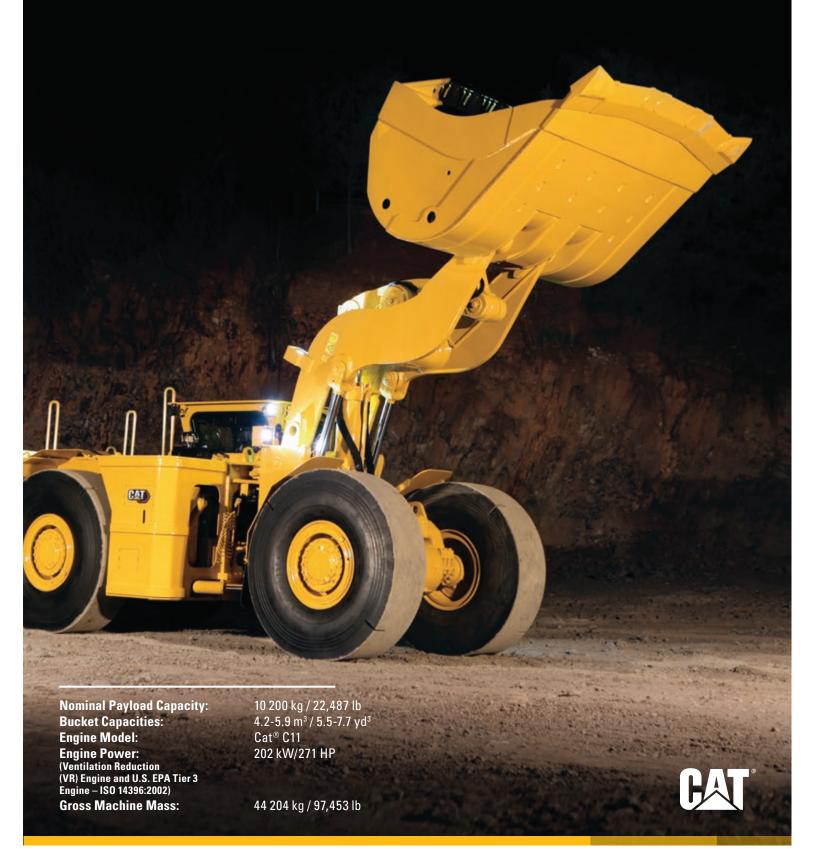
R1600H

UNDERGROUND LOADER



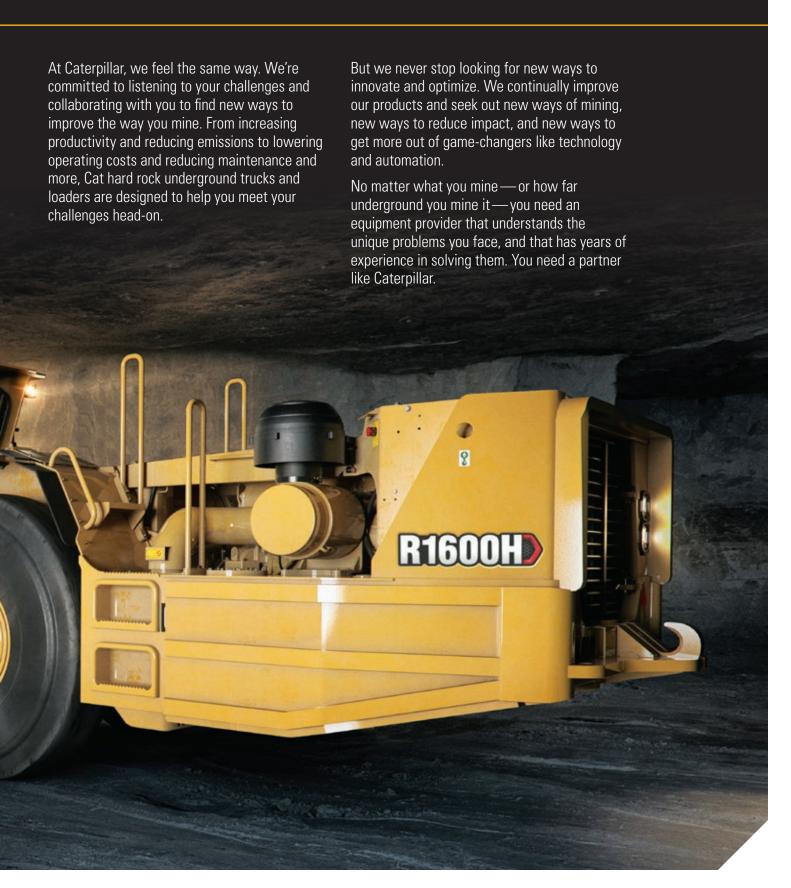
UNDERGROUND CHALLENGES.

