home safe and well

CASE STUDY AECOM | 1.1b) – Apr23'- Jun3'
A63 Castle St – Diaphragm Wall Cable Break

Introduction

A63 Castle Street scheme is currently at PCF Stage 6 construction phase. The AECOM team work on site full time, and have a requirement to be in fairly close proximity to construction works such as the excavation of diaphragm wall panels. Diaphragm Walls (D-Walls) are excavated using a very large grabber and occasionally a large 10T chisel to ensure verticallity of the extents of the panel excavation. This digging, excavation and chiselling activity is a high risk activity.

Overview

AECOM were made aware that during a D-Wall excavation shift there was a cable break on a sling that was being used to support the chisel attachment. It was reported that an operative not directly involved in the operation reported being struck on the shoulder by a piece of wire rope approximatley 20 meters from the point of failure (outside of the exlusion zone). The injured party was checked out by a first aider and returned to work.

The sling that failed was supporting the chisel attachement. As part of the Diaphragm wall construction a Liebherr HS8130 Duty Cycle Crane utilising a 7 meter long chisel attachment was in the process of removing excess concrete that was encasing a stop end at a depth of circa 6 meters. The operator experienced some resistance when lifting the chisel out of the excavation and seconds after the crane's load alarm had sounded and the 12 tonne wire rope sling connecting the chain block to the chisel failed. The chisel remained 'wedged' near the base of the 10 meter excavation (it had not been suspended at height at the moment of failure).

This failure was clearly very serious and dealt with accordingly by all parties involved on site, to include National Highways, Contractor & sub-contractor and AECOM. All parties worked collaboratively to resolve the issue and ensure that it did not occur again.

Challenges

- Ensuring all parties involved understood the seriousness of potential dangers to site staff who were witnessing the excavation of the diaphragm wall panels.
- Ensure that a change was made to ensure extra measures were put in place to ensure maximum safety on site.
- Ensuring that the cable break was investigated thoroughly and communicated back to the client and site staff.
- Ensuring that lessons were learnt due to this failure, and mitigation meansures were put in place to avoid reoccurance.

Images

Action Taken

The Contractor and the sub-contractor led an investiation, with input from AECOM. All Diaphragm Wall works were stood down and an investigation initiated. Initial steps taken –

- Statement taken from the crane operator 18.03.23 and photographs taken of the incident
- Failed wire rope sling quarantined and later removed from site for analysis
- Liebherr engineer visited site 21.03.22 to download load date from the crane and confirm whether the crane was unaffected by any potential shock loading
- Early replacement of crane wire rope
- Review of Diaphragm Wall work package plan and development of a plan for retrieval of the chisel

Following the above actions AECOM suggested that the following mitigation measures be implemented to ensure the safety of our own staff on site.

- A 'Waiting Zone' on site, where AECOM Staff can wait on site in a safe location before being accurately briefed about the site activities and where it is safe to be. (Photo example – Figure 2)
- Paper briefing sheets that AECOM can read and sign to ensure all activites and H&S points are understood properly before entering site. (Photo example – Figure 3)

Results

Following the above actions, the 'Waiting Zone' and the Briefing sheets on site were implemented to ensure the safety of all the AECOM site staff and other staff witnessing works. Also, the Contractor and Sub-Contractor implemented new sling storage on site, that made it very clear which slings were available to ensure the correct sling class was being used for the correct lift. It was concluded that the 12T sling was not the correct sling to be using with the 10T chisel, as it may have been under too much stress when attempting to remove the 'stuck' chisel. The D-Wall operations were put on hold for 2 weeks during the completion of the principal investigation into this sling failure, and all the site operatives were re-briefed in detail about the lifting works on this operation. More details lifting plans were implemented to ensure the correct slings were always being used and maintained.

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Figure 1- Cable break location and broken cable highlighted

