EPC GROUPE

Case Study

Problem solving through expert consultancy

A complex quarry expansion project for Hanson UK, brought to fruition using EPC Metrics' proven knowledge, digitalized capabilities, and skilled drilling & blasting operations.

Project: Blast design to meet pylon vibration limits
Client: Hanson UK
Location: Tytherington, South Gloucestershire

EPC GROUPE EPC METRICS

An operating division of EPC-UK

The project

When the presence of pylons needed to be addressed as part of a site expansion proposal at Tytherington Quarry, EPC Metrics was brought on board to provide consultancy on blast positioning and effective blast planning and design, so vibration limits could be assured and customer value maximised.

Avoiding damage to the pylons – owned and managed by National Grid – was imperative. By drawing on data from regression line work previously performed by EPC Metrics, and using state-of-the-art drone technology and software solutions, the team was able to produce blast designs that would meet all the required criteria, safely and effectively.

The objectives

- To maximise the recoverable reserve through as small a stand off from the pylons as possible.
- To minimise any increase in production costs by making effective changes to blast designs.
- To ensure that any vibration constraints imposed due to the pylons' presence were adhered to.

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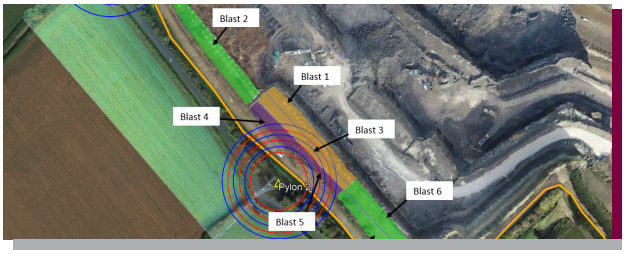
Challenges

- Finding the balance between reserve recovery and increased blasting/processing costs.
- Ensuring the planned blast design was adhered to as closely as possible.
- Limiting deviation from the original blast designs, to mitigate against issues including lost holes or overburdened faces.
- Achieving consistent vibration results in poor ground conditions.



Plan progression

National Grid had not previously imposed vibration limits on the pylons, so EPC Metrics advised the quarry team regarding sensible vibration limits in line with industry standard guidelines.

"As blasts to extend the quarry's excavation area would edge closer towards the pylons' location, we had to plan incremental changes to the blast designs using our VERTEX© software solution to reduce the induced ground vibration."

EPC Metrics had previously performed regression line work at Tytherington Quarry and produced a validated vibration prediction model. To gather further information for this project, they created an up-to-date map of the quarry area using drone technology photography. Photogrammetry techniques were also employed to produce a georeferenced 2D image of the area.

Using all the data, the quarry and EPC Metrics teams worked in collaboration to agree minimum blast standoffs from the pylons. Once established, EPC Metrics could plan a series of blasts to allow additional rock to be recovered and ensure operations remained under the vibration limit.

"Using the gathered data, appropriate distances could be plotted from the pylons to reduce the number of blast design parameter changes made and maximise recovery, streamlining operations and minimising costs."

Assuring compliance

The ground at Tytherington around the pylons had historically produced poor vibration data, so the team had to implement a different process to prove that operations were adhering to the agreed vibration limits. This was achieved by mounting state-of-the-art seismographs directly onto the pylons' concrete bases.

"We analysed vibration data from each previous blast, then adjusted parameters for the next, creating an iterative programme of blast design to effectively recover more rock from the area."

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Implemented technology

The project saw multiple areas of EPC-UK's investment in technology come together to deliver highly successful outcomes.

- Drones enabled up-to-date site visualisation to achieve higher level blast designs and accurate profiling.
- Atlas Copco D55 drill rigs ensured precision drilling, utilising GPS together with pre and post blast drill surveys (A RoG service standard).
- Utilisation of probes allowed shotfirers to record full length drilled holes in wet or dry conditions and ensure adherence to the blast design.
- EPC-UK's EXPERTIR© blast design software, an element of VERTEX, gave shotfirers the confidence to design blasts to meet strict parameters.
- The online database software EXPLORE™ proved integral to reviewing previous blasts and communicating blast information throughout the team.
- Electronic detonators allowed for greater blast timing flexibility and precision, essential when reducing vibration caused through blasting. The use of electronic detonators yield more consistent results in regression lines due to the fact they are inherently more accurate than non-electrics.

Key Facts:

- Introduction of a multi-phase blast has ensured the design is optimised for economy and performance and incremental standoff distances
- Standoff from pylons reduced from 85m to 25m
- Increase of an estimated 1.1 million tonnes of reserves now able to be blasted
- Zero exceedances of vibration limits
- Remote firing and drone surveying is now used for 100% of operations – keeping operatives out of harm's way (A RoG service standard).
- Hybrid initiation used
- Maintained good blast performance
- 100% bulk emulsion explosive used
- Zero safety issues experienced
- Original bench heights maintained

Values that define the way we work

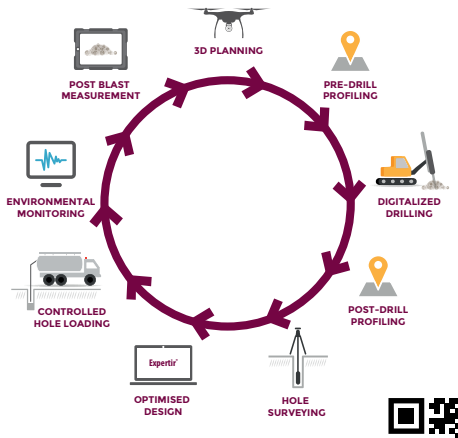
Within all operations, EPC-UK performs using methods that support our company's established **SPIRIT** ethos, demonstrating **safety, passion, integrity, respect, innovation** and **teamwork.**

The Tytherington Quarry expansion project illustrates how EPC Metrics brought our values to the field with notable results for the customer.

Assured compliance heightens **safety**, and the team's **passion** for developing and implementing the innovative technological solutions to achieve safer practice is always prioritised. By performing with **integrity** and **respect** towards the working environment and customer, trust in our capabilities has developed, and our effective approach to **teamwork** has helped to fulfil a quarry expansion project, safely and successfully.

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 and EPC Metrics are realising the development of the digital quarry, supported with mobile and fixed plant telematic systems to significantly impact productivity, cost optimisation and most importantly, safety.



Find out more

Watch Dr. Liam Bermingham's explanatory presentation by scanning the QR code.

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