

Effectively delivering the digital quarrying process

A joint partnership that improved safety, efficiencies and blast performance at Hanson UK's flagship site.

Project: The Digital Quarry Project
Client: Hanson UK - Whatley Quarry
Location: Mendip Hills, Somerset



The project

Having provided Rock-on-Ground services to the Hanson UK Whatley Quarry since 2012, EPC-UK worked to evolve both the relationship and operation by creating a testing site at the limestone quarry in 2018. Designed to deliver 'The EPC Way' – the programme was created to introduce the latest and most advanced drilling and blasting technologies to a live UK quarrying operation. The aim has been to create an overall optimised mine-to-mill study and operation.

The objectives

- Reduce scalping percentage.
- Improve efficiencies across the entire quarrying operation.
- Improve blast performance for load and haul.
- Enable safer, remote operations.

By harnessing technologies including drone photogrammetry surveying, SmartROC drilling rigs with automatic hole layout, GPS RTK surveys, remote detonation and specialist Expertir software, blast performances and parameters were optimised and the overall quarry performance improved.

Situational challenges

Delivering the necessary onsite training to ensure personnel understood the technologies and techniques being realised, whilst taking every possible measure to safeguard health & safety processes, were considered principal priorities and challenge points throughout the project's implementation. Other challenges faced included obtaining the relevant telematic data to form accurate baselines to measure from.

Trust and transparency

Further building on the effective relationship already in place between EPC-UK and Hanson UK, the partnership's trust in sharing data and collaborating together enabled the project to be successful and results to be defined.

Implemented technologies

Epiroc SmartROC drilling rigs

GPS navigated smart drill rigs, staggered patterns and auto hole layout have been key to improving capabilities.

Drone surveying

Piloted by trained CAA qualified personnel, drones perform photogrammetry techniques for face profiling surveys from known locations to create accurate 3D models of the area.

Expertir

EPC-UK's integrated and highly advanced drilling and blasting software package is now realised in the Whatley Quarry operation, combining multiple streams of data, generated by the implemented technologies to create complex, accurate and repeatable blast designs.

Expertab

The drilling and hole loading information is uploaded onto EPC-UK's Expertab application for the driller and MEMU operation teams to monitor and record the drilling performance and hole loading process of a blast. This is then re-uploaded, back into Expertir creating a 360° reviewable digital process.

Explore

An online cloud-based database has been integral to the overall software implementation, allowing all relevant data to be accessed and analysed together.



“By trialling both staggered and traditional blast pattern layouts, we've been able to completely optimise the blast performance. Drone technology and post blast fragmentation analysis have enabled us to better realise the changes we're making and drive improved practice downstream.”