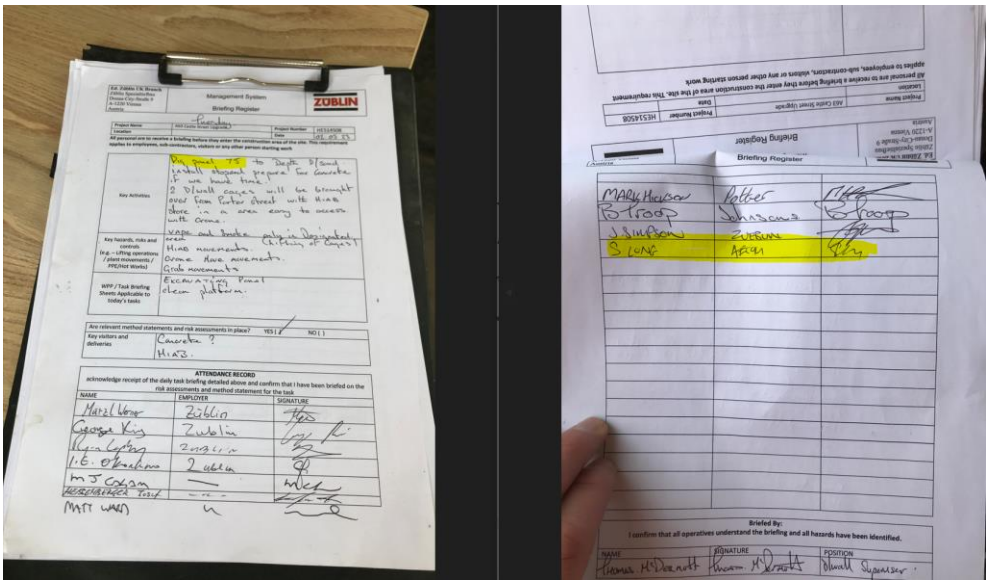
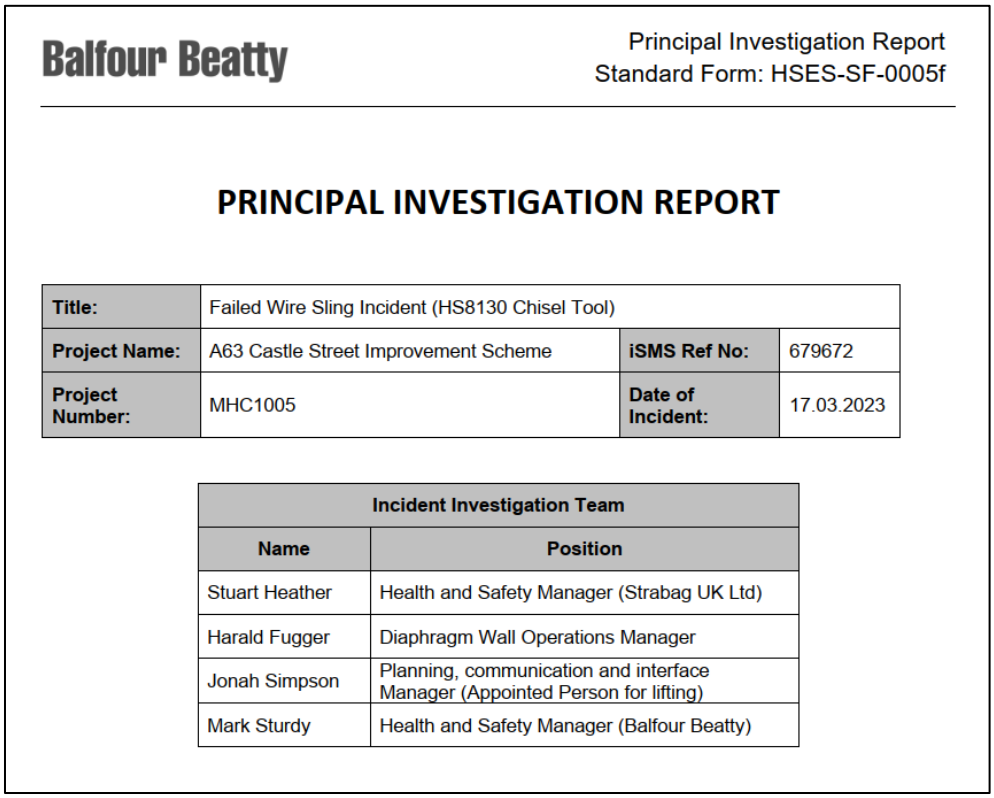


Figure 2 – Briefing sheet example to be signed by all site attendees

Figure 3 – Site visitor waiting area (pre-brief)

Figure 4 – New sling storage to ease of use and understanding



Balfour Beatty

Principal Investigation Report
Standard Form: HSES-SF-0005f

PRINCIPAL INVESTIGATION REPORT

Title:	Failed Wire Sling Incident (HS8130 Chisel Tool)		
Project Name:	A63 Castle Street Improvement Scheme	**iSMS Ref No:**	679672
Project Number:	MHC1005	**Date of Incident:**	17.03.2023

Incident Investigation Team	
Name	**Position**
Stuart Heather	Health and Safety Manager (Strabag UK Ltd)
Harald Fugger	Diaphragm Wall Operations Manager
Jonah Simpson	Planning, communication and interface Manager (Appointed Person for lifting)
Mark Sturdy	Health and Safety Manager (Balfour Beatty)

Figure 5 – Screenshot of Principal Investigation Report Title Page