R 9800

Job report:
Mining excavator

The Liebherr R 9800 excavator at Mount Thorley Warkworth (MTW), NSW, Australia

LIEBHERR

Mining Excavator

Situation

Yancoal Australia Ltd (Yancoal) operates the Mount Thorley Warkworth (MTW) site, an open-cut coal mine located in the Hunter Valley region of New South Wales, Australia. The operation combines two adjacent mines, Mount Thorley and Warkworth, into a single, large-scale mining complex. The mine began operations in 1981.

Yancoal's operations at MTW include overburden removal, coal mining and haulage, equipment maintenance and progressive rehabilitation. The site produces thermal and metallurgical coal for both domestic and international markets and plays a key role in Yancoal's New South Wales operations.

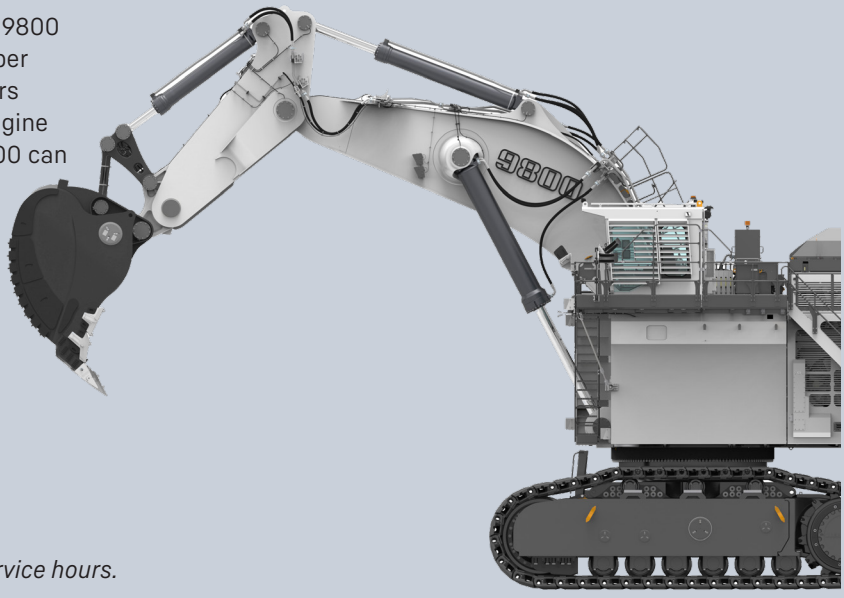
Yancoal and Liebherr have shared a long-standing relationship in Australia for over a decade that is built on reliable equipment performance, responsive support and technical collaboration. Across its wider Australian operations, Yancoal's Liebherr fleet includes 25 excavators, ranging from 120-tonne to 800-tonne class machines, plus 10 additional excavators from joint ventures in New South Wales and Queensland.

There are currently four Liebherr machines operating at MTW, including two R 9800s and two R 9400s. Both R 9800s underwent repowers of their engines in October 2024 and are now powered by Liebherr D9812 engines. These excavators support high-production workloads and work alongside ultra-class haul trucks on site to maximise efficiency.

The R 9800

The Liebherr R 9800 is built to perform in demanding mining environments, with a design that prioritises productivity and longevity. Engineered for a service life that exceeds 80,000 operational hours, the excavator features a modular design that streamlines major overhauls and upgrades throughout its life cycle. The 800-tonne machine is also equipped with mining-optimised components, developed and manufactured in-house by Liebherr, which support consistent performance over time.

With greater payload capacity than its competitors, the R 9800 provides faster material movement and better efficiency per pass. In addition to its productivity, the machine also offers significant fuel savings. Through Liebherr's proprietary engine management system, Liebherr Power Efficiency, the R 9800 can save up to 120,000 litres of fuel annually*, compared to R 9800s operating without this system.



