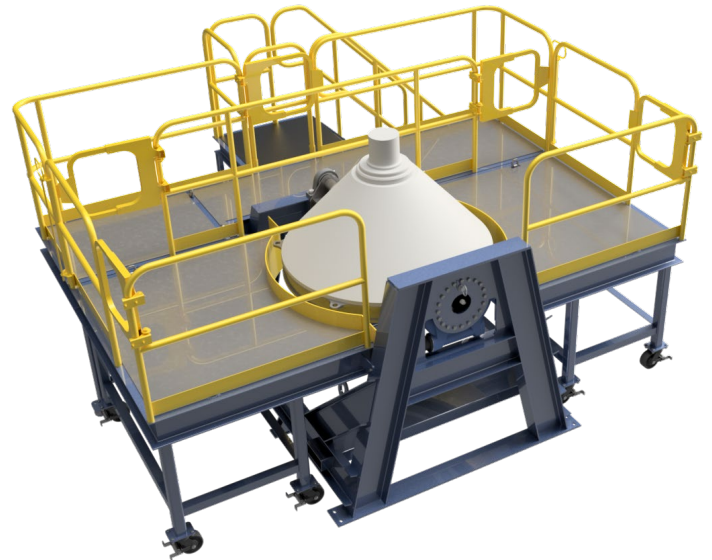
Custom built for any crusher!

Head rotators and maintenance platforms for your cone crusher make working on the heads safe.

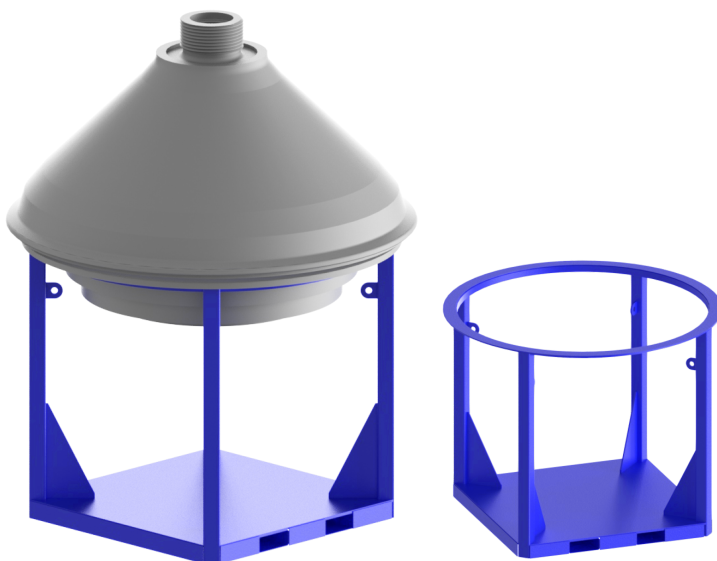
Our Head Rotator is a safety minded tool with heavy duty structural frame and platform with access stair mounts directly to a slab. With the handrails and spring gate, the need for lifelines is eliminated.



Head Rotator



Head Rotator with Platforms



Head Stand



CRUSHER MAINTENANCE

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ACCESS STAIRS



Custom built for any crusher!

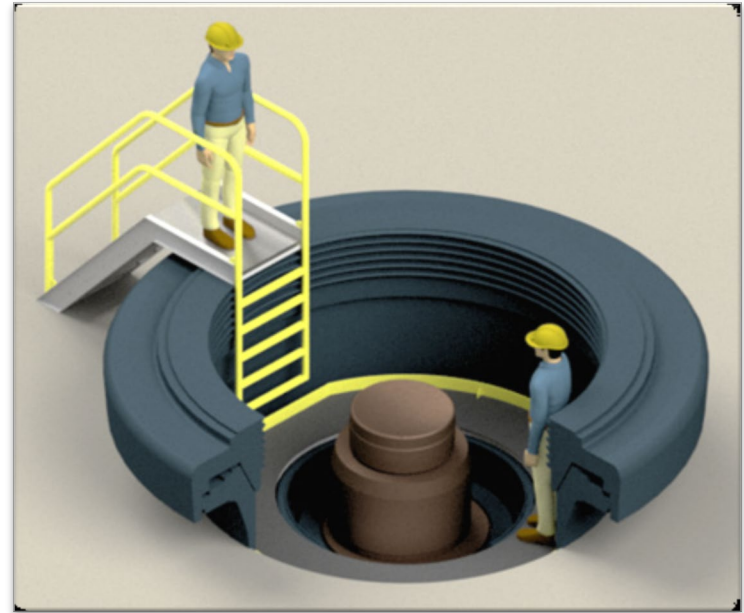
Access stairs are removable, built to safety standards, and provide safe access to crushers, dump pockets, or other frequently accessed areas.

All access stairs are designed with your specific equipment and site requirements. With many customizable configurations and mounting brackets, you can have a safe and effective solution.

