

Help GB Work Well case study highlights science and innovation in health and safety.

During national science week, HSE want to share a case study about how Crossrail's commitment to its workforce uses a science and innovation approach to provide a safe and healthy working environment for drill operatives.

Crossrail recognised early on in their project that innovation and the use and development of new technology had the potential to manage the risks posed by such a project. Championing innovation from the top of the organisation was instrumental to the changes they wanted to make and funding was provided. Everyone was involved and encouraged to bring forward new and innovative ideas.

One challenge faced by Crossrail was the fitting of supporting bracketry for the electrical cable management systems, overhead power and firefighting systems within the railway tunnel environment. There was a requirement to drill some 250,000 holes. To meet this challenge, a bespoke automated drilling rig was developed, which provided multiple drilling points to create service connection holes.

Whilst the potential for increased productivity initiated this project, the core value of safety and the welfare of the workers was paramount. This resulted in the focus being on improving the working environment for operatives. The innovations made to the drilling rig reduced, and under certain conditions eliminated, the issue of hand arm vibration, reduced the need for manual handling, and provided a key health benefit – the control of Silica dust.

For most of its use on the Crossrail project, the rig has mostly been used along the rails of the tunnels. The changes made provided flexibility to allow the rig to be mounted on tyre mounted vehicles, allowing the holes to be drilled where the track hadn't been laid. This gave the programme some schedule benefit with more work fronts being made available.

The process for setting up the drilling operation included a scientific approach using a 3D scan of the tunnel, development of the programme of data for the machine to operate and input of that data to the machine. The rig was designed and constructed to be capable of drilling 16 holes at a time, working through 250 metres of tunnel a shift. Supporting data suggests that undertaking the same operation manually would complete some 30 metres a shift.

The business benefits of this approach included elimination of setting out resources within the tunnel environment, saving time and reducing safety and health risks at the work face. This was the first time this piece of

equipment has been used in an operational environment in the UK. Developing a solution to improve safety and health while also delivering programme / schedule benefits has proved invaluable and can be of benefit to others in the construction tunnelling environment going forward.

This equipment was a wonderful example of collaborative working across the Crossrail project environment, linking client, designers and contractor's delivery teams, who contributed valuable time and resources into making the rig a success.

There is no doubt that the process and schedule benefits will provide some element of commercial saving but the relevance in terms of improving health and safety in the workplace provided the inspiration for engineers on the project and we hope can inspire others in the future to demonstrate that innovative thinking can effectively align health, safety, cost and schedule benefits.

Further details on the development and use of the equipment will be available on the Crossrail Learning Legacy Website.

Make your commitment today visit [make a commitment](#) to join Crossrail in playing a part in #HelpGBWorkWell during British Science Week #BSW18