Operating weight with backhoe attachment
800 t

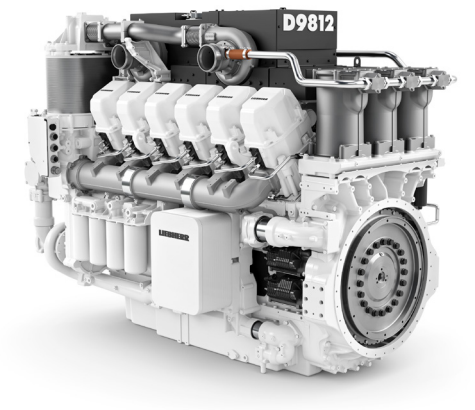
Engine rating at 1,500 rpm
3,000 kW

Bucket capacity at 1.8 t/m³
48 m³

** Liebherr Mining calculates annual fuel usage at 6,000 service hours.*

D9812 spotlight

The D9812 is one of the engines within the Liebherr D98 series and – like all engines in that range – it has been built to withstand the tough conditions of a mine site. For optimal safety, this 12-cylinder engine comes with heat shields on its turbochargers and exhaust lines. It also has individual fuel pressure accumulators per injector that considerably improve dynamic response and extend each injector's life. As well as this, the D9812 has a rated speed of 1,500 rpm, which puts less stress on components, increasing the engine's lifetime and fuel efficiency.



Onsite performance

Study conditions

The study aimed to understand how site-specific conditions and practices from the MTW team influenced the R 9800's strong performance outcomes.

One of Yancoal's two R 9800s was studied from May 2024 to April 2025 to evaluate its production capability and operational efficiency under typical site conditions at MTW. During this period, the machine predominantly operated in a conventional digging application and was paired with trucks in the 210-tonne, 300-tonne and 320-tonne classes. At MTW, the combination of R 9800s and 320-tonne class trucks was the most productive match, as the trucks could be filled in just four passes. As such, this combination is prioritised by MTW's dispatch and planning teams to ensure the best output.

4

passes

Site planning and operational discipline played a key role in supporting the R 9800's performance. Dig areas were consistently prepared and maintained by ancillary equipment to ensure a clean, level bench for both the excavator and truck fleet. This preparation contributed to minimal cycle time variations and enabled the machine to operate at sustained high productivity, reducing the need for unproductive activities, such as cleaning up the work area. Throughout the study, the R 9800 was also minimally used in double benching and wedge pass / topside loading configurations when necessary.

The bench height during the study period was approximately five metres. An optimal bench width of 110 to 120 metres was maintained throughout the study to support consistent truck exchanges and unhindered dig movements.

Both of the R 9800s at MTW were equipped with 48 m^3 buckets, designed and optimised with Liebherr to suit the material conditions encountered on site. The majority of material handled by the R 9800 during this period was blasted overburden, allowing for efficient bucket filling and consistent load factors.

Productivity

During the 12-month study period, the R 9800 achieved an annual average productivity dig rate of 2,763 bcm/hr, exceeding the benchmark rate of 2,420 bcm/hr for R 9800s in Australian coal mines. This represents a 13 % increase over expected performance.

The excavator consistently moved large volumes throughout the study period of May 2024 to April 2025, culminating in 16.25 million bcm (mbcm) moved in total. A peak of 1.752 mbcm was moved in January 2025, which won Yancoal the world record for R 9800 monthly material movement. The study period included a planned machine shutdown in October 2024, when both of Yancoal's R 9800s were repowered to D9812 engines. When the 16.25 mbcm figure is adjusted to account for this month of scheduled downtime, it annualises to approximately 17 mbcm.

16.25 mbcm
moved across the study period

With the strength of the R 9800's performance in 2024, Yancoal achieved 15.95 mbcm of material moved in the 2024 calendar year, marking another significant achievement from the site.