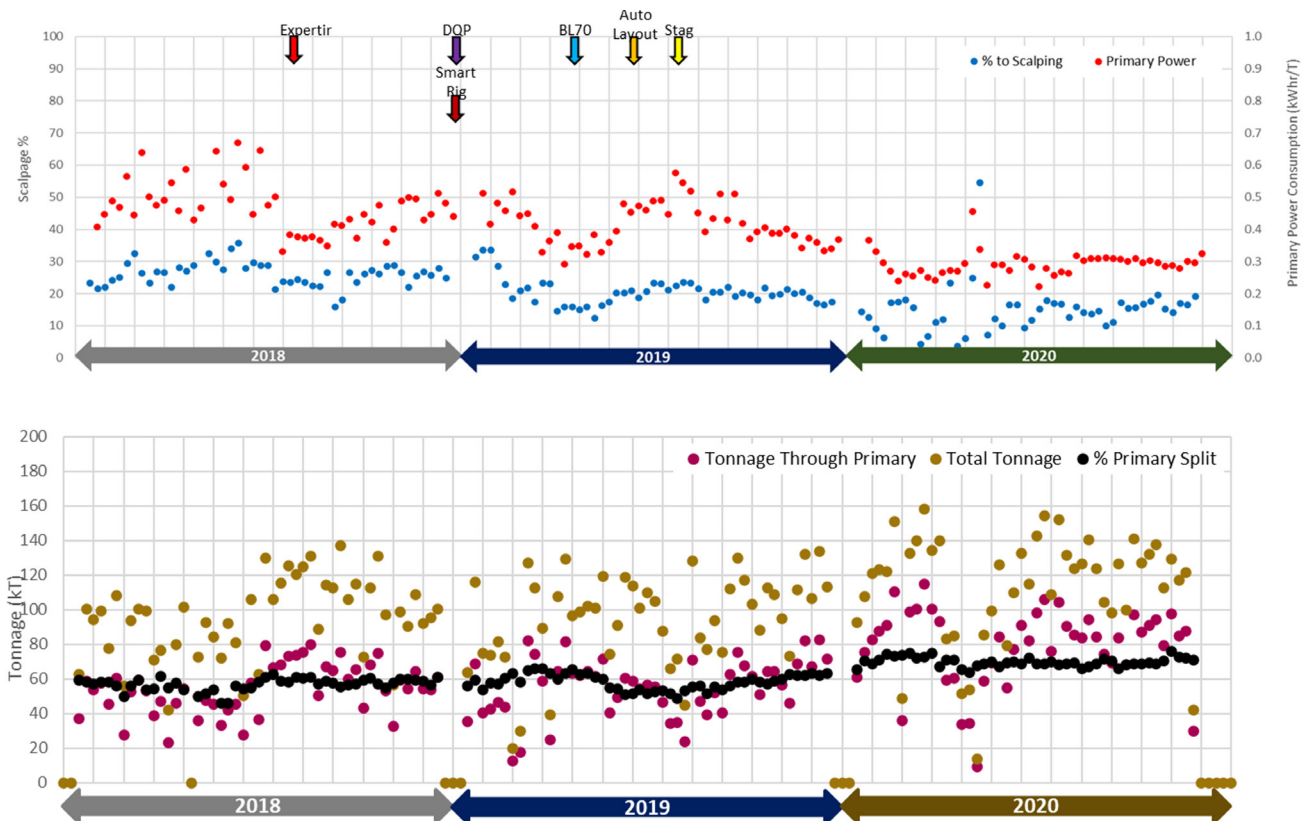
Key results & improvements

- The overall power consumption of the primary crusher was reduced by 0.13 kWh per tonne from 0.42 kWh to 0.29 kWh per tonne, resulting in a total energy reduction of 850 mWh per annum (based on annual production of 6 million tonnes).
- The percentage of scalpings waste product was reduced by 5.7% producing a higher value end product for sale.
- Improvement in the product split was realised, with an increase of 11.5% going through the primary crusher, resulting in fewer scalpings and less oversize.
- An improvement in blast fragmentation has led to a 'tightening' of the particle distribution curve as well as higher throughput and a lower percentage of waste material, alongside a reduction in oversize.

Onsite facts

- Whatley - a 6 million tonne per year limestone quarry.
- Operating with a permanent EPC-UK onsite blasting team and 2 x D60/D65 drilling rigs.
- 100% bulk emulsion explosive used.
- Remote firing and drone surveying is now used for 100% of operations - keeping operatives out of harm's way.
- Hybrid initiation used.
- 45,000 tonne average blast size.
- 4.2m x 4.2m burden spacing blast pattern.
- 15m average bench height.

Processing plant weekly data



Planned procedure

EPC-UK performed a supportive 'management of change' process, and a methodical on-site introduction to new equipment - where one piece of technology was brought in at a time. This considered and calculated approach allowed data to be analysed and quantified at every stage, creating evidence for the quarry to effectively drive improvements.



Results of a collaborative approach

The Whatley Digital Quarry Project has demonstrated that it is now possible to fully digitize the blasting process when working in partnership. By accurately measuring and analysing blast performance using drone technology, mobile plant telematic system data, and relevant load and haul KPIs - significant improvements can be achieved.

“We are now able to fully quantify blast performance and its impact on the entire quarrying operation and can make informed decisions for future blast designs – thereby optimising the entire rock breaking process for a quarrying operation.”

Values that define the way we work



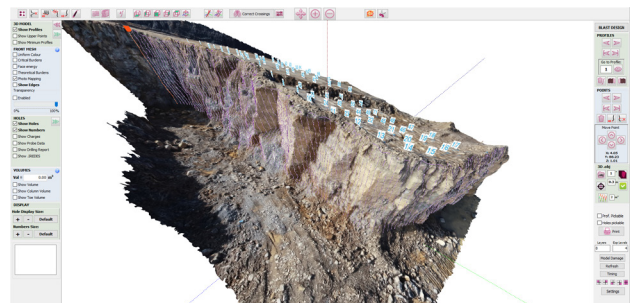
Within all operations, EPC-UK performs using methods that support our company's established SPIRIT ethos, demonstrating **safety, passion, integrity, respect, innovation, and teamwork.**

The Whatley Quarry digitalization project highlights a working example of where EPC-UK's SPIRIT values were both evident and effective.

Throughout the **innovative** technological implementation, we placed operator **safety** as paramount and worked with **integrity**, demonstrating our commitment to doing business the right way first time. By **respecting** our partner's operating processes and building increasing levels of trust, we have been rewarded with results achieved through **teamwork**, and a **passion** for creating a safer, digitalized future for the international quarrying industry.

EPC Metrics solutions - Developing the Digital Quarry “The EPC Way”

Implementing new possibilities that are capable of digitally measuring, storing and analysing data throughout the entire drill and blast process - from surveying and design, to measuring the resulting blast performance - EPC-UK, with support from the EPC Metrics engineering team has achieved the development of a digital quarry, supported with mobile and fixed plant telematic systems to significantly impact productivity, cost optimisation and most importantly, safety.



Find out more

To find out more, scan or click the QR code to watch Dr. Liam Bermingham's explanatory presentation.

