A breakthrough approach to superior dipper performance

The dipper is one of the hardest working pieces of equipment on your electric shovel, and the actual link between the earth and your payload. We understand the importance of this complex tool and the factors that will provide maximum performance for your operation.

Our P&H dippers utilize over 90 years of shovel dipper designs and technology along with insights provided by our customers. Productivity of our designs are monitored globally by our personnel and analyzed by our engineers so that we may remain the market leader – by every measure.

Before any changes are made, dipper designs are validated by third-party testing facilities that replicate mine pit conditions and materials through meticulous scale model calibration. We analyze various design adaptations, larger versus smaller corner radii, alternate lip configurations, and shaper lip profile systems to maximize performance. Strength-to-weight ratio is optimized through FEA (finite element analysis) along with other engineering tools and systems.

Mine-matched dippers

P&H Optima dippers, with nominal capacities of up to 120 tons, are tailored to your mine's conditions for optimum digging and loading performance in your particular application. Standard features include a high strength-to-weight ratio for greater efficiency and enhanced geometry for fast, easy filling, easy dumping and optimum loads.

With the latest Optima dippers, the corner radius of the lip is greatly increased to improve material flow into the dipper while at the same time working to eliminate material carry-back. The modified spade lip improves digging force at the center of the lip, and a low-profile bail design, or a bail-less design, optimizes dump height for even the largest haul trucks. With special attention to minimizing maintenance, Optima designs reduce corner loading and wear on the tooth adapters and heel band, thus providing extended pin and bushing life—a great example of the rugged durability of all P&H equipment.

Sharing our dipper knowledge

Peak performance guide

To better understand the keys to improving dipper performance, Joy Global Services offers the publications, “Peak Performance Practices for Dippers” and “Peak Performance Practices for Wire Rope.” Written for a broad audience, including mine managers, mechanics, operators, trainers and others, it discusses such topics as: Setting Up for Productive Digging; Operating Techniques; Ground Engaging Equipment; Maintenance; and more.

DSST (Dipper Size Selection Tool)

This application tool is used to accurately size a dipper according to the selected mine site’s specific application, and clearly understand the mine’s production goals. Matching the dipper for even-pass loading is essential for peak performance. Our evaluation is complete and factors in actual operating conditions to deliver the optimal performance for your operation.

Delivering world-class mine performance

At the core of our commitment to customers is providing world-class solutions through our unique direct service network. This allows us to collaborate with customers, developing innovative parts, products, consumables and systems that lower their total cost of ownership while safely maximizing production.

Our commitment to quality and reliability is supported by our focus on Operational Excellence. We use Joy OpEx principles to eliminate waste, simplify the process, automate and remove people from harm’s way.

Every customer is a reference

World-Class Mine Performance

Highest Production

Lowest Cost Per Ton

Delivering world-class
mine performance

Peak performance guide

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Coal loading
Specifically designed for coal to provide optimum payload performance versus dipper weight, this design is used for easy digging and low material density such as coal that has been blasted. Generally much larger in size than a hard rock style dipper, internal stiffeners are used to provide added structural support.

Hard rock
Wide radius lips are typically selected over square corner design to improve fill factor and dig cycle and minimize carry-back of material. This design is used in copper, gold, hard rock and coal overburden.

Oil sands
Our optimizer design provides superior performance and reduced maintenance. Its unique design improves fill time and payload. The body utilizes a reverse taper design to reduce drag, while the heel is raised to improve efficiency and reduce risk of striking track shoes when the dipper is in the tuck position.

Roller latch door
Sliding interfaces between the latchkeeper, latch bar, latch lever and shimbbox have been replaced with a deeper engagement rolling pin assembly for increased reliability—typically does not require adjustments for multiple PM intervals.

GET (Ground Engaging Tools)
Joy Global provides a full range of GET systems (teeth, adapters, shrouds, wing shrouds, locking mechanisms and cast lipia) to meet the performance and operation requirements of each customer’s mine site.

Welding expertise
Joy Global is world renowned for its welding proficiency and strong welding training program. For field repair work such as dipper door rebuilds, wear liner installations and more, you can be confident with Joy Global welding services—just one of the reasons we say we’re your partners for life.

