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Quarryman® Pro

Improve safety

Plan safer blasts, based on accurate data, to protect workers and the local environment and keep you legally compliant.

Increase profitability

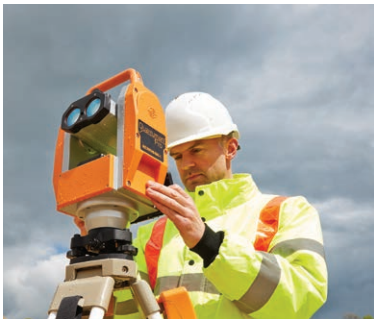
Using Quarryman Pro to plan blasts helps cut the costs of transport, explosives and secondary breakage.

Calculate stockpile volume quickly

To produce fast and accurate material stock valuation, assisting production and operational planning.

Quarryman Pro is the laser-scanning system of choice for quarries across the world

Renishaw's latest Quarryman Pro system builds on 25 years' experience delivering laser-scanning solutions to the worldwide quarrying industry. It's our most robust system yet.



Quarries around the world rely on Quarryman Pro to help them plan effective blasting operations.

What the system offers

- Safe, long-range reflectorless surveying for blast planning, stockpile measurement and whole site mapping
- The opportunity to save on surveyor costs, with easy one-man operation, intuitive software and minimal training
- Durability and reliability in tough environments, with certified water and dust resistance, and operating capabilities from –20 °C to +45 °C
- Integration with blast design software packages and with LiDAR data collected from mobile mapping systems
- A range of applications for quarry managers, providing excellent return on investment

How it works

- Quarryman Pro is a 3D laser-scanning system, which is easily operated by one person, with very little training needed to use the system or associated, intuitive software.
- Light and portable; coming in a single Peli case, the tripod-mounted Quarryman Pro system can quickly be moved around site and between sites by operators.
- Operators can choose between a manual point-and-shoot mode, and an automatic laser-scanning mode (250 points per second). Entire rock faces can be scanned in minutes.
- Quarryman Pro measures and records millions of data points directly to a USB drive and does not require external PDAs or computers in the field.
- The collected data can then be processed to create detailed 3D models, which can then be edited, analysed and exported to specialist packages or other CAD software.

Quarryman Pro is intuitive to use, portable and rugged: carefully designed and tested to ensure it is robust enough to operate in the toughest conditions.

Quarryman Pro options

Quarryman Pro (short range)	**Quarryman Pro (long range)**
Scans up to 750 m	Scans distances up to 1200 m
Optics designed and optimised for shorter range quarry applications	Optics designed and optimised for longer range quarry applications and improved results against coal and other dark materials
Class 2M laser safety rating	Class 3R laser safety rating

Blast design, blast optimisation and blast evaluation

Using data acquired by our laser systems, you can perform safer, quieter, more effective blasting.

Quarryman Pro is dust-resistant and waterproof for performance even in extreme conditions

The Quarryman Pro system has transformed the safety and productivity of quarrying operations where it has been adopted.

With Quarryman Pro, you can scan a full rock face quickly, without needing trained surveyors, and then use the data to plan:

- More accurate blasts, which eliminates the costs associated with over-using explosives
- Quieter, safer blasts that keep workers safe, have less impact on the external environment and keep you legally compliant
- Blasts with optimal fragmentation, thereby cutting transport costs for quarried rock, and minimising the wastage associated with over-fragmentation
- Improved floor control, minimising wear on tyres and heavy mobile equipment

Surveying

Accurate face profiling and surveying is a critical first stage in ensuring efficiency in all downstream operations. The use of accurate, reliable equipment can significantly reduce time and cost for quarry operators. Key to this is use of the correct equipment and trained operators. Quarryman Pro data is used to measure bench heights, level of crest and toe, slope angle, and maximum/minimum burden. By mapping a rock face in detail it is possible to determine actual burdens across the face. This will help avoid the problems associated with underestimating the burden, such as vibration and over-sized rock, or overestimating the burden, which can result in flyrock and airblast. If surveying is done incorrectly, this can have a detrimental effect on the rest of the quarrying process, including increased safety risks.