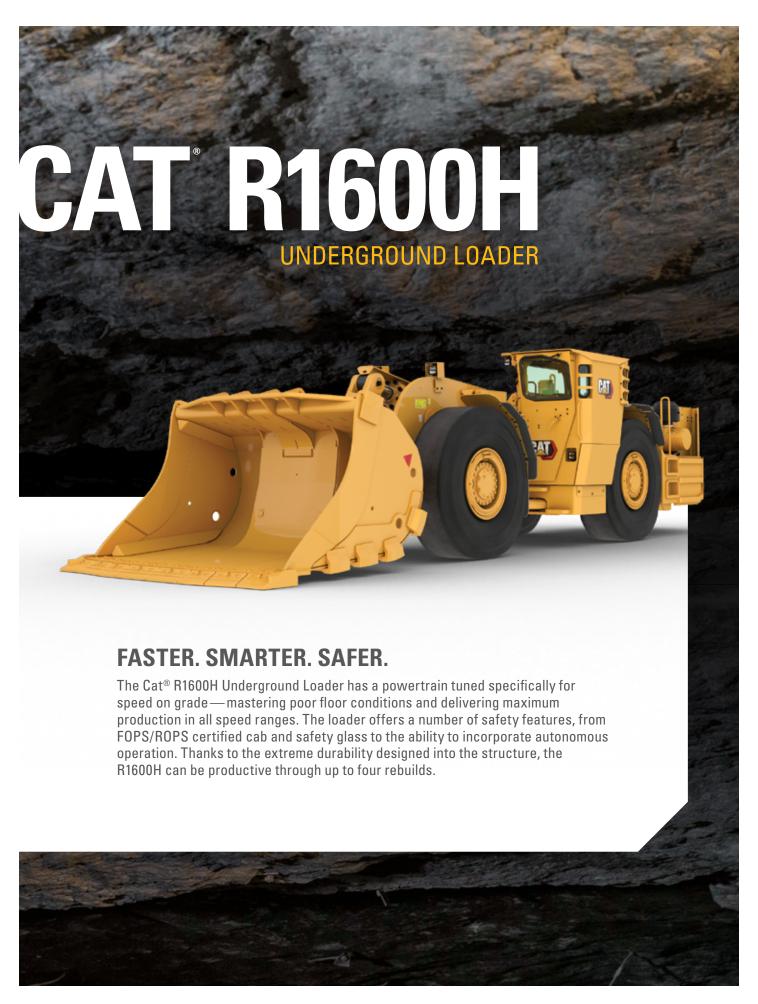
INNOVATIVE SOLUTIONS.

Underground hard rock mining presents special challenges when it comes to safe, efficient, productive operation — from environmental concerns and rising costs to communications and connectivity challenges. Even simple logistical issues become harder to manage as you dig deeper underground in search of new reserves.

But you want to do more than address these challenges. You want to work harder and turn those challenges into opportunities to improve.





