

company managed to build a network of 12 subsidiaries, including five production plants and now operates in eight European countries and the Russian Federation. **Visit OKZ HOLDING at stands 124, 125, 138 and 139.**

Recognising that not everyone will have a thorough knowledge of the recently updated API 2000 6th Edition (ISO 28300) and TRBF 20, in 2009 **Protego** launched the first sizing programme to incorporate the new requirements for calculating both normal and emergency venting of atmospheric and low-pressure storage tanks. Having received several hundred requests for installation of the software, it can safely be said that it is already becoming a valued tool within the industry.

On top of the tank or in the tank; hot or cold weather; corrosive; sticky or clean; Protego has the correct solution for the application. For example, customers with tanks storing flammable liquids would benefit from highly reduced emissions and lower costs of ownership by using the model VD-TS, combination pressure/vacuum vent valve with integrated flame arrester. The ten percent full-lift technology, long used by Protego, has proven to limit standing breathing losses to a minimum, while the easily accessible Flamefilter ensures less down time during inspection and maintenance.

Specialty solutions include the model UB/SF, a unique and proven diaphragm type pressure/vacuum vent valve with integrated dynamic flame arrester function. This is the only solution that will prevent tank implosion or explosion by keeping pallets from sticking or flame arresters from clogging when used in freezing or polymerising vapour services. Specifically designed and approved for ethanol applications, the model PV/EBR-E pressure/vacuum vent valve with integrated flame arrester assures safety even when stabilised burning occurs during long-time out-breathing of the tank. For existing or new installations of Protego pressure/vacuum vents in cold environments, frost-proof operation must be ensured.

In order to minimise

contamination more and more storage tanks are utilising Protego floating suction units, especially for fuel storage; for example the kerosene tanks at the new Dubai Airport. A model previewing the functional principle will be shown.

The newly developed, service-friendly flame arrester unit (flame bank assembly) for Protego in-line flame arresters will be showcased. Where lower service and spare parts costs are critical factors this innovative design minimises maintenance expenditures. **Visit Protego at stands 61 and 62.**

The Netherlands-based **Ragworm** has recently completed a project with Shell U.K. at one of its terminals. After carrying out statutory inspections of three 95,000m<sup>3</sup> capacity floating roof storage tanks it was confirmed that the steel floor plates in each of the tanks had suffered excessive corrosion and had to be replaced.

The general scope of work was to remove and renew the tank floor plates, repair / replace the corroded sections of the tank floating roof plates (centre deck and pontoon plates) replace the floating roof periphery seals and replace the floating roof articulated roof drains

Shell U.K. awarded this contract to the UK's Amec Power and Process Support Services. Amec contacted and introduced its specialist sub contractor, Ragworm by Jet Set Hydro Technics, to the Shell Stanlow Projects Division.

A full health and safety assessment was carried out on Ragworm Jet Set Hydro Technics by Amec and approved by Shell, prior to a sub contract order being placed by Amec on to Ragworm to carry out the of the tank floor plates, by use of Ultra High Pressure Water Cutting Methods (UHPWC.).

Ragworm's unique UHPWC system uses 70% less water than conventional cold cutting systems and low impact under the floor plates.

The use of minimum quantities of water to cold cut the floor plates was a critical factor, as the substrate under the floor plates was

heavily impregnated with crude oil, the introduction of additional water would greatly increase the already anticipated disposal cost of the contaminated substrate.

The project took seven days for the total cutting length of 3,400 metres of the tank floor plates. **Visit Ragworm at stand 108.**

**Rawell Environmental** is a UK-based manufacturer of Rawmat HDB – the world's only pre-hydrated, high density bentonite geosynthetic clay liner. The membrane is highly resistant to hydrocarbons, acids and saline ground conditions. The membrane utilises a unique, 5mm thick layer of pre-hydrated bentonite clay which is laminated between protective geotextile carrier fabrics. This carpet-like material provides a flexible impermeable barrier which can be installed as secondary containment for both upgrading of existing facilities and the construction of new tank farms.

Secondary containment is an issue facing storage terminals and refinery management across the globe. A reliable containment solution is of vital importance in the construction and maintenance of the tank farms within these sites. Operators are fully aware of the obligations and requirements post-Buncefield and are looking at the options open to them for the provision of secondary containment barriers to bund floors and beneath tanks.

The Rawmat HDB system has already helped many oil companies and terminal operators achieve the levels of bund impermeability required for compliance with Control of Major Accidents and Hazards (COMAH) Containment Policy in the UK, by offering true hydrocarbon resistance in a cost-effective manner. For concrete and earthen bunds alike, or even in tank floor replacement applications, Rawmat HDB is manufactured in an ISO-accredited, quality-assured environment to a consistent standard and allows swift coverage for minimal down-time of facilities.

**Visit Rawell Environmental at stand 183.**

**Tanksystems** and Shell Global Solutions have recently

conducted fire tests on floating roofs. Both GRE full contact floating roofs and aluminium pontoon type floating roofs have been fire tested at the Maritime Safety and Rescue agency in Spain.

All tests have been done by Niall Ramsden from Resource Protection International, member of the Last fire Group. The fire tests proved that the Tanksystems GRE floating roof withstands a full surface fire. After each fire test (lasting over 1.5 hours) the Tanksystems GRE floating roofs showed no damage. The fire tests on the aluminium pontoon type roof resulted in a pool fire within minutes and a complete loss of the floating roof.

So besides the proven effectiveness on the emission reduction, the Tanksystems GRE full contact floating roofs might also be considered as a fire blanket, reducing the risk of tank fires like Buncefield and recently in Puerto Rico to a minimum.

Another new development is that Tanksystems pressure tested, with good results, the gas tightness of their primary seal. Tests have been performed on the Tanksystems GRE floating roofs as well as on external floating roofs in the Netherlands, Germany and Denmark. The German TUV certified the seal in accordance with TA Luft

Knowing that with a non gas tight seal the emission from a tank increases with a factor from 10% to 100% a certified gas tight Tanksystems seal not only reduces the emission considerably but is also minimises the risk of a rim fire.

With the Dutch resin manufacturer DSM, Tanksystems tested a new resin that is 100% harmless for the environment and is 100% emission free during application. The resin has been developed for use in a wide variety of products and has an improved chemical resistance. **Visit Tanksystems at stands 187 and 188.**

#### From overseas

**Baillie Tank Equipment** [BTE] has added geodesic dome roofs to its line of tank