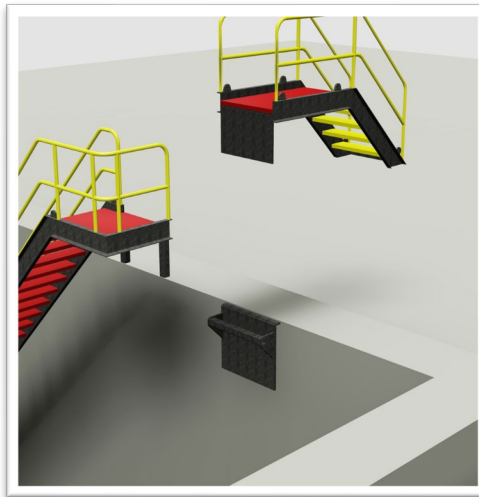
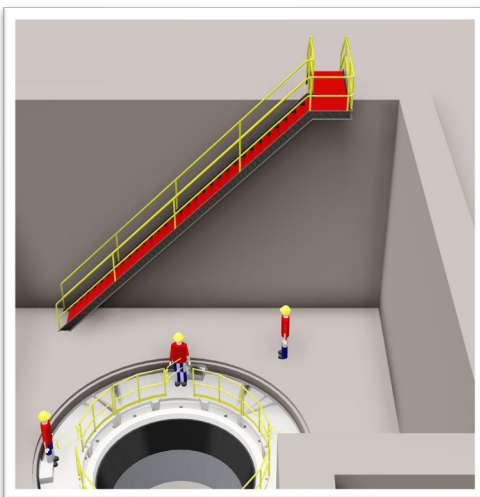
The safer, faster, and smarter way to access the dump pocket.

Access Stairs can be designed specifically for your site equipment in addition to other specifications.

Safe Access for Cone Crusher Dump Pocket Access:



Safe Access for Gyrotory Dump Pocket Access:



Item	Product Lifespan
Safety Chamber, Cone Crusher – Access Stair	Life
Safety Chamber - Assembly	Life

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SPIDER ACCESS DECK

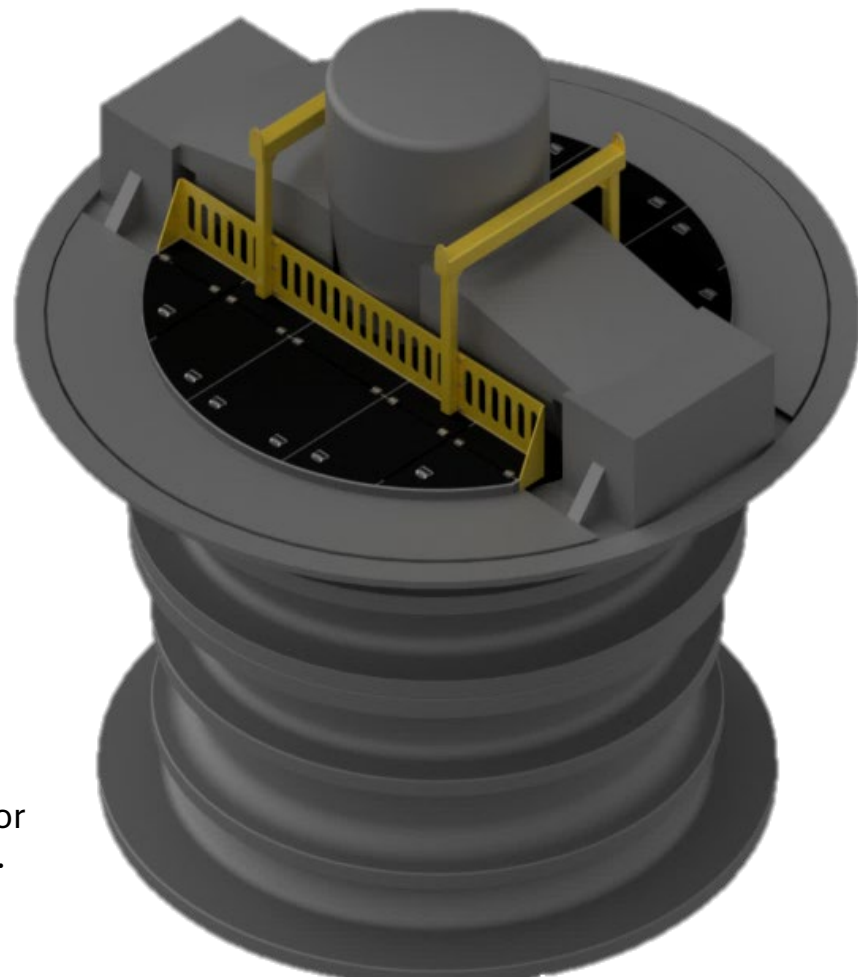
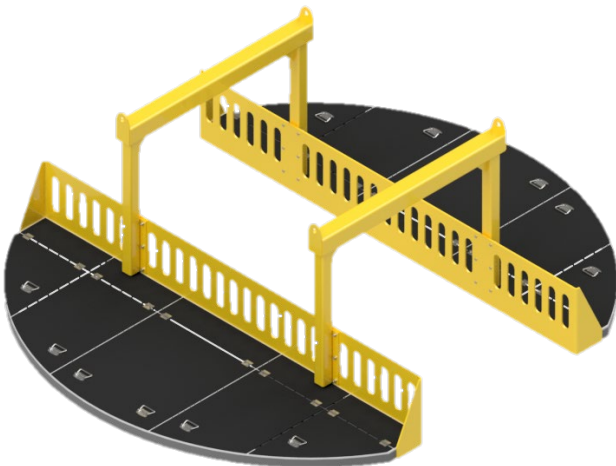


Custom built for any crusher!

Our Spider Access Deck eliminates many of the risks associated with burning tramp metal. It sits in your crusher to give access to the spider.

You can safely and easily perform maintenance without annoying lifelines.

We make this tool for all sizes and models of gyratory crushers. This works in conjunction with the Crusher Access Platform for a more complete maintenance solution.



