health in CONSTRUCTION leadership group

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Making tomorrow a better place

Case study:
Dust management

Problem statement
One of the primary issues facing the team at Paradise Birmingham was the control of dust during the demolition phase of the enabling works.

The primary concerns related to two aspects of airborne particulates. The environmental impact to neighbouring stakeholders from nuisance dust levels and also the potential of health impacts to individual's exposure to uncontrolled levels of dust.

Summary
The project is a first stage enabling contract of a 10+ year major transformational regeneration scheme in the heart of Birmingham City Centre. Historic civic buildings are immediately adjacent to the extensive re-development and the architecture will complement the grand surroundings. The works include the demolition and site clearance of existing structures and the formation of a new podium slab which will support the heart of the development. A new basement car park will also be built extending under a remodelled Chamberlain Square. Major highway alterations have also been completed to help connect the development with the city centre.

The project team recognised engagement was required with all of the major stakeholders to identify their concerns and help manage their expectations. These include the Birmingham Museum and Art Gallery, Birmingham School of Music, Birmingham Town Hall and the Copthorne Hotel.

One of the significant challenges would be the management of environmental impacts, exposure to dust, noise and vibration to the workforce, neighbouring stakeholders and the general public.

What did you do?
We specifically looked at two areas where the management and control of dust specifically affected the health of our workforce and how it affected our Stakeholders and members of the public.

Health of our workforce

- We engaged with our demolition contractor and looked how we could develop personal monitoring that would give actual real time readings
- Personal dust monitoring was trialled to accurately record respiratory exposure levels to the workforce during the demolition operations. The lightweight sampling pump device with Bluetooth® connectivity enables the wearer to be tracked and monitor the pump remotely with a motion sensor which confirms that the pump is being worn. Results were reassuring that exposed limits were not being reached.
- We undertook personal Face Fit testing to any of the workforce required to use respiratory protection equipment (RPE) as part of the focus on protecting the health and well-being of our contractors.
- Rolled out safety critical medicals which focused on monitoring key personnel's health and wellbeing including lung function

Figure 1 personal monitor worn on the belt

Health and Wellbeing of our Stakeholders & Members of the Public

- Provided a dedicated Liaison Manager within the project team to act as a direct link for the 45+ local stakeholders to support and address any issues relating to the project including the nuisance factor of dust, noise and vibration.
- Engaged with Birmingham City Council Environmental Air Quality Consultant for guidance and to provide liaison support when engaging with the stakeholders.
- Collated six months of background data from which suitable actions levels were set. These levels were set with the agreement of the BCC experts. Consultation took place with all strategic stakeholders, explaining the action levels and what would happen should a level be exceeded.
- Installed a combined monitoring device that could identify real time environmental impacts. The intelligent telemetry monitoring station operates on remote receptors located at sensitive areas to alert when trigger levels have been exceeded. The system has a dual function with an integral traffic light providing

Figure 2 monitoring station

visual recognition on site of an activation whilst also sending mobile text notification alerts to the site management.

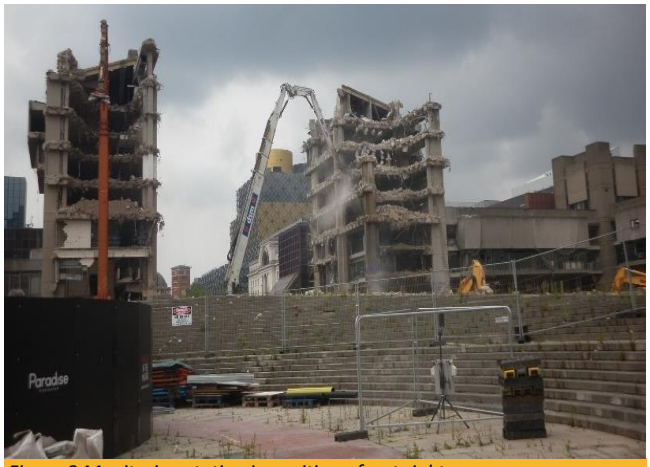

Figure 3 Monitoring station in position - front right

- During the demolition of the existing buildings the ultra-high reach demolition rigs operated with an integrated water spray attachment to suppress dust at the work face.
- "Dust Boss" water cannon suppression systems were utilized to provide water mists to reduce the release of airborne particulates strategically located with consideration to the prevailing weather conditions.