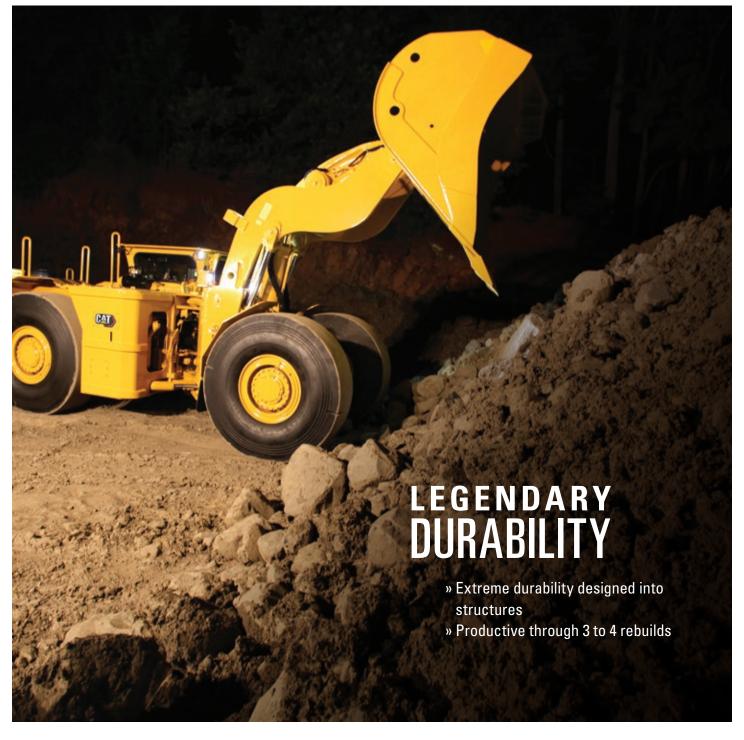


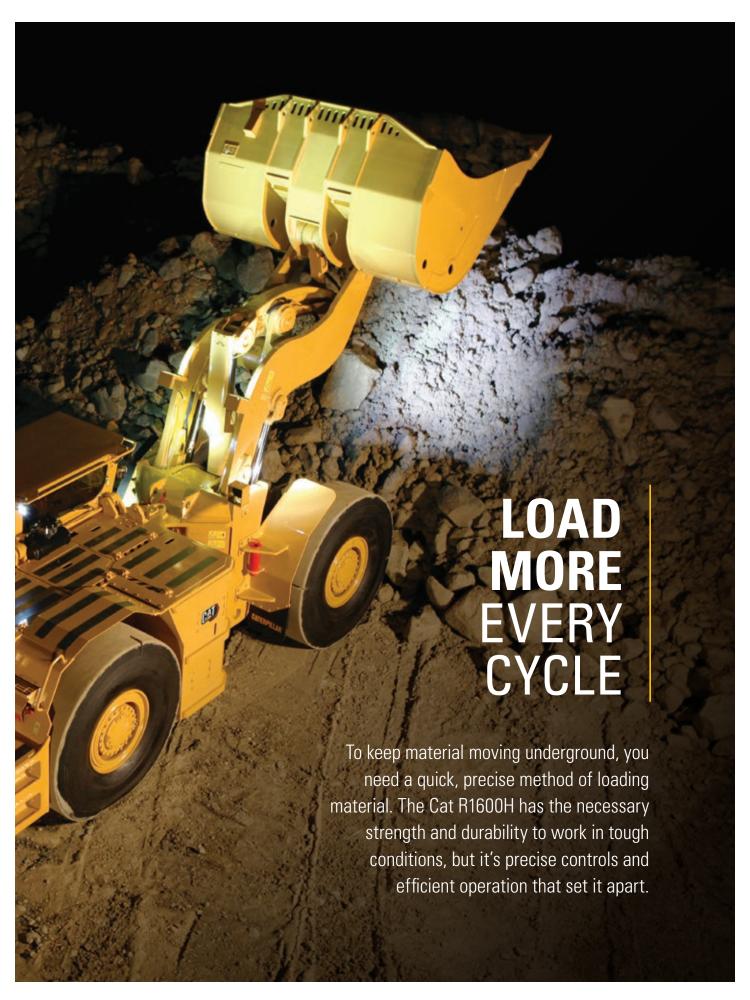
A PERFECT MATCH

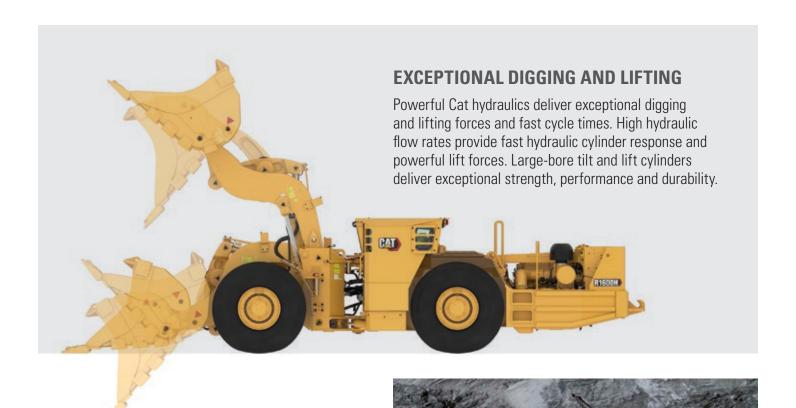
» Perfect 3-pass match with the Cat AD30 underground articulated truck

SAFETY-INFUSED

- » Autonomous and line-of-sight operation
- » Operator presence system
- » Safety glass







MORE POWER TO THE GROUND

The Cat four-speed planetary power shift transmission is Caterpillar designed and supported to provide maximum integration with the Cat C11 engine — delivering constant power over a wide range of operating speeds. The high-capacity torque converter delivers more power to the wheels for superior powertrain efficiency.

Cat final drives work as a system with the planetary power shift transmission to deliver maximum power to the ground. Built to withstand the forces of high torque and impact loads, double-reduction final drives provide high torque multiplication to further reduce drive train stress.

SUPERIOR STABILITY

An oscillating rear axle ensures four-wheel ground contact for maximum traction and stability at all times, while the no-spin rear differential reduces tire wear and maximizes traction in uneven terrain.

EFFICIENCY-BOOSTING FUNCTIONS

- + The electronic auto shift transmission increases operator efficiencies and optimizes machine performance. The operator can choose between manual or auto shift modes.
- + Using the left brake pedal, the operator can engage the service brakes and neutralize the transmission, maintaining high engine rpm for full hydraulic flow enhancing digging and loading functions.
- + The Torque Converter Lockup Clutch combines maximum rimpull while in torque converter drive with the efficiency and performance of direct drive when the lockup clutch is engaged. The lockup clutch delivers more power to the wheels for superior powertrain efficiency.
- + The Steering and Transmission Integrated Control (STIC™) system integrates steering and transmission functions into a single controller for maximum responsiveness and smooth control. The low-effort, pilot-operated joystick implement control with simultaneous lift and tilt functions optimizes operating efficiency. Optional circuit controls enable the ejector bucket to be controlled from a switch on the joystick.





