Job Report Mining Dozer

PR 776

Litronic®

The Liebherr PR 776 Mining Dozer
in operation at Wilpinjong Mine, Australia.

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Situation

Wilpinjong coal mine is an open cut coal mine located 40 kilometres north-east of Mudgee, NSW. Wilpinjong mine is owned and operated by Peabody Australia and is one of the lowest-cost thermal coal mining operations in Australia. The mine provides coal for domestic generators and exports to customers in the Asia-Pacific region. Currently the mine produces 13 million tons of coal per annum and employs more than 400 workers. It has contributed 35% toward Peabody's improvement in global safety rate since 2012, and $610 million of direct and indirect economic benefits from the mine in 2016. Peabody has restored / rehabilitated 6,450 acres of coal-mined land. Being an open cut mine, Wilpinjong uses trucks, shovels, castings and dozers in its mining operations.

Task

The Liebherr PR 776 hydrostatic bulldozer arrived at Wilpinjong with 3,500 hours in March 2017, completing an additional 2,500 operating hours to August 2017, with machine availability averaging 94%. Equipped with a 22m^3 U-blade and single shank ripper, the PR 776 conducted general applications ranging from dump push, to cleaning excavator floors, and bulk push. The machine generated a keen interest for a comparative test trial against a 70t class dozer in the Wilpinjong fleet.

Overall, feedback from operators was positive and the ability of the dozer to push heavy loads without issues was a common theme. Test parameters were agreed, with the objective to compare the hydrostatic PR 776 performance against a class competitor from the mine site's established mechanical drive fleet. Test parameters included:

- **Time taken to push off bulk quantity of material:** the mine plan was set up for a dumpsite where tight dump of bulk load of material was pushed, and a drone flying overhead measured bank cubic metres (BCMs) moved by each machine.
- **Comparison of manoeuvrability:** by dumping series of loads across the tip head at a set distance from the edge, parameters tested time taken to move the series load by each machine and how the ground base was disturbed and traction achieved.

Solution

Test 1

In order to commence trials, a mine plan was prepared to have a test area with flat ground. The requirements of testing were to use one machine after the other using the same operator: providing a real-world scenario of dozer operations in a mine site.

Peabody's Liebherr R 9400 excavators loading 180t class trucks dumped two sets of loads. Each set was placed 15m from the dump edge, with five loads in series, followed by a further two sets of six loads, and a survey drone measured the amount of material in both sets of loads before and after. One service truck was used for both machines before and after the test, with fuel consumption measured at the service truck meter reading and from the operator cab.

The survey drone measured:

- **PR 776:** 1,821 BCM at 1.8 t/m^3 (3,277.8 tonnes) in the first heap pushed in 2 hours 44 minutes.
- **Competitor:** 1,791 BCM at 1.8 t/m^3 (3,223.8 tonnes) in the second heap pushed in 2 hours 43 minutes.

The PR 776 completed the task a minute slower than the competitor machine; however, this time was attributed to the extra 54 tonnes pushed by the PR 776.

Fuel consumption readings from on-board computers showed:

- **PR 776:** 2 hours 44 minutes operating hours at 92.6 litres/hour and fuel consumption of 253 litres.
- **Competitor:** 2 hours 43 minutes operating hours at 114.7 litres/hour and fuel consumption of 311 litres.

Test 2

The second test comprised two parts.

Part A: cleaning the dump site where the haul truck dropped six loads in series, 5 metres from the dump edge for each machine, and time taken for each machine to clear the load. The PR 776 finished the task 1.5 minutes slower than the competitor machine; however, the PR 776 completed the task in 36 passes, three less than the competitor. This test showed the PR 776 could move more tonnes per pass.

Part B: testing the agility of the machine and its ability to turn/steer (instead of move) with full load. During this test, the advantages of a hydrostatic machine over mechanical drive were clearly visible. The PR 776 moved easily with a full blade and could carry material, whereas the mechanically driven machine struggled to manoeuvre under full load, and spilled a considerable amount while trying to both manoeuvre and move forward.

At the completion of Part A and B tests, a service truck filled the two machines. The truck meter reading showed PR 776 fuel consumption for the test to push 36 full blades of pass over the dump edge and to carry out the agility test, consumed 17 litres less than the competitor's machine.

Summary

Operator feedback on key performance indicators and capabilities were noted over the test period. The PR 776 has a superior ability to push load and manoeuvre under a fully loaded blade, and completed the manoeuvrability test quicker than the competition. The Liebherr on-board computer readings were closer to the service truck readings. A further advantage of Liebherr system shows live data on the operator's screen, whereas the data on competitor's machine needed to be downloaded to a computer first.

All tests showed comparable performance; however, the Liebherr PR 776 exceeded expectations, with 19% less fuel consumption.

Results showed that the PR 776 is a strong contender with superior operator visibility, excellent manoeuvrability, and better fuel consumption rate, providing the user with a comprehensive product to meet production targets efficiently.

Technical Data

Engine	Liebherr D 9512 A7
Engine output according to ISO 9249 (FWD/REV)	440 kW / 565 kW / 598 / 768 HP
Operating weight	73 tonnes / 80 tons
Blade capacity	22 m^3 / 28.8 yd^3

Equipment

U Blade with dual tilt
Single shank ripper
LED headlights
Work platform
Fire supression system
Touchscreen display with integrated rear view camera
Eco mode
Automatic engine speed reduction

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