

## Safety Alert 24-13 Coupled Rebar Failure

*The following Safety Alert contains content from an external source which is relevant to MWH Treatment Operations.*

### What Happened?

Threaded reinforcement coupler bars failed in shear under light loading.

### Location of the bars and outlet channel

The outlet launder channel to the ASP is connected to the adjacent wall 4m above the ground by the use of reinforcing bar couplers. The couplers were chosen to speed up the construction of the ASP walls by reducing modifications to the wall formwork to accommodate reinforcement.

### Leviat threaded bar

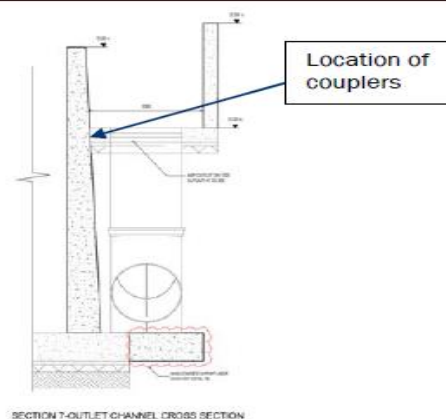
An issue was identified whilst fixing the threaded bar into the coupler. The threaded section suddenly failed under a small shear weight, resulting in the bar breaking from the coupler. Had the site team not noticed, and the soffit poured, there could have been a catastrophic structural failure of the overhanging outlet channel.

Works were immediately stopped and the MMB technical team were informed. They liaised with the supplier, Encon Construction Products, and manufacturer, Leviat, to recover samples from site and understand the cause of failure.

### What was found

- 600 no. 16mm bars were affected.
- Failure occurred under minimal shear weight and was not due to over torquing the bars on site.

### Photos



**Photo 1:** Location of the couplers on wall Y of the ASP



Photo 2: 16mm dia male threaded bar



Photo 3: Sheared failure at threaded section

### Immediate corrective action taken

- Works were halted whilst an investigation was carried out and a solution found.
- All previously installed threaded bars were removed.
- The procurement team have checked that no other bars have been purchased from Leviat on Client schemes in the last 3 months.

Leviat conducted an initial investigation and found the product faulty, and confirmed that they believed:

- The cause of the failures was due to a worn former on the testing machine used to proof load the bar as part of their quality control procedure. It caused the threaded section to be loaded at an angle, inducing stress and resulting in a fracture beneath the thread.
- The worn former has been replaced and manufacture of replacement bars commenced.
- In house tensile testing of the new bars was undertaken, with MMB witnessing. Further testing of the faulty and new bars was undertaken by a CARES accredited laboratory.
- Fractures were visible in both old and newly machined bars, as a result of machining the thread on the bar. This led the delivery team to change the construction methodology from a cantilever to a ground bearing structure. We are still liaising with Leviat to try and obtain a root cause of the failures.

### Learning: What do we all need to do?

**All MWHT Project / Site Managers must identify where Leviat / Ancon / Halfen threaded bar couplers have been / are being used on their projects, particularly for cantilever and suspended slabs and to notify Craig Flint (MWHT Civil Lead) and the SHEQ team.**

*Safety Alerts should not be thought of as an incident investigation report. They are issued to raise awareness of incidents that occur and to highlight the safe work practices required to avoid them being repeated.*