OPTIMIZED PERFORMANCE

The Mechanically Actuated, Electronic Unit Injection (MEUI™) high-pressure, direct injection fuel system electronically monitors operator demands and sensor inputs to optimize engine performance. Air-to-air aftercooling provides improved fuel economy by packing cooler, denser air into cylinders for more complete combustion of fuel and lower emissions.

MANAGED HEAT

Oil-cooled pistons increase heat dissipation and promote longer piston life, while full-length water-cooled cylinder liners provide maximum heat transfer.

AFTER-TREATMENT OPTIONS

To provide better air quality in your underground mine, you can equip your R1600H with an optional Ventilation Reduction (VR) Package, which incorporates selective engine hardware and software to reduce diesel particulate matter in the engine exhaust.

Engines equipped with the VR Package feature a significant ventilation rate reduction with no change in fuel consumption and maintained or improved machine performance. VR Package availability is subject to regional regulatory compliance. Engines that emit equivalent to U.S. EPA Tier 3 and EU Stage IIIA are also available.

A Cat Diesel Particulate Filter can be used with the VR engine package. This filter complements the VR engine by further reducing particulate matter in the exhaust. This filter requires the use of ultra-low sulfur diesel (15 ppm) and CJ-4 low ash engine oil.



The R1600H features an operator station that is ergonomically designed for total machine control in a comfortable, productive and safe environment. All controls, levers, switches and gauges are positioned to maximize productivity and minimize operator fatigue.

CAB OPTIONS

Cabs are offered in both enclosed and open configurations to allow sites to choose based on their specific needs. The optional sound-suppressed ROPS cab provides a quiet, secure working environment with large window openings for excellent visibility in all directions. Air conditioning provides filtered, pressurized, temperature-controlled air for a more comfortable working environment.

EFFORTLESS OPERATION

The STIC system makes it possible to control the complete mobility of the machine with a single controller. Simple side-to-side motion articulates the machine. Directional shifting (forward/neutral/reverse) is controlled using a three-position rocker switch. The thumb-operated buttons control gear selection. Low-effort pilot operated joystick controls integrate steering, transmission and implement functions for smoother, faster cycles with less operator fatigue



DESIGNED FOR CONTROL The four-corner oil-cooled braking system provides excellent control, with planetary reduction at each wheel and torque that is developed at the wheels for less stress on the axle shafts. Planetary units can be removed independently from the wheels and brakes. The service brake system is actuated by modulated hydraulic pressure, while the parking brake function is spring applied and fluid released. This system assures braking in the event of loss of hydraulic failure.

OPTIONAL RIDE CONTROL

The optional ride control system uses a nitrogen-filled oil accumulator in the hydraulic lift circuit to act as a shock absorber for the bucket and lift arms. The lift arm and bucket response to movement is dampened over rough ground, reducing fore and aft pitch, improving cycle times and load retention. A smoother, more comfortable ride gives operators the confidence to travel at speeds above 5 km/h (3 mph) during load and carry operations.

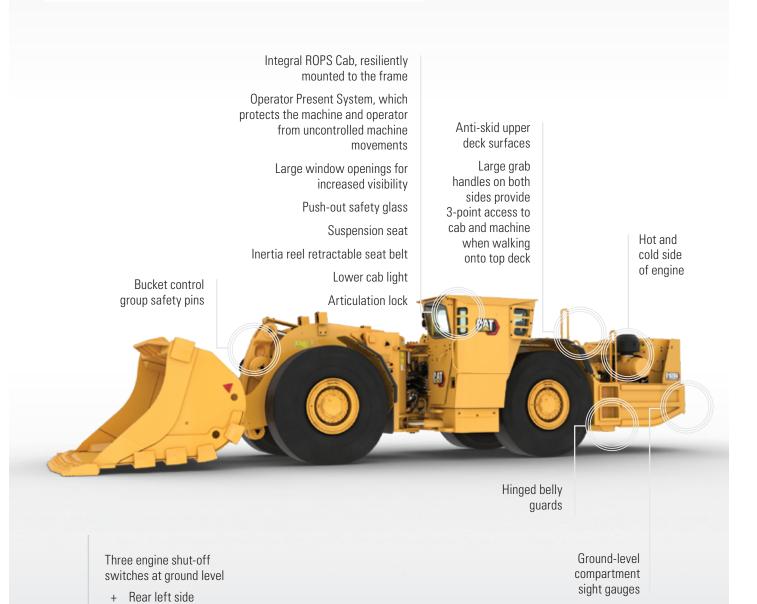
DESIGNED FOR COMFORT AND SAFETY

The optional sound-suppressed cab provides a quiet, secure working environment with large window openings for excellent visibility in all directions. Enclosed design provides fresh, pressurized, temperature-controlled air circulation with air conditioning for a more comfortable working environment. The operator station features an integrated Roll Over Protective Structure (ROPS) and Falling Object Protective Structure (FOPS) resiliently mounted to the frame, reducing vibration for a more comfortable ride.



