

Job Report Mining Dozer

PR 776

Litronic®

**The Liebherr PR 776
Mining Dozer**
in operation at Ewington Coal
Mine, Australia.



LIEBHERR

Situation

Ewington Coal Mine, run by the Griffin Coal Mining Company Pty Ltd, is an open cut thermal coal mine located in Western Australia. The mine has been in operation since 1925 and produces approximately 4.5 million tonnes of coal annually.

A 12-month trial of a Liebherr PR 776 70-tonne mining dozer was conducted on this site from August 2019 to July 2020.

The PR 776 was operated and maintained by the customer. A Liebherr subject matter expert was available to provide technical support during the test period.

Task

The new dozer was fitted with an 18.5m³ Semi-U blade, a triple shank ripper and numerous local options to meet the customer's specific mine site and safety requirements. The upgraded lighting package, camera systems, remote monitoring capability, auto idle, eco-mode, and pressurised cabin were standard factory options.

The PR 776 worked in all standard dozer applications on both coal and topsoil during the test period: ripping, pushing (including on the overburden dump area), and general clean up.

The dozer was scrutinised based on its ability to meet and/or exceed performance parameters set by the customer and mine site, and agreed to by Liebherr Mining. The target Key Performance Indicators (KPIs) for the PR 776 included:

- 93% machine availability per month
- 60hrs or greater Mean Time Between Failure (MTBF)
- fuel burn no greater than 56L/hr at an average 40% engine load factor
- minimum 400 Service Meter Units (SMU) per month



Results

Performance

The PR 776 dozer exceeded expectations for all listed KPIs, marking the trial as a success.

The machine availability KPI of 93% was exceeded in 11 of the 12 months, with 96.1% average availability over the trial period.

The dozer demonstrated excellent maintainability and reliability, with an average MTBF of 163.69hrs, easily surpassing the benchmark MTBF of 60hrs.

The fuel burn results further illustrated the efficiency of the dozer, with an average of 49.7L/hr, compared with the customer-set benchmark of 56 L/hr at 40% load factor. This data not only demonstrates fuel burn efficiency (of less than the target fuel burn), but also the lower load factor boundaries of the PR 776 when compared with mechanical drive system dozers in this class. This is a result of the constant RPM of the Liebherr diesel engine combined with the advantages of the hydrostatic drive, including: infinite stepless dozer travel speed, superior steering and manoeuvrability, continuous traction and torque on both tracks, intuitive and simple joystick control with quick response, safe and wear-free service brake.

Over the test period, the dozer was utilised an average of 455.8 SMU per month with a total of 5,470 SMU in the year, exceeding the site's minimum requirement of 400 SMU per month. Although the utilisation rate of the dozer was not a KPI for this study, based on the mine site's dozer usage it can be determined that the dozer had an annual utilisation rate* of 68%. Therefore, the SMU achieved is not reflective of the potential output of the PR 776.

*Utilisation Rate is based on the proportion of machine Service Meter Units (SMU) in annual Calendar Time where mine is assumed to be operating for 365 days with two 11-hour-shifts per day.

Operator feedback

Operator feedback was also provided from an anonymous survey conducted by Griffin Coal. Positive reports were received in relation to the dozer's capability and performance in a variety of tasks including:

- Pushing coal and overburden,
- Ripping coal and overburden,
- Levelling dump areas and cleaning floors,
- Working in wet areas and on slopes,
- Stacking coal seams and coal clean ups,
- Road building, and
- Stripping topsoil.

Some feedback reported that these tasks were achieved with greater efficiency in the PR 776 than the equivalent machines on site. The feedback also included positive comments regarding operator comfort, ease of control, manoeuvrability, and the machine's visibility.

Maintenance

During the trial, Liebherr and Griffin Coal closely monitored expected maintenance rates for the PR 776 based on a detailed Life Cycle Cost (LCC) model, with close attention given to the undercarriage.

The nature of the dirt and the high water content at Ewington Coal Mine creates an unfavourable environment for long track lives, with other dozers on site undertaking a complete undercarriage overhaul approximately every 2,500 SMU. The PR 776 initially fell short of this 2,500 SMU milestone; however, the issues were resolved after the site implemented recommendations to ensure compatibility with the challenging operating conditions, as suggested by Liebherr. These improvements minimised strain and measured wear rates on the undercarriage components, indicating the PR 776 will now meet undercarriage overhaul targets, albeit outside of the 12-month trial period.

Long-term maintenance data is not yet determined, given the short timeframe of the trial in comparison to the dozer's expected lifetime. However, at the conclusion of the 12-month period there were no major downtime events due to premature component failure, therefore indicating positive maintainability of this machine.

Summary

This 12-month trial with conditional purchase resulted in the customer purchasing the dozer after achieving, and exceeding, the agreed KPIs. The customer will also add additional PR 776 units to this site's dozer fleet as a direct result of the success of this trial.

The overall feedback showed that the customer was satisfied not only with the performance of the dozer, but also with the support and service provided by Liebherr-Australia and Liebherr-Werk Telfs.

The PR 776 has been proven to be a reliable, productive and efficient machine, presenting a low total cost of ownership for customers. The Liebherr PR 776 is a valuable asset for any 70-tonne dozer fleet.

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	18.5m ³ / 24.2yd ³

Equipment

18.5m ³ Semi-U blade
Triple shank ripper
High density LED headlights
Working platform
Fire suppression system
Automatic greasing system
Touchscreen display with integrated rear-view camera
Eco-mode
Auto idle

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