Features:

- Provides safe access into the crusher.
- Complete fall protection in the dump pocket.
- Safely and easily place into the crusher.
- Rests on the rim of the crusher.
- Hinge up flooring and permanent grating for increased protection during tramp removal.

Uses:

- Weld wear blocks.
- Inspect Dump Pockets or Bushings.
- Rig the Spider Cap and Spider for removal.
- Heavy duty flooring provides protection while burning tramp.

Add-on Features:

- Handrail and Swing Gate.
- Lift Up Floor Panels.
- Access doors to view crusher.

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MAINSHAFT WORK PLATFORM

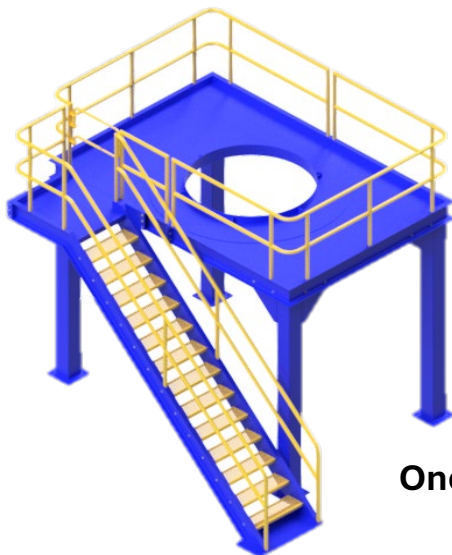
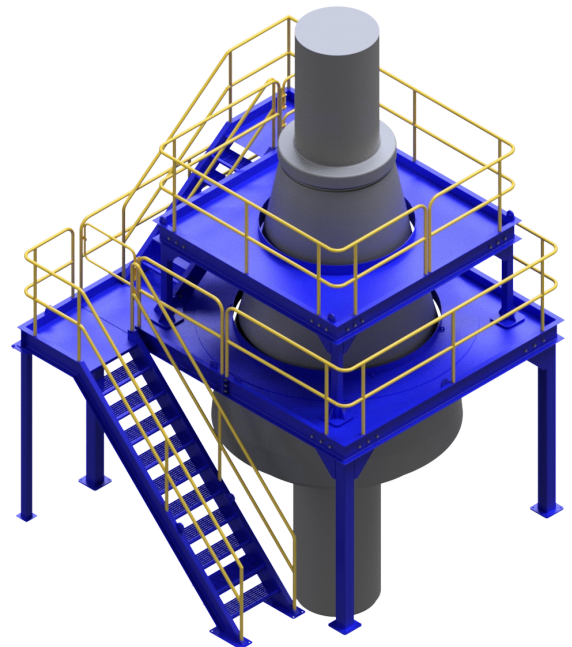


Custom built for any crusher!

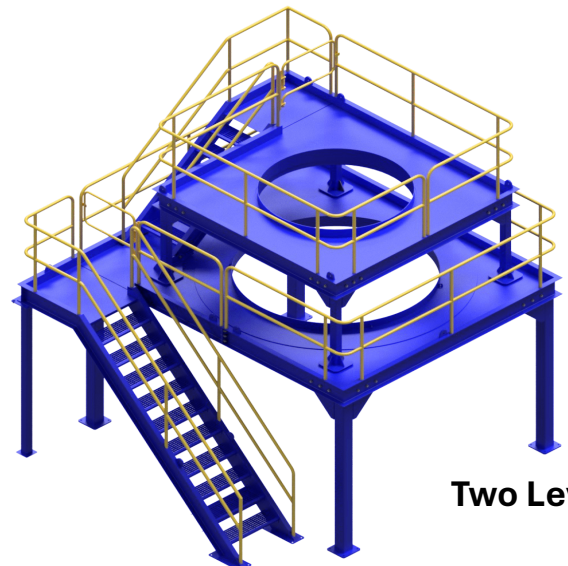
Our generous size work deck allows the entire crew to efficiently perform their work functions. The convenient height of the work deck and handrail system eliminate ladders and fall risks.

The rolling structure wraps around your Mainshaft when sitting in a staging pit.

The built-in staircase allows for safe and easy access to the upper work deck.



One Level



Two Levels

CRUSHER MAINTENANCE

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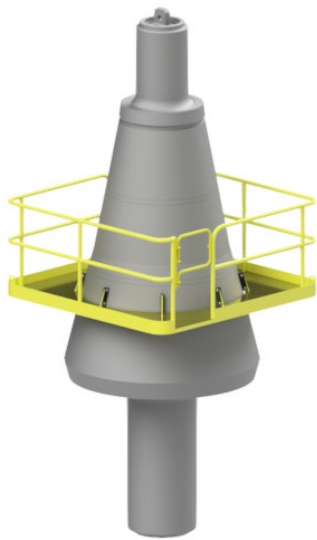
CROWS NEST



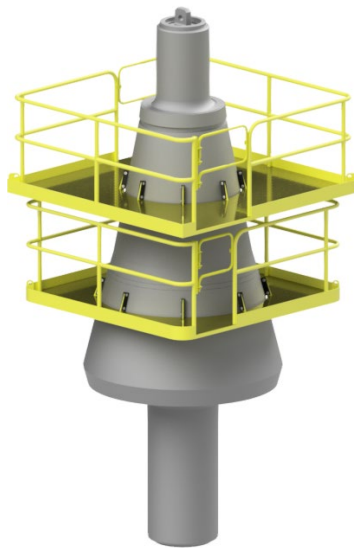
Custom built for any crusher!