SAFETY-INFUSED

The R1600H is infused with features to help both operators and service personnel feel safe and confident on the job. Caterpillar has been and continues to be proactive in developing mining machines that meet or exceed safety standards. Safety is an integral part of all machine and systems designs.



Rear right side Under operator seat

SPEND MORE TIME LOADING AND LESS TIME SERVICING

Reduced downtime and maintenance costs are key contributors to the R1600H's ability to achieve the lowest possible owning and operating costs. With more robust structures, modular and longer-lasting components, parts commonality, more accessible maintenance areas and extended service intervals, the R1600H can be maintained in less time for less money by fewer people — helping you lower cost per ton and keep your machines hard at work.

IMPROVED SERVICE ACCESS

Easy access to daily service points simplifies servicing and reduces time spent on regular maintenance procedures. Ground-level access allows convenient servicing to all tanks, filters, lubrication points and compartment drains. The modular radiator with swing-out grill provides easy access for cleaning or repair, while a built-in sight gauge allows for quick, safe coolant level checks.

COLOR MULTI-PURPOSE DISPLAY (CMPD)

The R1600H cab features a multi-screen display unit showing various levels of machine system conditions, pressures and temperatures. Warning information displayed advises operator of problems as well as the response required. The operator or technician can view real-time information without having to use service tooling devices. Multi-language options are available.



DOWNTIME-REDUCING FEATURES

- + Radial seal air filters are easy to change, reducing time required for air filter maintenance.
- + Fluid level checks are made easier with sight gauges.
- + The CMPD multi-screen display along with Caterpillar Electronic Technician (Cat ET) service tool enables quick electronic diagnosis of machine performance and key diagnostic data for effective maintenance and repairs.
- + Electrical connectors are sealed to lock out dust and moisture and harnesses are covered for protection. There are no cables located in the outer articulation area.
- + Wires are color- and number-coded for easy diagnosis and repair.
- + Scheduled Oil Sampling (S·O·SSM) helps prevent minor repairs from becoming major ones. Sample point adapters are fitted standard to the machine.
- Sealed colleted pins are fitted to all major bucket and lift arm hinge points for longer pin and bushing life. This reduces maintenance costs and extends service intervals. The sealed joints retain lubrication and prevent contaminant entry.
- + Field-proven Cat high pressure XT hydraulic hoses are exceptionally strong and flexible for maximum system reliability and long life in the most demanding conditions. Reusable couplings with O-ring face seals provide superior, leak free performance and prolong hose assembly life.
- + Upper and lower hitch pins pivot on roller bearings to distribute horizontal and vertical loads over a greater service area. Shim-adjusted preload reduces maintenance time.

THE RIGHT TOOLS

OPTIMIZED BUCKET DESIGN

Aggressive Cat bucket designs deliver unmatched productivity in the most demanding applications. Underground mining buckets are designed for optimal loadability and structural reliability to help lower your cost-per-ton.

Buckets are available in a range of sizes to suit material types and densities, with multiple options including dump buckets and ejector buckets. Four dump bucket sizes, one ejector option, and one bolt-together option are available for the R1600H — and all have been designed and manufactured to match its performance capabilities.





FLEXIBLE AND RELIABLE GROUND ENGAGING TOOLS

Caterpillar offers a number of Ground Engaging Tool (GET) options for the R1600H, so you can customize your machine to meet your site-specific needs and fit with your overall maintenance strategy. Cat GET helps you achieve the productivity and the bucket life you desire. In addition, Cat Bucket Pro can help you manage GET performance and optimize bucket lifecycle costs. All Cat GET are built for strength and long life, so you spend less time replacing shrouds.

CAT MODULAR SEGMENT WELDED GET SYSTEM

Modular shrouds deliver welded part reliability with the replacement simplicity of a mechanical system. Integrated bevel allows for faster weld installation time—20% faster than competitive shroud systems—and creates an 18% stronger modular shroud assembly by locking segments together. Wear indicators are visible from the top to help establish maintenance intervals.

OPTIONAL WEAR PACKAGES

Weld-on wear plates in high wear areas are standard. Additional wear packages, including sacrificial wear strips and Cat heel shrouds protect the edges from damage and reduce the need for costly bucket rebuilds.

BOLT-ON HALF ARROW GROUND ENGAGING TOOLS

For the entire underground loader line, Caterpillar now offers Bolt-On Half Arrow (BOHA) GET for bucket edges. Designed for high abrasion applications where weld-on GET experience high wear rates, the system delivers best-in-class lip protection with fewer parts than competitive systems. With a proven and reliable retention system, the bolt-on GET offer more wear material than standard weld-on GET, and the bolt-on design enables fast and easy removal and replacement. Despite additional wear material, the low-profile front edge eases pile penetration and promotes fast bucket loading.