Figure 4 Machine mounted suppression & dust boss

- We promoted the various ways the job could be contacted – via email, phone (24hrs call centre) or Twitter.

Key challenges faced

- Identifying control measures to prevent / reduce the migration of airborne particulates during the demolition of high rise concrete structures.
- Confronting the "it's only a bit of dust "culture amongst contractors and the work force. Addressing the perception that dust is an acceptable hazard in demolition works.
- Interpreting the respiratory surveillance to understand the daily individual exposure levels from airborne particules and recognising where activity levels cease to be harmful or of nuisance.
- Managing the Stakeholders concerns surrounding a major construction project on their doorstep and the perception that any adverse impact on their working environment would be ignored.
- There was no existing environmental monitoring data available to formulate an action plan.

What were the main benefits?

- The use of personal monitoring equipment, face fit testing and health surveillance has raised awareness across the work force of the risks associated with airborne dusts.
- Having a greater understanding of the respiratory exposure levels from airborne particulates during major demolition works.
- The personal monitoring gave real time data as to whether operatives were being exposed to dust above the agreed levels. Which were set below legal limits.

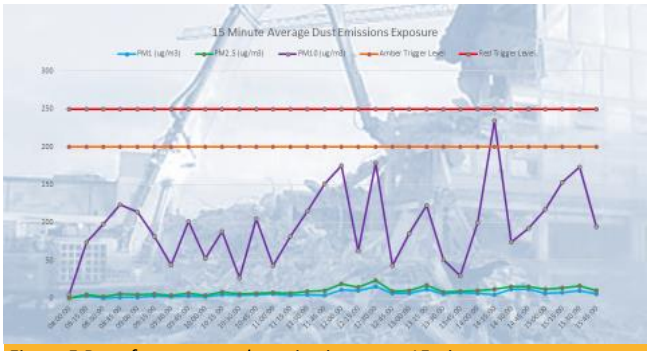

Figure 5 Data from personal monitoring every 15mins

- Tackling dust at source with use of hi-reach suppression techniques reduces dust migration and therefore reduces the requirement for wider dust control measures such as RPE and road sweepers. Reducing the need for RPE has a positive effect on the comfort and general wellbeing of the work force, while reductions in road sweepers and other cleaning services has a financial benefit.
- By working with the neighbouring stakeholders and developing an open communication link during the pre-construction phase, the team were able to focus on their concerns and formulate a monitoring strategy beneficial to all parties. Stakeholders felt assured and had confidence that Carillion would listen and react to the environmental impact issues from dust, noise and vibration to their businesses.
- Having access to real time data from the monitoring equipment was a real benefit, both for understanding current site conditions, see below, and dealing with complaints. E.g. If a stakeholder makes a complaint on

dust levels, the data can be quickly downloaded and converted into a graph to demonstrate the trigger levels against the vibration levels during the relevant time period. We had a lot of positive feedback from stakeholders by answering complaints quickly and with factual evidence to support our statements. We were also able to give stakeholders access to the live data stream should they wish.

Measures of success

- Having a greater understanding of the control of respiratory exposure levels from airborne particulates during major demolition works.
- Well-being: a culture change across the workforce on the harmful effects of dust has been noted during engagement sessions on site.
- At no point have the actions levels been triggered for either dust, noise or vibration.
- Working in close collaboration with our stakeholders has created a meaningful platform from which to build on during future phases of the development. Several testimonials have been received on the proactive approach to the city wide liaison.

Lessons learnt

- Demonstrate that Health and Well-being remains at the fore front of our HS&S ethos by continuing to embrace new technologies and providing health surveillance support.
- Formulate best practice demolition standards focusing on dust management. Including both personal monitoring and background monitoring.
- The significance of early engagement with stakeholders as a method to remove blockers and build trust.

Supporting material

Monitoring station information:
http://www.siteprotech.co.uk/

Site Pro Tech Web Brochure.pdf

Personal monitoring:
http://www.casellasolutions.com/uk/

apex2-handbook-english[1].pdf

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