Access the top portion of the Main Shaft to inspect or maintain without the need to tie-off. Our Main Shaft Crows Nest is complete with OSHA-compliant handrails and stairs.

The size of the platform allows multiple workers to perform their duties at once.



One Level



Two Levels



SHACKLES

SAFER – FASTER - SMARTER

POWER SHACKLE



Custom built for any crusher!

The Power Shackle™ eliminates many lifting hazards by replacing slings, shackles, and straps with an easy-to-use remote controlled lifting device. With capacities from under 20 tons to 240 tons, no piece of equipment is too difficult to lift.

Ultra Low-profile designs are no larger than a standard shackle strap system, but the remote operation will keep you out of harms way.

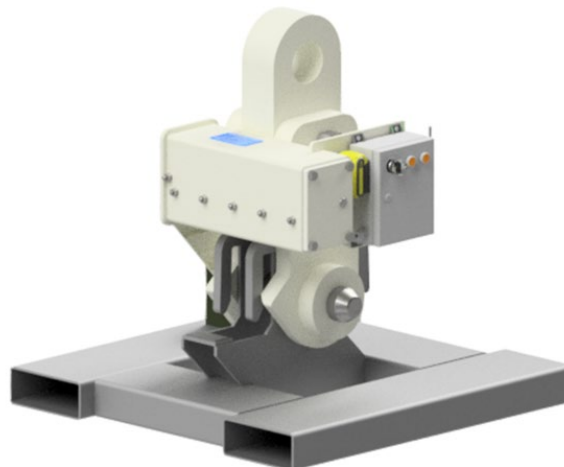
The Power Shackle™ can be designed specifically for your crusher and crane size in addition to other specifications.

The Power Shackle is designed with several certifications and verifications to ensure quality, reliability, and safety of the product. This includes the following:

- Professional Engineer Stamp
- Designed following ASME BTH-1 Design Criteria
- Fabrication following AWS D1.1 Weld Standards
- Nondestructive Testing of all Structural Welds
- Proof Load Testing to 125% of Rated Capacity
- Extensive Quality Control Inspections and Operational Testing



Up to 20 Ton Capacity



Up to 240 Ton Capacity

Included in a Power Shackle Purchase:

- Below the hook Power Shackle
- Transport and Storage Stand
- Battery and Battery Charger
- Remote

SHACKLES

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TURN SHACKLE



Custom built for any crusher!

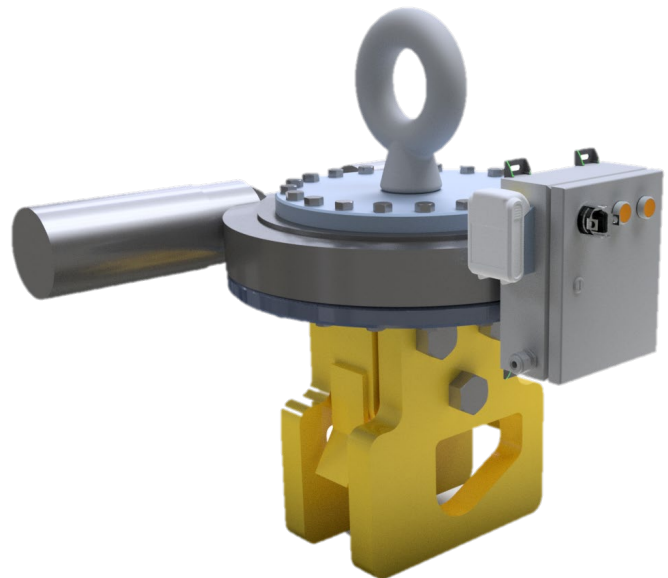
The Turn Shackle can attach to lifting lugs without the need for human assistance. Offered with an optional powered rotator, this Turn Shackle has a 150-ton capacity.

Our Turn Shackle with a Powered Rotator is remote controlled and powered with a rechargeable battery.

Our Turn Shackle can be used with all Tri Star Design crusher tools.



Turn Shackle



Turn Shackle with Powered Rotator

The Turn Shackle can be designed specifically for your crusher and crane size in addition to other specifications.

Our Turn Shackle is designed with several certifications and verifications to ensure quality, reliability, and safety of the product. This includes the following:

- Professional Engineer Stamp
- Designed following ASME BTH-1 Design Criteria
- Fabrication following AWS D1.1 Weld Standards
- Nondestructive Testing of all Structural Welds
- Proof Load Testing to 125% of Rated Capacity
- Extensive Quality Control Inspections and Operational Testing

SHACKLES

SAFER – FASTER - SMARTER

QUICK SHACKLE



Custom built for any crusher!

Using a counterweight system, our Quick Shackle can attach to lifting lugs without the need for human assistance. The counterweight holds the hook open until a load is applied. The load then closes the hook and lifting can begin.

Easy, safe, convenient, and efficient!



The Quick Shackle can be designed specifically for your crusher and crane size in addition to other specifications.