BOHA GET can reduce changeout times while extending the life of traditional weld-on GET option. BOHA GET are bolted onto the bucket instead of welded — shortening replacement time from as much as 40 hours to as little as one or two. And with no need for welding, they are easier to replace.





STRONG BACKBONE

The R1600H features a frame that is engineered to withstand extreme forces generated during loading and tramming cycles. Precision manufacturing process ensures all structures are consistently built to high quality. Deep penetration and consistent welds throughout the frame ensure structures are solidly fused to provide sturdy platform for the linkage and the axles.

SPREAD HITCH DESIGN

Spread hitch design widens the distance between upper and lower hitch plates to distribute forces and increase bearing life, and thicker hitch plates reduce deflection. Upper and lower hitch pins pivot on roller bearings to distribute horizontal and vertical loads over a greater surface area.



PROVEN Z-BAR LINKAGE

Proven Z-bar loader linkage geometry generates powerful breakout force and an increased rack back angle for better bucket loading and material retention. Heavy duty steel lift arms with cast steel cross tube ensures extreme loads encountered during loading and tramming are efficiently dissipated for long service life.

BUILT TO BE REBUILT

The design and manufacturing quality of Cat LHD frames has been proven by our customers — many of whom re-use frames during machine rebuilds to get second and third lives out of their LHDs. The R1600H's frame, powertrain, engine and components are built to be rebuilt — using new, remanufactured or rebuilt parts and components—so you can take advantage of multiple lives of like-new performance at a fraction-of-new price. Reused or remanufactured components can deliver additional cost savings.



through Autonomous Operation

The R1600H comes factory ready for remote operation and can be equipped with the industry-proven Cat® MineStar™ Command for underground.

Command for underground offers multiple levels of autonomy through Caterpillar's scalable autonomous solution, including line-of-sight remote, teleremote operation, and co-pilot, which requires only directional input from the operator. This building block approach allows you to capture value at your most economic entry point while allowing scalability as technology maturity grows.

Command for underground enables remote operation of load-haul-dump machines — from simple line-of-sight to full autonomy — providing immediate productivity and efficiency gains and improving safety. Command allows you to relocate operators to a safe, comfortable location underground or on the surface. Automation improves accuracy of tunnel navigation, boosting productivity and reducing machine damage caused by contact with drive walls.

FULLY AUTONOMOUS OPERATION

The addition of three new controls enables fully autonomous operation of the R1600H.

- + Auto Pilot, which oversees tramming of the machine without input between the load and dump points.
- Auto Dump, which allows the machine to dump into a fixed infrastructure without operator input.
- + Auto Dig, which enables autonomous digging and bucket loading.

MAKE INFORMED DECISIONS AND OPTIMIZE MAINTENANCE with MineStar Health Machine health data is critical to helping you improve the reliability of your mining equipment, reduce unplanned downtime and prevent costly failures. MineStar Health enables you to collect and transmit

GET ESSENTIAL OPERATIONAL INFORMATION with MineStar Fleet for underground Timely access to accurate information is key to running a productive mine. Fleet for underground provides real-time visibility to cycle time, payload, machine position and other key operational parameters and automatically records and tracks data up and down the value chain. Fleet can help you better understand machine usage, improve shift changes, manage tasks, maximize operational efficiency and more.

equipment data that enables proactive maintenance services and predictive

equipment analysis.

ADDRESS RISKS TO PEOPLE AND ASSETS

with MineStar Detect for underground

Detect prevents unintended interactions between people and assets by letting you "see" in the dark. Using a high-precision peer-to-peer proximity detection system coupled with a revolutionary communications and tracking network, Detect can prevent incidents and track people and machines in real time and with no reliance on mine infrastructure. It provides operators continuous awareness of their surroundings, along with the location and status of all personnel and assets.

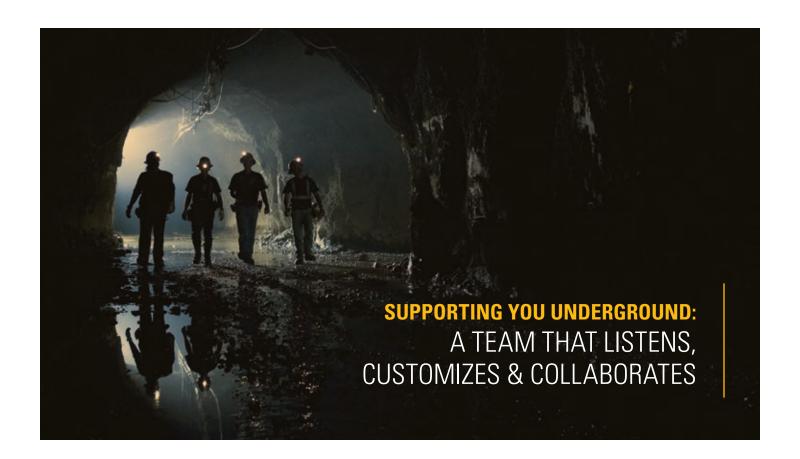
MINING — FOR A — BETTER WORLD

Governments and regulatory agencies mandate that you establish and follow environmentally sound policies and practices as you meet the demand for mined materials. We're focused on doing our part to make sure our machines help you meet those regulations. Every piece of Cat equipment is designed to be better and do better. Because the better we mine, the better the world can be.

