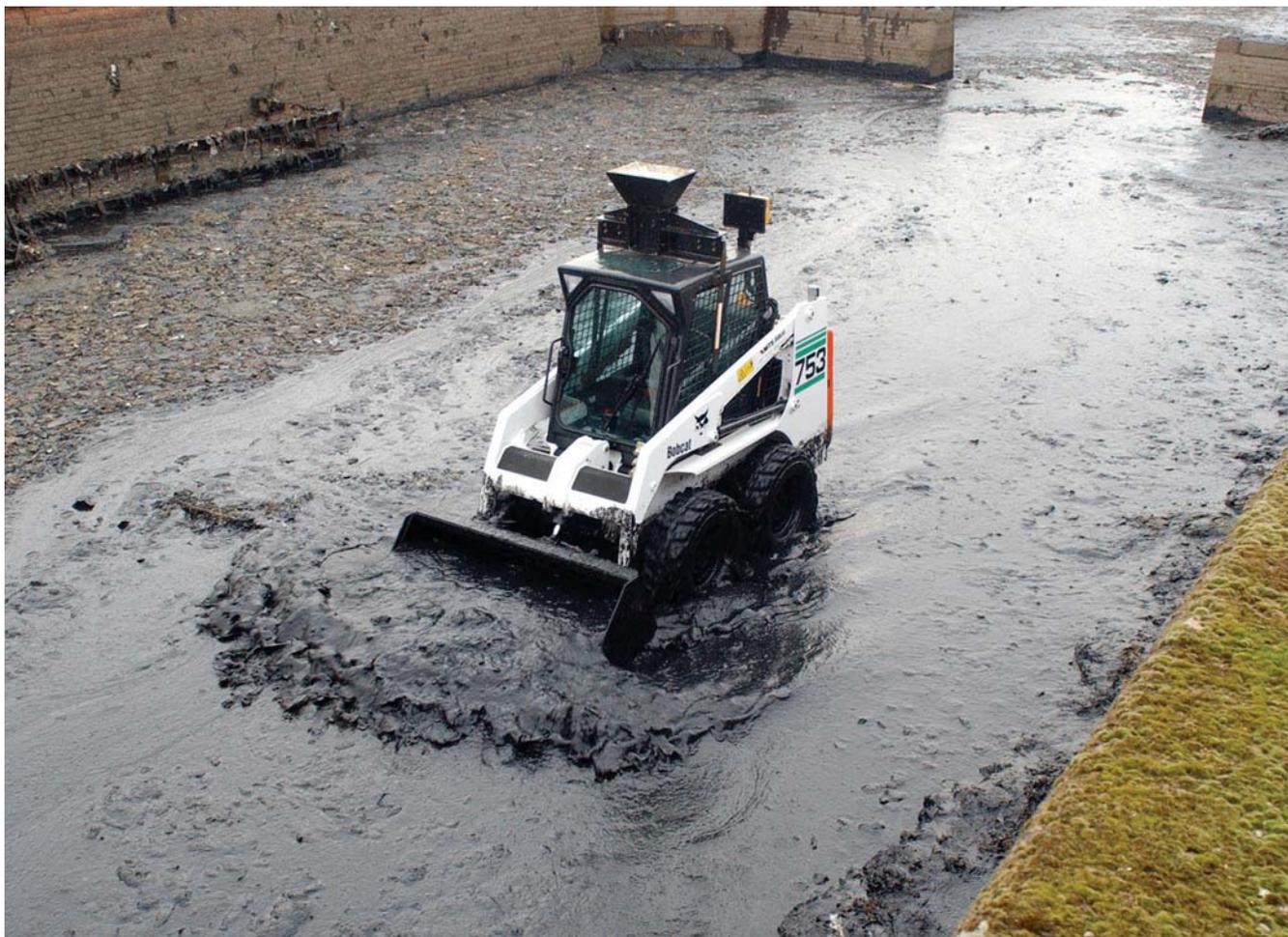


Knostrop WwTW- Leeds

technology used to clear land mines cleans storm tanks

by Dave S Young BSc, CEng, MICE, FCIWEM

An innovative application of technology, more frequently seen clearing landmines in Bosnia than sewage sludge in Yorkshire is improving safety at a major sewage treatment works near Leeds. A specially built remote controlled Bobcat plant vehicle has removed the need for an operator to be placed in a potentially risky environment, at a quarter of the price of alternative automated solutions.



Knostrop STW: A remote controlled 'Bobcat 753 which can clear sludge up to 3 m deep from storm tanks

courtesy: MWH & Yorkshire Water

In February 2003, Yorkshire Water issued a brief to *Gleeson MWH* – the Joint Venture contracted to carry out design and construction of all wastewater schemes in Yorkshire Waters Western Area – to find an alternative, cost effective way to clean out storm tanks at Knostrop WwTW, a facility serving the entire city of Leeds.

Previously, an operator driving a modified dumper had cleaned the 10 tanks - cumulative area in excess of 15,000m² - manually following a storm. Although a common process at many treatment works, Yorkshire Water was concerned about the potential safety risk presented to the operator working in the tanks in the event of an accident.

Options explored

Conventional options were explored in depth and ultimately rejected due to high cost. These included the provision of scraper bridges and mixing, auto emptying and return contents to the head of the works. The chosen option, when compared with the conventional methods, showed an overall saving of approximately £1m.

Innovative solution explored

The manual procedure for pushing sewage sludge presents hazards as the operator of the machine is inside the tank. The only way to increase safety was to remove the operator from inside the storm tank altogether.

Investigation revealed that Merseyside Fire Brigade used remote control technology, as did the Army for clearing land mines. These applications used basic technology but proved in principle that the system worked.

The manufacturers of all appropriate plant vehicles and companies that specialised in industrial quality remote control devices were contacted before creating a detailed functional design specification for the vehicle, that included a series of modifications to make it suitable for operation in up to 600mm of raw settled sludge.

Solution

The result, a *Bobcat 753* skid steer loader with proprietary remote

control technology by *Joysticks Ltd.*, can be operated either remotely or manually. A range of fittings to the front of the vehicle mean that in addition to clearing sewage sludge from the 3 metre deep concrete tanks, it can be used for a variety of other tasks around the site, making it a flexible and cost efficient asset.

Existing jib cranes were of insufficient capacity to lift the new vehicle and were, therefore, replaced with 5No. double goal post arrangements with horizontal lifting beams, each serving two tanks. Handrailing was modified to allow the vehicle to be lifted through the edge protection into the tanks.

A special latch-in/latch-out lifting arrangement is fitted on top of the vehicle to facilitate lifting without the need for man access into the tanks as the hook releases when the load reaches the tank floor.

Result

As well as enhancing safety, the remote control *Bobcat* provides a labour saving: the clearance work previously required two operators, one driving the dumper, another outside the tank as a precaution in case of breakdown or accident.

The new system, operated entirely from outside the tank, eliminates the need for another operator.

The combination of cost effectiveness and enhanced safety is proving popular: other Yorkshire Water sites have already expressed interest in using the equipment. ■

Note: *The author of this article, Dave S. Young, is a Project Manager with MWH.*

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