Research Problem Statement – Pile Cleaning

How could your research contribute to ensuring internal foundation pile surfaces are clean of any marine growth?

Problem (and business need)

A dock facility is anchored to the bedrock by several (70+) steel foundation piles. The foundation piles must be periodically surveyed. To undertake accurate inspection surveys and data capture it is essential that the pile surface is clean of any marine growth, sediment, calcium build-up, dirt etc. Borescope surveys undertaken indicate that the internal pile wall surface is fouled. Babcock have undertaken an optioneering study and concluded, largely due to access constraints and the perceived presumption of a calcium limescale build-up, that a chemical solution stands the best chance of success with the least amount of bespoke design or infrastructure alterations. Any chemical cleaning technique MUST NOT negatively impact the material substrate.

Sensitivity (e.g. whether commercial, official sensitive etc)

Problem and specification: Official. Facility is within the nuclear licensed site. Access will be restricted

Specifications (more information available on request)

The foundation piles are vertically aligned and buried in concrete ~1m beneath dockside level. Each pile is only accessible via ~50mm diameter plastic access tube, which consists of slight bends and is not consistent across piles. This poses a serious challenge in deploying any surveying equipment into the foundation pile.

The access tubes are ~3-4m long, starting at dockside level and emerging into the pile at an unknown location. Some of the piles are up to 50m in depth; however most have a concrete toe approximately 10m to 20m beneath dockside level. The first 2m of the pile (at the concreate cap) are expected to be the worst areas for corrosion.

The configuration of the steel piles is as follows:

1. The piles have an internal diameter of approximately 700mm and a nominal thickness of 28.6mm;
2. The piles are manufactured from structural steel S355 J2;
3. The internal surface of the piles is covered in a surface contaminant thought to be a calcium deposit;
4. The piles are either partly, or fully, immersed in water. This can be drained if required.
5. The water within the piles can be cloudy; and
6. The piles consist of periodic narrowing's, due to the location of internal support rings or butt welds.

Scope

Cleaning process only

Desktop study; development of laboratory trial; clean up and waste disposal; metallurgical assessment; environmental assessment. Preparation for site trial.

Potential Research Areas (not exclusive)

Metallurgy, Chemical engineering

Owner/Sponsor contact details

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