At Caterpillar, we continue to research alternative energy sources such as biofuels and liquefied natural gas and power options like electrification to find new ways to reduce emissions. Underground mining continues to be an early adopter of sustainable mobile equipment solutions, based on the need for a clean and safe working environment.

In addition, we rebuild and remanufacture parts, components and complete machines to increase the lifespan of equipment—reusing instead of discarding, conserving energy, reducing waste, keeping nonrenewable resources in circulation for multiple lifetimes and minimizing the need for new raw materials.

We're also listening to our customers and investigating ways we can help them in their efforts to recycle end-of-life machines and components. Retrofits and upgrades enhance and improve older machines to incorporate efficiency improvements and emission reductions, and to keep them in production longer to conserve energy, lower emissions and minimize the need for raw materials.



YOUR PARTNER FOR THE COMPLETE EQUIPMENT LIFECYCLE

No one knows more about how to get the most from a piece of Cat equipment than Caterpillar and your local Cat dealer. Our partnership starts with validation and testing of the machine and continues through the complete lifecycle of the loader.

The one-of-a-kind Cat dealer support network delivers expert service, integrated solutions, aftersales support, fast and efficient parts fulfillment, world-class rebuild and remanufacturing capabilities and more.

Cat dealers operate as nearly 200 local businesses — each one fully embedded in and committed to the geographic area it serves. That means you work with people you know, who know your business, and who respond on your timeframe.

Caterpillar and Cat dealer personnel will partner with you on site to improve the performance not only of your LHD but of your overall loading and hauling operation.

You'll have access to parts and service, as well as technicians who are focused on helping you optimize repairs to keep machines productive. And we help with training to ensure your operators have the skills and knowledge they need to work as efficiently and productively as possible.

We also work alongside you to ensure you achieve maximum value throughout the life of your equipment. Together with our Cat dealer network, we customize service offerings to provide a maintenance solution that fits your operation—whether you want to perform the majority of service yourself, or you're looking for an onsite partner to manage your maintenance organization. We're also consultants who can help you make smart decisions about buying, operating, maintaining, repairing, rebuilding and replacing equipment.

TECHNICAL SPECIFICATIONS

See cat.com for complete specifications.

ENGINE		
Engine Model	Cat® C11	
Engine Power		
Ventilation Reduction (VR) Engine – ISO 14396:2002	202 kW	271 hp
U.S. EPA Tier 3 Engine – ISO 14396:2002	202 kW	271 hp
Bore	130 mm	5.1 in
Stroke	140 mm	5.5 in
Displacement	11.1 L	680.4 in ³
TRANSMISSI	ON	
Forward – 1st	4.5 km/h	2.8 mph
Forward – 2nd	9.0 km/h	5.6 mph
Forward – 3rd	16.8 km/h	10.4 mph
Forward – 4th	27.5 km/h	17.1 mph
Reverse – 1st	5 km/h	3.1 mph
Reverse – 2nd	11 km/h	6.8 mph
Reverse – 3rd	19.0 km/h	11.8 mph
Reverse – 4th	29.3 km/h	18.2 mph
OPERATING SPECIF	ICATIONS	
Rated Payload	10 200 kg	22,487 lb
Gross Machine Mass – Loaded	44 204 kg	97,453 lb
Static Tipping Load Straight Ahead, Lift Arms Horizontal	25 905 kg	57,110 lb
Static Tipping Load Full Turn, Lift Arms Horizontal	21 803 kg	48,067 lbs
Break Out Force (ISO) Tilt	17 928 kg	39,524 lb
Break Out Force (ISO) Lift	19 202 kg	42,333 lb
Bucket Capacity Range	4.2 - 5.9 m ³	5.5-7.7 yd ³
HYDRAULIC CYCL	ETIMES	
Raise Time	7.6 seconds	
Dump Time	1.6 seconds	
Lower, empty, float down	2.0 seconds	