Our Quick Shackle is designed with several certifications and verifications to ensure quality, reliability, and safety of the product. This includes the following:

- Professional Engineer Stamp
- Designed following ASME BTH-1 Design Criteria
- Fabrication following AWS D1.1 Weld Standards
- Nondestructive Testing of all Structural Welds
- Proof Load Testing to 125% of Rated Capacity
- Extensive Quality Control Inspections and Operational Testing



SPIDER LIFTERS

SAFER – FASTER - SMARTER

SPIDER HOOK

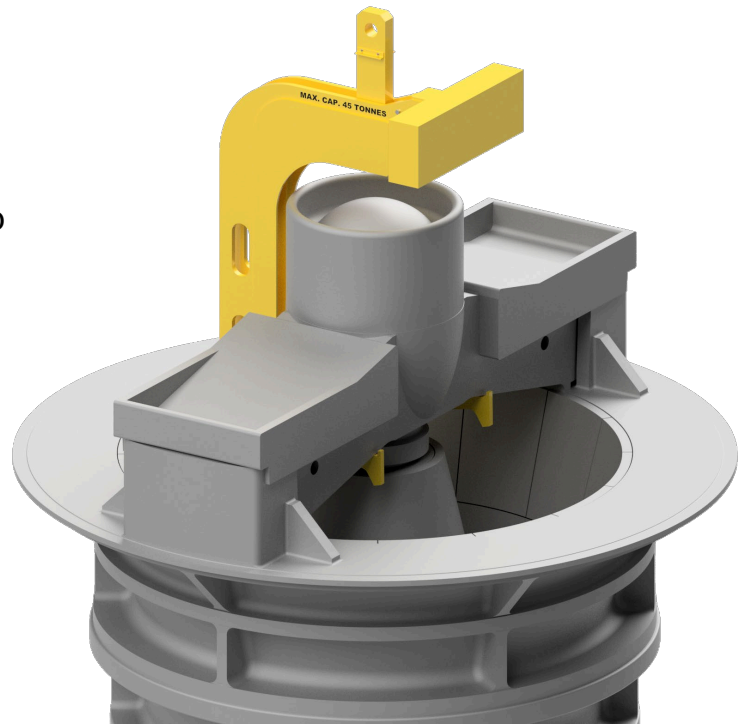


Custom built for any crusher!

Our Spider Hooks will lift out and replace the entire spider assembly without placing a person in the dump pocket.

With the integrated tilt-mechanism, the crane operator can easily position the Spider Hook to pick it up evenly and safely, from outside the dump pocket. Integrated tilt-mechanism angles hook for easy installation and removal.

The safer, faster, and smarter way to lift your spider.



The Spider Hook can be designed specifically for your crusher and crane size in addition to other specifications.



Item	Capacity
Spider Hook, Small	Under 70 Tons
Spider Hook, Medium	70-99 Tons
Spider Hook, Large	Over 100 Tons

SPIDER LIFTERS

SAFER – FASTER - SMARTER

Z HOOK



Custom built for any crusher!

You can remove and replace your spider assembly much safer, faster, and smarter with a Tri Star Design Z-Hook.

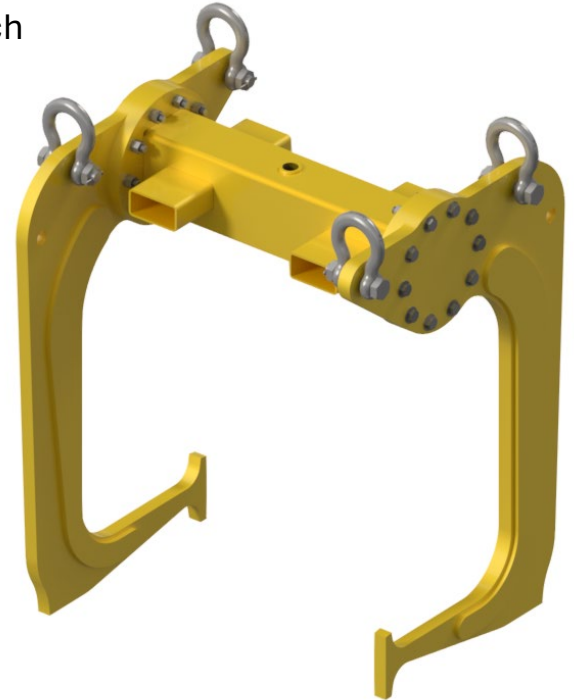
With a simple twist, the spider comes free!

The safer, faster, and smarter way to lift your spider.

Our Z Hook is designed with several certifications and verifications to ensure quality, reliability, and safety of the product. This includes the following:

- Professional Engineer Stamp
- Designed following ASME BTH-1 Design Criteria
- Fabrication following AWS D1.1 Weld Standards
- Nondestructive Testing of all Structural Welds
- Proof Load Testing to 125% of Rated Capacity
- Extensive Quality Control Inspections and Operational Testing

The Z Hook can be designed specifically for your crusher and crane size in addition to other specifications.



Item	Capacity
Z Hook, X-Small	Under 40 Tons
Z Hook, Small	40-69 Tons
Z Hook, Medium	70-99 Tons
Z Hook, Large	Over 100 Tons



SPIDER LIFTERS

SAFER – FASTER - SMARTER

WASP



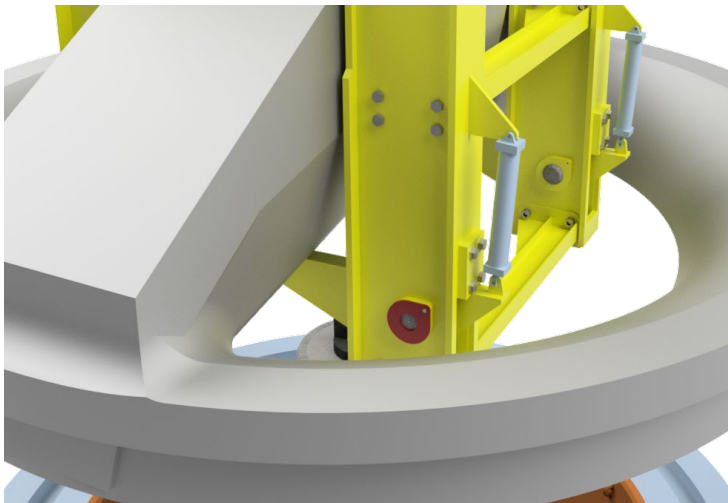
Custom built for any crusher!