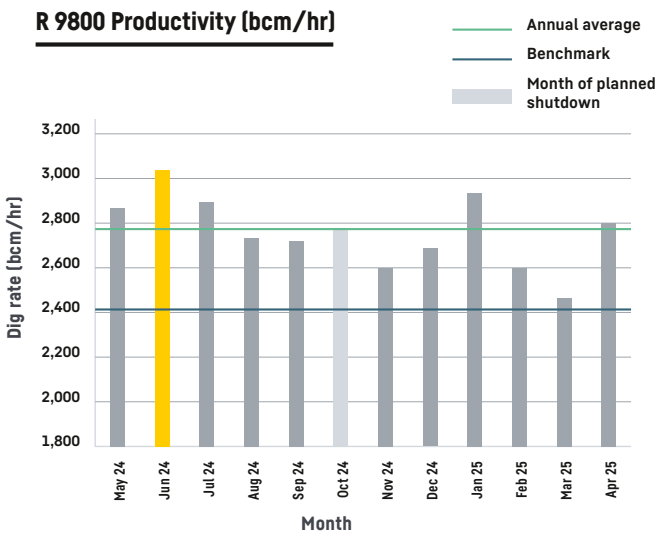
These results demonstrate the machine's capacity to sustain high output, reflecting the benefits of disciplined proficiency across all aspects of MTW's operations.

Dig rate

3,032 bcm/hr
peak average monthly dig rate

As seen in the graph, the R 9800 achieved outstanding dig rates throughout the study period, consistently exceeding the benchmark for R 9800s in Australian coal mines. This R 9800 achieved top results in June 2024, with a peak average monthly dig rate of 3,032 bcm/hr*.

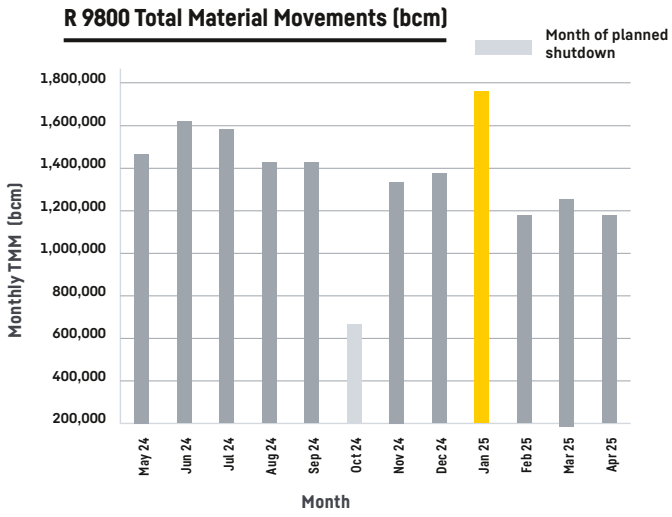
**bcm/hr takes into consideration Direct Operating Time and Inherent Delay Time, including secondary tasks and work area delays, as per the Yancoal Time Usage Model.*



Total Material Moved

1.752 mbcm
moved in January 2025

As seen in the graph, the R 9800 moved outstanding amounts of material throughout the study period. In its highest performing month of January 2025, the excavator moved 1.752 mbcm, achieving a new world record for R 9800 material movement.



Yancoal's Proficiency Model

Yancoal's MTW team applies its unique Proficiency Model to maximise operational performance. This framework focuses on five key areas to achieve consistent productivity, reliability and efficiency across the site. These key areas are:

Machine

Selecting the right machine configuration, combined with ongoing service support, ensures peak performance.

Yancoal's R 9800, with its D9812 engines and customised 48 m³ bucket (developed in collaboration with Liebherr teams), enables 320-tonne trucks to reach their target load in four passes. Regular performance tuning and condition-based maintenance by onsite service teams help maintain fast cycle times of under 30 seconds and support sustained fleet productivity.

Material

Understanding the material enables smooth and efficient excavation.

Overburden at MTW is blasted to achieve ideal fragmentation, which supports best diggability and reliable bucket fill factors for optimal average bucket and truck payloads. This fragmentation also helps maintain strong production rates and reduces machine stress during digging.

Design

Optimised designs support safe and efficient operation of the mining fleet.

