

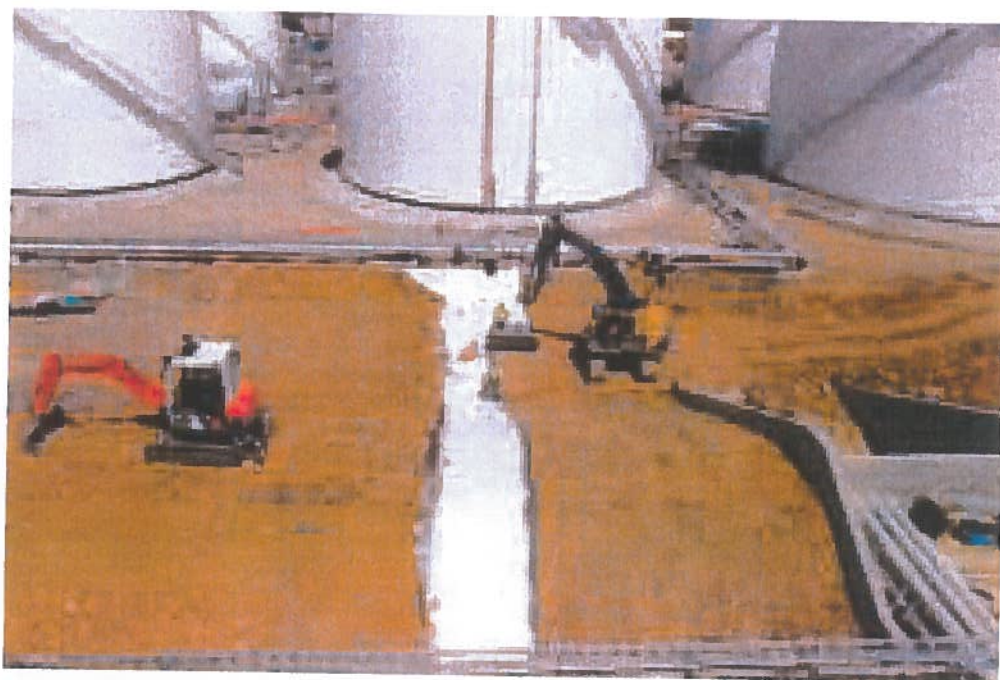
Today's engineers face important choices about long-term hydrocarbon containment against a backdrop of increasing scrutiny

Retrofitting bund liners

Long-term barrier performance is not merely optional for owners, engineers and managers of the tank farms within petrochemical containment installations.

The stakes are high not only for the environment and its inhabitants, but also for the site owners if they are found not to meet environmental regulations. A reliable containment solution is of vital importance in the construction and maintenance of the tank farms within refineries and terminals. The volatile nature of petrochemicals makes them a demanding long-term challenge for the protection systems chosen.

Traditionally, risk of spillage from storage tanks is mitigated by the incorporation of an environmental protection barrier beneath tanks and within bunding designs; bunding is used to prevent the liquid from causing damage (either by force or its chemistry.) If a large tank has a catastrophic failure, the liquid alone can cause extensive damage simply



Rawmat HDB installed to line an overflow lagoon between the bunds

by the force it exerts on the floor and wall of the bund, and therefore the integrity and strength of the bund at maximum capacity is vital. Bunding must be large enough and strong enough to meet

the regulations – 110% of the largest tank or 25% of the combined volume of all of the tanks within the bund.

The Department for the Environment, Food and Rural Affairs is keenly reviewing the

safety of the UK's fuel storage arrangements in the wake of the Buncefield disaster. Over 80 sites are under a complete review with a further 40 falling under the auspices of another review focused on the Buncefield disaster itself. The performance of the structures used to store the nations' fuel supplies has never been under such intense scrutiny, and a crucial component of these structures is the materials which are used to provide the all-important barrier between combustible, polluting hydrocarbons and the environment where they are to be stored.

It is a legal requirement in the UK to provide a watertight bund around hydrocarbon and chemical storage tanks as well as transformers in electricity sub-stations which use oil for cooling and insulation purposes. To comply with the regulations,

BP's post-Buncefield upgrade

BP Logistics has selected Rawmat HDB as its preferred system for upgrading the floor and earth embankments at its Hemel Hempstead terminal in the UK. This is located across the road from the HOSL site and previously scene of the Buncefield Fire. The clay bunds in the Hemel Terminal were used to hold the fire water from the disaster site, BP chose to upgrade its bunds in compliance with the regulations.

Using designs supplied by Trident Engineering the embankments were stripped and graded, Rawmat HDB and slope stabilisation geogrids installed and the clay replaced over the membrane. Joints connecting the sheets of Rawmat HDB were sealed using a pre-hydrated

bentonite mastic to provide an immediate seal as each sheet was laid. The floors to both bunds were lined in a strip, lay, cover operation: removing 300mm of clay, placing and jointing the Rawmat membrane then covering it with the clay as the next section is prepared. A thin layer of clean gravel was introduced over the clay across the floor of the bunds.

To comply with the containment capacity requirements BP also constructed an overflow lagoon area between the bunds, removing an access road to attain the required capacities. This same system has been adopted across a number of other BP sites throughout the UK, as part of a programme to upgrade its terminals.