The Tri Star WASP™ reduces many risks by eliminating hazards during the removal and installation of a spider.

Sizes and weights options available from smaller than 20 tons to over 150 tons and can work with both Primary and secondary/tertiary crushers.

The safer, faster, and smarter way to lift your spider.

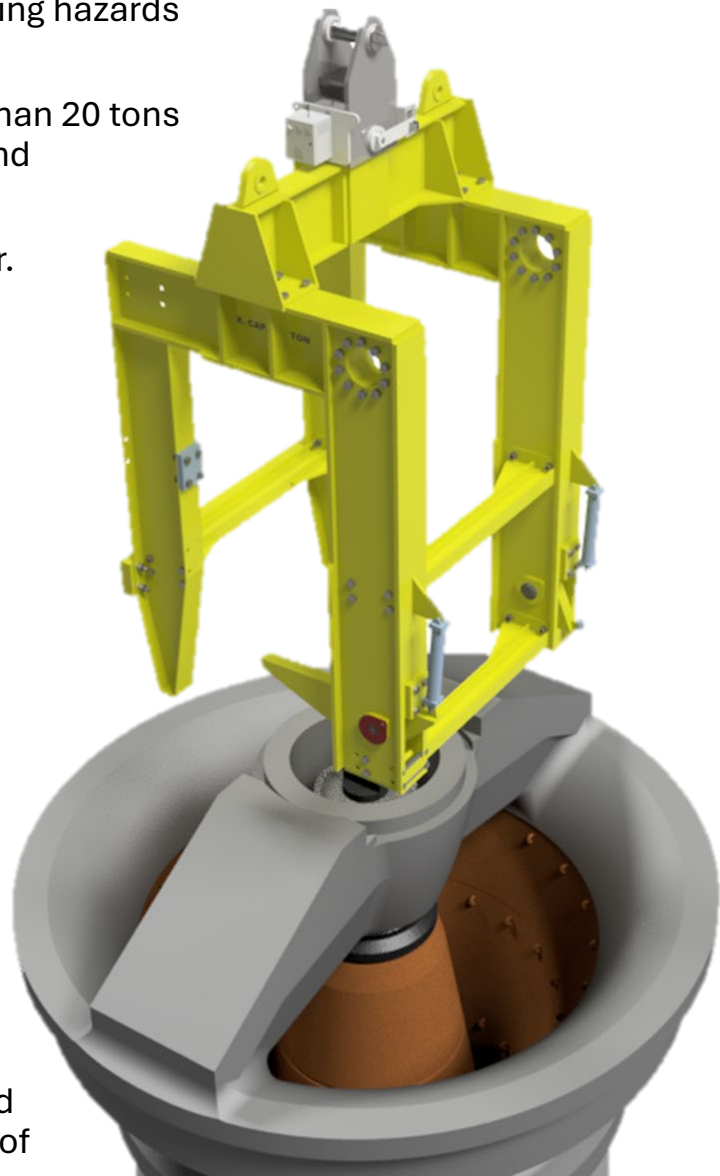
Your safety is our goal.



The WASP can be designed specifically for your crusher and crane size in addition to other specifications.

Our WASP is designed with several certifications and verifications to ensure quality, reliability, and safety of the product. This includes the following:

- Professional Engineer Stamp
- Designed following ASME BTH-1 Design Criteria
- Fabrication following AWS D1.1 Weld Standards
- Nondestructive Testing of all Structural Welds
- Proof Load Testing to 125% of Rated Capacity
- Extensive Quality Control Inspections and Operational Testing



Item	Capacity
WASP, Small	Under 70 Tons
WASP, Medium	70-99 Tons
WASP, Large	Over 100 Tons

SAFETY DEVICES

SAFER – FASTER - SMARTER

JAW CRUSHER SAFETY DEVICE

Our Jaw Crusher Safety Device is designed to raise and lock Jaws in place. This Device allows for safe and easy removal of the toggle plate and other various Jaw Crusher components. For removing toggle plate through the top or bottom of Jaw Crusher.

