

Confidential Reporting on Structural Safety (CROSS): newsletter 55



We highlight a report from CROSS newsletter 55 on a failure stemming from buildability issues.

813: Failure of waling beam connected to raking prop

A reporter writes in response to CROSS report 298: *Props to large excavations*, as they have witnessed a failure on site as a result of the design issues discussed in this report.

Figure 1 shows a detail where the design required a cantilever beam to resist the vertical reaction from a raking prop where it connected to the waling beam. The cantilever beam was welded to the sheet pile behind and the design required that a large fillet weld be applied around the entire beam.

However, the contractor installed the cantilever beam after the waling beam had been fixed and was therefore unable to fully weld around the bottom flange.

The partial weld to the bottom flange failed, allowing the beam to rotate upwards. The weld to the web of the beam seemed to remain intact, with the rotation causing local deformation of the sheet pile at the web.

The reporter adds that additional brackets were welded on as an emergency remedial measure.

CROSS Panel comments

One feature that this failure highlights is that 'design' is not just a matter of calculation. If it was impractical for the contractor to install the cantilever beams prior to the waling beam, then the temporary works designer could have realised that, with the waling beam in place first, it would be difficult or impossible to weld or otherwise fix the bottom flange of the cantilever beam.

Equally, if the design cannot be built, there should be an onus on the contractor to go back to the Temporary Works Coordinator to flag the issue and get a revised solution from the temporary works designer. A discussion



Figure 1
Failure of waling beam connected to raking prop

on construction sequencing between the temporary works designer and the contractor should have resolved this issue.

From the description, the cantilever beam failed upwards, implying tension on the bottom flange, which is the exact location where the weld was omitted. Self-evidently, the resistance of the profile weld must have been significantly less than the design intent.

This incident shows a repeated theme from numerous CROSS reports that what was actually built did not match the design intent. As with report 844: *Defects in tapered thread reinforcement bars for coupling*, site inspections are highly desirable.

Full newsletter

Newsletter 55 also contains the following reports:

- 798: Industry not reacting to failures
- 844: Defects in tapered thread reinforcement bars for coupling
- 784: Swapping insulation behind cladding without adjusting details
- 794: Contractor uses incorrect fixing bolts for masonry support angles
- 800: Retaining wall excavation collapse
- 467: Large stone panel falls from building facade

Read the newsletter in full at bit.ly/CROSS_NL_55.

WHAT IS CROSS?

Confidential Reporting on Structural Safety (CROSS) is a confidential reporting scheme established to capture and share lessons learned from structural safety issues which might not otherwise have had public recognition, with the aim of preventing future failures.

Analysis of the reported safety issues can provide insight into how the safety concerns or events occurred and spur the development of measures to improve safety.

WHAT SHOULD BE REPORTED TO CROSS?

Structural failures and collapses, or safety concerns about the design, construction or use of structures should be reported. Near misses, or observations relating to failures or collapses (which have not been uncovered through formal investigation) are also welcomed. Reports do not have to be about current activities as long as they are relevant.

Small-scale events are important – they can be the precursors to more major failures. No concern is too small to be reported and conversely nothing is too large.

Your report might relate to a specific experience, or it could be based on a series of experiences indicating a trend which may require industry or regulatory action.

Submit a report to CROSS at www.structural-safety.org/confidential-reporting/submit-report/.

RECEIVE THE NEWSLETTER

Readers can register to receive the CROSS newsletters at www.structural-safety.org/subscribe.