SnubRite™
hydraulic snubber
Eliminate door swinging and the associated damage, downtime, and repair costs. Heavy duty version available with twice the snubbing power for larger dippers.

TripRite™
electronic door trip system
Reduce your cycle times and lower your cost per ton with more reliable door trips, while reducing trip maintenance and adjustment time. TripRite delivers the most robust enough for the largest payloads and digital control for smooth rope control and easy operator adjustment.

Traditional latch bar system
Increase component life and reduce maintenance time and costs with a completely upgraded latch system. The latch lever and bracket, lever arm slot and lower latch bar wear plates, deflector sheave bracket assembly, and latch bar guide insert have all been reengineered to deliver greater structural integrity, improved adjustability, and extended wear and reliability.

Lifting legs
Eliminate the potential of damage to machine frames by hooking legs. This cost effective upgrade utilizes shackles which are added to the lifting legs and placed at optimum balance points for lifting the dipper safely.

Adjustable pitch braces
Improve your digging performance and reduce power consumed in the digging cycle— one inch at a time. Our patented pitch braces optimize your rake angle without cutting or welding. Fine tune to ±3 inches (7.62 cm) in either direction, then replicate on other shovels.

Hoist rope retention upgrade
Extend hoist rope life with enhanced positioning and protection. Additional rollers help retain the ropes within the D-Ring, reducing bending stresses and the risk of ropes being cut. Rock guards at the top of the bail also help align ropes, while providing protection from potential rock damage.

Pins and bushings
Virtually eliminate premature failure with superior wear material options at every joint. Manganese steel or through-hardened steel alloy bushings may be paired with either tool steel weld overlay or induction hardened pins. Our professional technicians will help you spec for your application.

JOY wire rope
Optimizes shovel hoist function performance. Free inspection service helps you better schedule maintenance to reduce or eliminate unplanned downtimes.
Joy Global engineers, working with our customers and scientists from third-party testing facilities, duplicate mine pit conditions in miniature, with a sophisticated device that is calibrated to measure payload forces as new dipper design models are put through vigorous exercises; all without downtime effecting personnel or actual machine.

With scale modeling and meticulous calibration of specific individual mine site digging characteristics, Joy Global engineering teams explore a variety of design adaptations of selected dipper features—such as larger corner radii, alternative lip configurations, and sharper profile lip systems—as they develop the ideal configurations for real-life applications.

Close monitoring and measuring over hundreds of cycles assist researchers and designers in determining precisely if expectations had indeed been proven in the miniaturized but identical mining conditions. From such results, further refinements are applied to the scale model dipper until the desired results are achieved, all without the significant cost of the typical trial and error approach of building a dipper and then seeing how well it performs.

In scale model testing, the effectiveness of refined dipper designs versus standard dippers is consistently demonstrated by overall efficiency gains achieved through a combination of increased payloads, reduced dig time and less dig energy required to move the dipper through the material.

Before, during and long after your dipper purchase, Joy Global Services partners with you to help your mine operate more efficiently and achieve the lowest cost per ton.

As one of the hardest working pieces of equipment on an electric shovel, the proper selection, specification, operation and maintenance of the dipper can help you improve your overall shovel operating costs. Joy Global is ready to help you get the most from your dipper investment throughout its service life.

For expert attention and superior parts, trust your business to Joy Global Services:
- New and used equipment
- Genuine OEM parts
- Equipment inspections
- Lubrication management
- Maintenance, repair and rebuild services
- Wire rope and wire rope services
- P&H Snubrite dual series system
- Dipper door, replacements and enhancements
- Operator and maintenance training

No dip in performance, ever

In fact, the only thing that outlasts a P&H dipper is Joy Global’s service. So get used to the unmatched productivity you achieved on day one. We’re here to ensure you never get less. Joy Global’s service offers the expertise, parts, service and support you need - where and when you need them. As your partner, we’ll provide complete life cycle management of your dipper, maximizing your investment every step of the way. We’ll perform value analysis to determine the cost savings your mine would achieve with the Dipper Advantage Upgrade. We’ll custom design your maintenance and parts replacement program to deliver the lowest cost per ton. And we’ll do it all with the responsiveness and reliability the mining industry demands.

Contact your local Joy Global service representative today for more information about the P&H Dipper Advantage System.