



EXCEL™ Wide Path™ Undercarriage surpasses 31,000 hours

Since the first EXCEL™ Wide Path™ Undercarriage was installed in late 2013, this engineering innovation has proven to be a huge success—both for our customers and our business. The first ever P&H 4100 XPC Electric Rope Shovel Wide Path Undercarriage gave an excellent performance by propelling the shovel 4 years and 3 months (31,121 machine hours).

With these results, it's easy to see why our EXCEL™ Wide Path™ was the obvious choice.

Background and objective

A copper mine in the southwestern United States was getting 15,000–18,000 hours of operation out of the OEM undercarriage for their P&H® 4100™ Electric Rope Shovel. The short life of the undercarriage was complicated by the failure of costly components, requiring frequent and expensive maintenance to get through the normal lifecycle. They found that unplanned maintenance was regularly required to trim the toenails between the track pads. At a lost production cost of \$55,000 per hour of downtime, the 20 hours they spent cutting toenails over the short life of the undercarriage equates to a loss of over \$1,000,000.

In the late fall of 2011, our customer contacted FLS experts to talk about the problems they were experiencing. FLS proposed creating a new undercarriage design for the customer to better handle the tremendous weight exerted by the 3,800,000 lb. machine on the roll path during operation..

The benefits of the Wide Path™ over OEM undercarriages

- Eliminates toenailing
- Decrease maintenance and downtime
- Allows for easy installation without frame modifications
- Lowers equipment operating costs by up to 50%

A winning design using innovation, optimisation and service

Defining the project

The mine owner wanted an undercarriage system that would last longer and require less maintenance. At the time, there was not a better design on the market, but FLS committed to re-engineer the system if possible. A trial of the new design would be done on one of the mine's 12 electric rope shovels.

FLS worked with the customer to learn the common reasons for maintenance and undercarriage failure to find ways to overcome the problems with the conventional design. The extreme weight of the electric rope shovel causes stress on the track pads, early wear on the system components, bending and toenailing. The challenge was to create a design that reduced these problems.



Toenailing on OEM undercarriage.

The solution

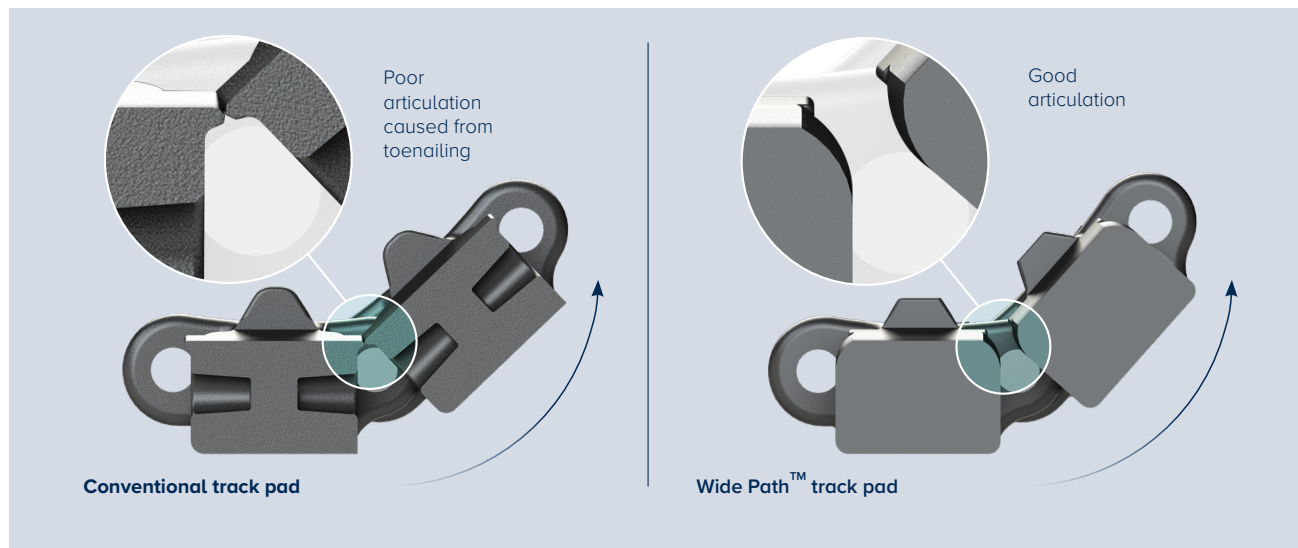
The final Wide Path™ design is wider and has a thicker internal structure. A wider track pad transfers the pressure of the shovel to the roll path more evenly and over a larger surface area. At the same time, the robust internal structure better supports the track pad so it does not contact the frame, bend or toenail. These design improvements work together to increase the life of the undercarriage components because they do not wear as quickly.

With the attention spent on preventing toenails, the design has the added benefit of increased safety because it eliminates the possibility of pieces of metal forcefully breaking off the track. With the new design, articulation remains uninterrupted throughout the life of the undercarriage.

In late 2013, FLS installed their first Wide Path™ undercarriage system on one of the mine's P&H® 4100™ Electric Rope Shovels to test the new design compared to the original equipment manufacturer (OEM) system.

Optimized geometry of track pads

Our wider, better supported track pads will last longer than conventional designs. When material flow does occur as they wear, the optimised geometry of the track pads prevents the metal between track pads from touching, toenailing or interfering with articulation.





The results

The initial installation cost of the Wide Path™ was approximately equal to the OEM system in component cost and downtime. However, Wide Path™ achieved 31,121 shovel hours compared to less than 18,000 shovel hours for the OEM system.

The Wide Path™ undercarriage had one maintenance event that took 24 hours to replace normal wear components. Over the same 31,000 hours, the OEM system had to be replaced once and had three additional maintenance events. The four shutdowns combined took 384 hours and cost \$2.3 million in new components.

The mine owner estimates downtime to cost \$55,000 per hour. Including the initial installation hours, the Wide Path™ system required 264 downtime hours for a total downtime cost of \$14,520,000. The OEM undercarriage required 624 downtime hours for a total downtime cost of \$34,320,000.

Considering the cost of components and the cost of downtime, the Wide Path™ cost \$523 per hour of operation compared with \$1,237 per hour of operation for the conventional undercarriage.

Customers are impressed with low maintenance and minimal reactive downtime as a result of our unique design and use of superior materials. The cost per hour of operation is half or less than the competition.

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