11.2 seconds

MACHINE DIMENSION	S		
Dump Bucket (STD)	4.8 m ³	6.3 vd ³	
Bucket Width over Cutting Edge	2600 mm	102.4 in	
Height – Max Bucket Raised	5204 mm	204.9 in	
Height – Max Dump	4497 mm	177.0 in	
Height – Max Lift Bucket Pin	3752 mm	147.7 in	
Height – Dump Clearance at Max Lift	2207 mm	86.9 in	
Height – Digging Depth	39 mm	1.5 in	
Height – Ground Clearance	344 mm	13.5 in	
Height – Top of Rear Guard	1895 mm	74.6 in	
Height – Top of ROPS	2400 mm	94.5 in	
Length – Overall (Digging)	10 107 mm	397.9 in	
Length – Overall (Tramming)	9711 mm	382.3 in	
Length – Wheelbase	3536 mm	139.2 in	
Length – Front Axle to Hitch	1768 mm	69.6 in	
Length – Rear Axle to Bumper (with auxiliary lines)	3055 mm	120.3 in	
Length – Reach	1408 mm	55.4 in	
Width – Overall Tire	2400 mm	94.5 in	
Width – Machine without Bucket	2564 mm	100.9 in	
Width – Machine with Bucket	2723 mm	107.2 in	
Recommended Clearance Width	3500 mm	137.8 in	
Recommended Clearance Height	3000 mm	118.1 in	
TURNING DIMENSIONS			
Outside Clearance Radius	6638 mm	261.3 in	
Inner Clearance Radius	3291 mm	129.6 in	
Axle Oscillation	10°		
Articulation Angle	42.5°		
TIRES			

18 × R25

Tire Size

Total Cycle Time

STANDARD AND OPTIONAL EQUIPMENT

Standard and optional equipment may vary. Consult your Cat dealer for details..

POWERTRAIN		
	Standard	Optional
Brakes, full hydraulic enclosed wet multiple-disc (SAFR)	Х	
Engine		
Cat C11 six cylinder, diesel	Х	
Air-to air aftercooler (ATAAC)	Х	
After-Treatment Options – DPF (Flow Through)		Х
Engine options (choose from):		
Engine, VR		Х
VR engine, Flow Thru Ready		Х
Engine, Tier 3		Х
Fuel Priming Aid	Х	
Park Brake Automatic Activation		Х
Precleaner, engine air intake	Х	
Radiator, High Efficiency		Х
Reversible Steering		Х
Torque converter with automatic lock up clutch	Х	
Transmission, automatic planetary power shift (4F/4R)	Х	
Transmission Neutralizer	Х	

ELECTRICAL		
	Standard	Optional
Alarm, reversing	Х	
Alternator, 95 amp	X	
Battery Disconnect Switch, Ground Level	X	
Battery, Low maintenance	X	
Diagnostic Connector	X	
Engine shutdown switch	Х	
Lighting - Front, Rear, Stop (single)	X	
Receptacle group, auxiliary start	X	
Starter, electric, 24-volt	Х	
Starting and charging system	Х	

TECHNOLOGY		
	Standard	Optional
Command for Underground		Х
Remote Control Interface (excludes Transmitter and Receiver), includes Warning Lights (Green)		
Cattron		Х
RCT		Х

OPERATOR ENVIRONMENT		
	Standard	Optional
Cab, ROPS and/or FOPS certified	Х	
Operators Station ROPS/FOPS Enclosed		X
Color Multi Purpose Display (CMPD)	Х	
Horns, electric	Х	
Instrumentation/gauges	Х	
Operator Presence System	Х	
Automatic Brake Application (ABA)	Х	
Pilot hydraulic implement controls (single joystick)	Х	
Suspension Operator Seat with retractable seat belt	X	
Secondary Steering System		Х
Steering and Transmission Integrated Control (STIC™) Steering	х	

TIRES, RIMS, AND WHEELS		
	Standard	Optional
Tire Arrangements (must select)		
Tire, 18 × R25 VSMS L5S Bridgestone	х	
Rims (set of 4):		
Tubeless, set of four	Х	
Spare, tubeless		х

OTHER STANDARD AND OPTIONAL EQUIPMENT		
	Standard	Optional
Brake release arrangements, includes steering release: recovery hook or recovery bar		Х
Bucket, Dump (4.8 m ³ /6.3 yd ³)	Х	
Various sizes, dump (4.2 m³/5.5 yd³, 5.6 m³/7.3 yd³, 5.9 m³/7.7 yd³); Bolt-together (5.3 m³/6.9 yd³); Ejector (4.8 m³/6.3 yd³)		х
GET and wear package options		х
Centralised or Automatic lubrication system		х
Fast fill system		Х
Fenders, front, rear	Х	
Firewall	Х	
Fluids - Arctic Fuel, Arctic Coolant		Х
Handholds	Х	
Lifting Group, Mine Transfer		х
Ride Control System		Х
Radiator grill, swing out	Х	
Service oil sample	Х	



LOADER

For more complete information on Cat products, dealer services and industry solutions, visit us at www.cat.com

Materials and specifications are subject to change without notice. Featured machines in photos may include
additional equipment. See your Cat dealer for available options.

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