Pattern design

Quarryman Pro data lets you plan the blast hole layout. Safety parameters, vibration limits, explosives to be used, and design floor elevations must also be considered when designing the pattern. The resulting blast design plan should clearly specify the collar elevations, burden, spacing, drill hole diameter, type and quantity of explosives, and type and delay of detonators. The final layout of the blast hole pattern can then be confirmed with the Quarryman Pro system.

Drilling

Checking that the drilling has been carried out correctly as per the blast design is very important. Incorrect drilling – including wrong positioning, incorrect angle, hole deviation, and incorrect depth – can pose serious risks. Renishaw's Boretrak® borehole deviation tool can be used to verify the hole depth, heading and inclination.

When used in combination with our Boretrak borehole deviation tool, Quarryman Pro enables you to design more productive blasts.

Boretrak®

Our two borehole deviation tools – Rodded Boretrak® and Cabled Boretrak® – let you:

- **Improve safety:** Get the accurate borehole data you need and use it to plan projects safely and compliantly
- **Cut costs:** Optimise blasting and engineering works using detailed surveys of drilled holes, without needing qualified surveyors, and use the data to drive efficient project planning and execution
- **Deliver results, in tough environments:** water and dust resistance, together with real portability and options for uphole/downhole measurement, as well as operation in areas of magnetic interference, make Boretrak a system you can use for a range of challenging projects

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Quarryman® Viewer software

Our new software, Quarryman® Viewer, offers users big advantages over previous Quarryman Pro software.

Quicker to operate

- Its new, intuitive feel makes work flow quicker for operators
- Brand new visuals allow for clearer viewing and quicker interpretation of data
- Automation saves time: Quarryman Viewer offers automated point coding, automated traverse processing, and automated surfacing of single scans
- User preference options mean that Quarryman Viewer stores your most commonly completed functions, making it quicker to repeat them for future projects
- Project tree gives easy access to, and control of all data: scans, surfaces, observations and stations

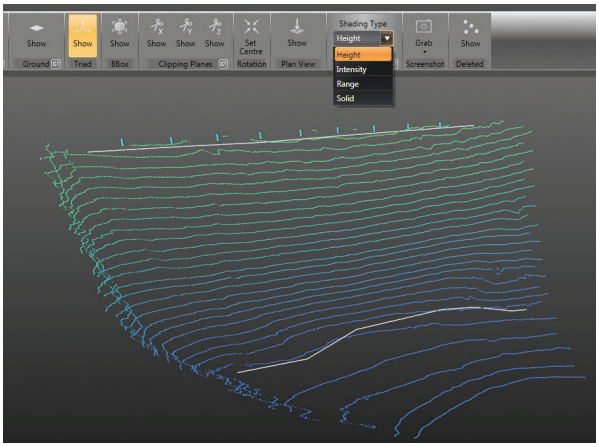
Flexible options suit the way you work

- Import options reduce operator programming time. Enter in one system and view in Quarryman Pro
- Set up filters to give you the data that you want
- Export points, surfaces and strings in multiple formats to all major CAD and point cloud packages

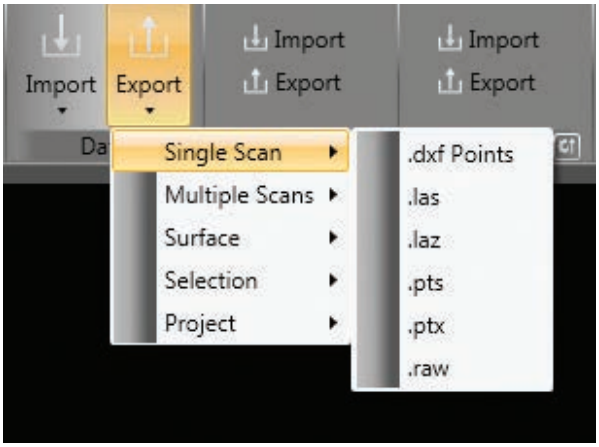
Increased functionality enables you to complete more operations in the software, and save time

- Compute traverses, resections and range and bearing observations

The new-look Quarryman Viewer software is faster and more intuitive, and provides greater flexibility than before.