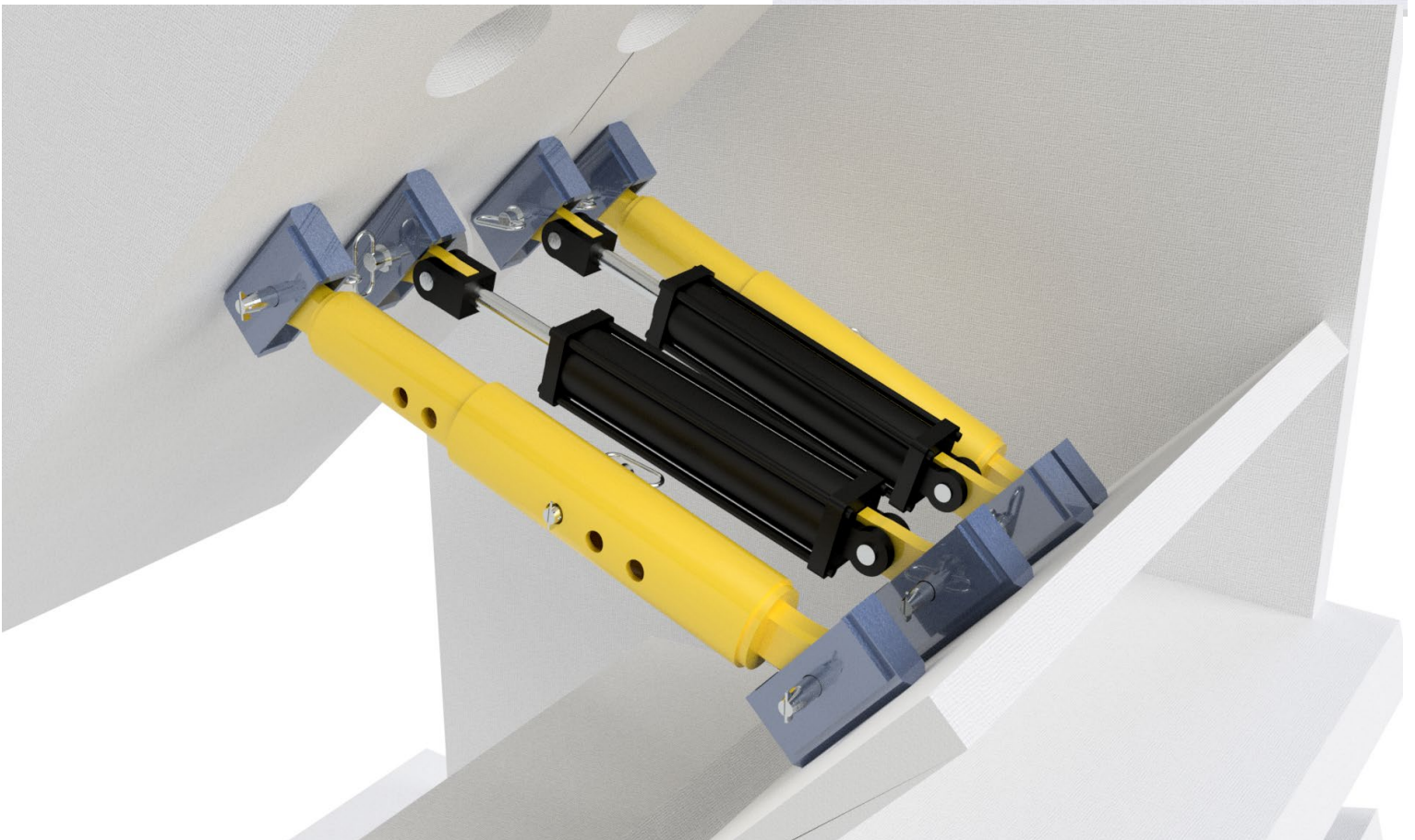
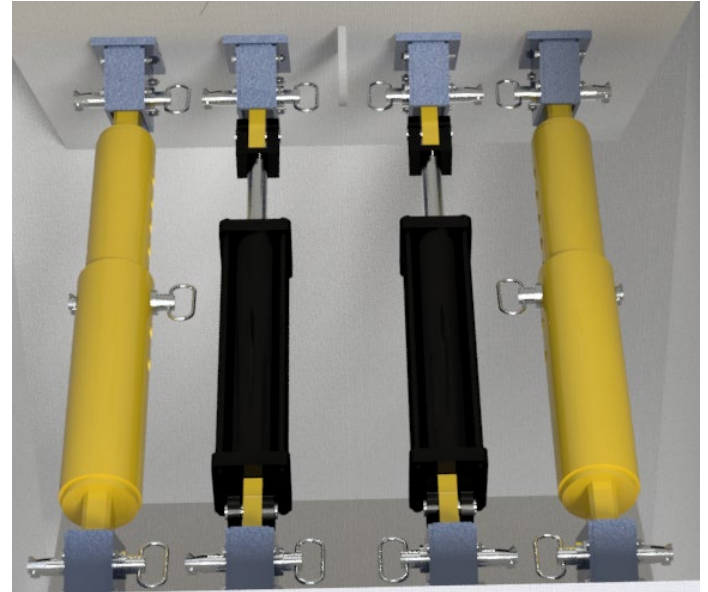
Required HPU Specifications: 2,500 psi and 3 gallon Reservoir Capacity.

Max Capacity of system: 30 tons.

The safer, faster, and smarter way to work on your Jaw Crusher!



Custom built for
any crusher!



Available for all styles and sizes of Jaw Crushers.

TRI STAR
DESIGN & MANUFACTURING, INC.