Planning and designs are optimised to maintain ideal bench heights and support digging methods that enable best-practice cycle times and efficient truck exchanges.

Method

Operational methods are consistently applied to standardise and maximise output.

Yancoal's proven, standardised operating sequences for the R 9800 and its truck fleet support efficient cycle times and highly effective truck exchanges. These practices are safe, reliable and productive, resulting in minimal non-loading delays.

People

Operator capability is central to achieving benchmark performance.

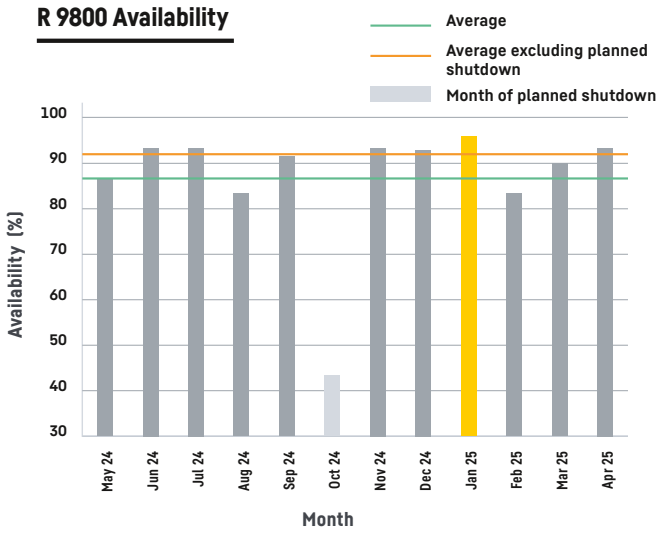
Operators are coached in the standardised techniques used on the R 9800 to support efficient, consistent operational practices. Ongoing monitoring, coaching, performance feedback and positive reinforcement help maintain motivation, equipment care and sustained operational excellence.

The application of these five core elements enabled the MTW team to achieve strong, repeatable results within the excavator fleet on site.

Reliability

As seen in the graph, the R 9800 achieved an average availability of 88 % over the 12-month study period. When accounting for the planned shutdown in October 2024, **average availability increases to 92 %**, highlighting the machine's consistent performance during normal operations.

These results demonstrate that the R 9800 is able to sustain high production while requiring few interventions, supporting operational efficiency and accurate planning at MTW. These numbers also highlight the agnostic modular design and ease of maintainability of the R 9800, as well as the effectiveness of site maintenance practices and the suitability of the machine for MTW's operational conditions.



Conclusion

During the study period, Yancoal's R 9800 at MTW delivered strong and consistent productivity, reliability and operational efficiency. The excavator averaged 2,763 bcm/hr over 12 months, exceeding Liebherr's benchmark expectations, and achieved a monthly peak – and a new world record – of 1.752 mbcm in January 2025.

Performance above benchmark levels reflects the combination of disciplined site practices, careful planning and the application of Yancoal's Proficiency Model. By aligning machine selection and configuration, material management, optimised digging methods, trained personnel and effective site design, MTW ensured the R 9800 operated efficiently and safely while achieving its targets. The combination of the R 9800's D9812 engines, custom 48 m³ bucket and the modular design of the R 9800 contributed to the machine's average availability of 88 % – which increases to 92 % when the October shutdown is accounted for. These results demonstrate how Yancoal's approach to planning, maintenance and equipment utilisation enables sustained proficient operation.

The overall performance of the R 9800 at MTW illustrates the effectiveness of Yancoal's operational practices, the strength of the excavator's design and the site's ability to deliver repeatable, measurable results for its stakeholders.

Opportunities

The strong performance of the R 9800 at MTW reinforces its value within Yancoal's fleet. This success supports the ongoing partnership between Liebherr and Yancoal around future machine deployments, engine repowers and expanded collaboration across their sites nationally.

Watch the video!

Scan to hear directly from site and see Yancoal's R 9800 in action.

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