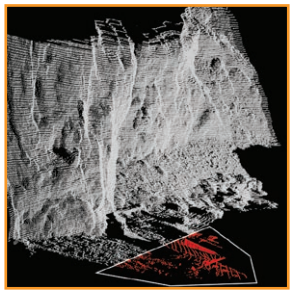
Software improvements include clearer presentation of visuals for quicker interpretation of data.



Filters can be defined to obtain the data you require. Data is then exported in multiple formats to all major CAD and point cloud packages.

Applications

Quarryman Pro helps you to calculate stockpile surveys and plan deliveries and collections.



Rock faces that are mapped by Quarryman Pro enable you to plan effective operations.

Renishaw's Dynascan® system can map vast areas quickly, but to obtain data from hidden areas, you need a Quarryman Pro.

Renishaw's Quarryman Pro system is a versatile tool that offers several applications, representing a value-for-money investment that will give quarry operators the ability to quickly and simply collect data to support all areas of operation.

3D mapping of entire quarry or mine sites

Open-pit landscapes are constantly changing as excavations are made, stockpiles grow, and blasting operations take place. With such a dynamic environment, regularly compiling a complete 3D map of the site is useful to the planning of such operations as truck routes, siting of generators, crushers or other equipment, and reporting to local residents or other stakeholders at update meetings.

The Quarryman Pro system is used in these circumstances because it is fast, portable and rugged. The resulting scans can be stitched together for a complete model of the site. The long range of the Quarryman Pro helps to minimise the number of instrument setups required and also to reduce the operator time needed to complete surveys.

Stockpile surveying and other volumetric surveys

Stockpile surveys are needed for legal and accounting reporting requirements, as well as helping to prevent theft from the site, and enabling managers to plan for deliveries and collections efficiently. Quarryman Pro gives you a quick and simple way to conduct this work, offering you a healthy return on investment against the initial outlay.

LiDAR infill of missing scan data

When used mounted on a vehicle, a mobile mapping system, such as Renishaw's Dynascan®, can be a very fast way of mapping out a complete site. However, there will often be areas that are 'shadowed' due to vehicle inaccessibility. Quarryman Pro can be used to fill in these gaps in large data sets as it can be set up in awkward locations where vehicles cannot gain access, or can view areas from longer distances than a mobile mapping solution. In this way, small 'infill' areas can be collected quickly and easily, then incorporated into the full model.

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About Renishaw

Renishaw is an established world leader in engineering technologies, with a strong history of innovation in product development and manufacturing. Since its formation in 1973, the company has supplied leading-edge products that increase process productivity, improve product quality and deliver cost-effective automation solutions.

A worldwide network of subsidiary companies and distributors provides exceptional service and support for its customers.

Products include:

- Additive manufacturing, vacuum casting, and injection moulding technologies for design, prototyping, and production applications
- Advanced material technologies with a variety of applications in multiple fields
- Dental CAD/CAM scanning and milling systems and supply of dental structures
- Encoder systems for high accuracy linear, angle and rotary position feedback
- Fixturing for CMMs (co-ordinate measuring machines) and gauging systems
- Gauging systems for comparative measurement of machined parts
- High speed laser measurement and surveying systems for use in extreme environments
- Laser and ballbar systems for performance measurement and calibration of machines
- Medical devices for neurosurgical applications
- Probe systems and software for job set-up, tool setting and inspection on CNC machine tools
- Raman spectroscopy systems for non-destructive material analysis
- Sensor systems and software for measurement on CMMs
- Styli for CMM and machine tool probe applications

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