BELT TOOLING

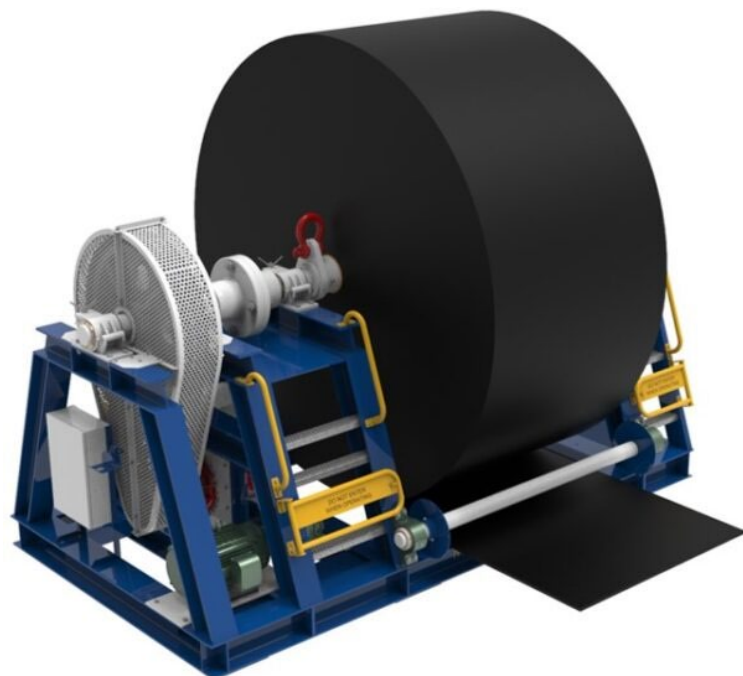
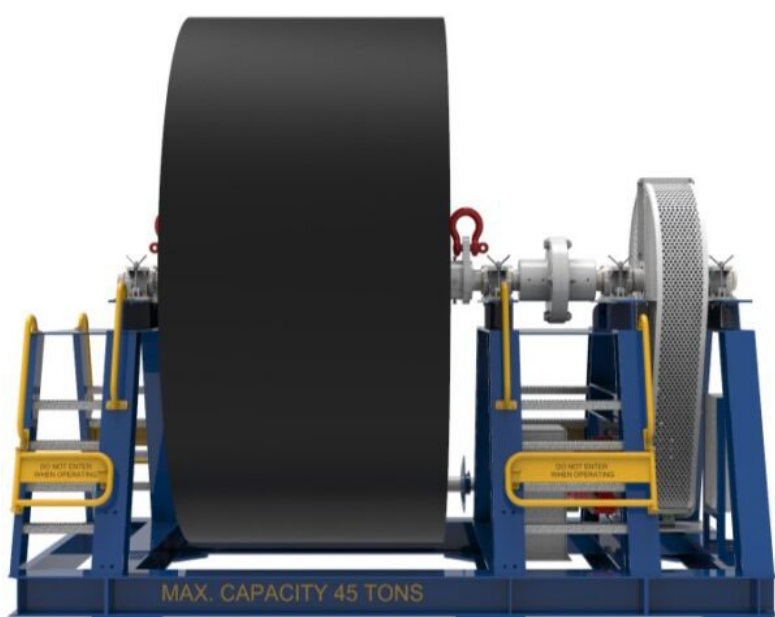
SAFER – FASTER - SMARTER

BELT WINDERS

Belt Winders provided by Tri Star Design are designed and engineered to meet your requirements.

With widths ranging from 48 inch to 72 inch, each belt winder is designed with proper access ladders, handrails, and guards to ensure safe working conditions.

Our belt winders are designed to get the job done safer, faster, and smarter.



SAFETY DEVICES

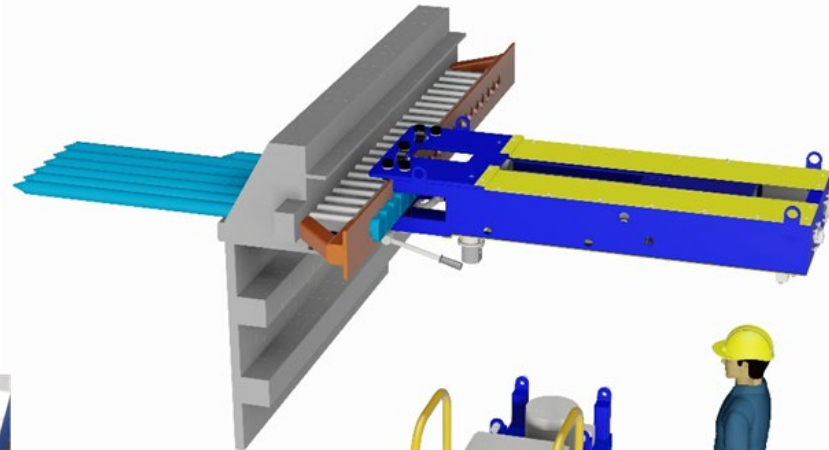
SAFER – FASTER - SMARTER

SPILE BAR SYSTEMS



Custom built for any site!

Our Spile Bar Systems are designed and manufactured for inserting and retracting Spile Bars. They are designed to work in correlation with chute and spile bar designs found at your site to ensure seamless operation. Chute design will include rails for hanging spile bar insertion system.



Hydraulic Power Unit

Lift Cart

Custom made to work with your site!

Features:

- Spile Bars are easily loaded by hand, moved into place by the machine.
- Hydraulic power unit for insertion/retraction and raising/lowering of spile bars.
- Mobile hydraulic power unit included.
- Controls conveniently located on the cart.
- Work Platform for accessibility.



**THE RIGHT TOOLS TO GET THE JOB DONE
SAFER, FASTER, SMARTER.**

CRUSHER TOOLING

EZ Nut
Mantle Clamp

SPIDER LIFTERS

Spider Hook
Z Hook
WASP

SHACKLES

Power Shackle
Turn Shackle
Quick Shackle

CRUSHER MAINTENANCE

Dump Pans
Setting Fixtures
Burn Platforms
Safety Chambers
Primary Corral
Head Rotators
Access Stairs
Head Access Platform
Mainframe Access Platform
Crows Nest

BELT TOOLING

CUSTOM DESIGN ENGINEERING

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