

Guidance

Following report of an incident involving the failure of an air pressurised road tanker

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SITUATION

An incident involving the failure of an air pressurised road tanker used for the transport of granular carbon has highlighted the potential for thinning due to erosion during loading &/or discharge of product. Fortunately no one was killed or injured in this incident.

Discharge of the contents takes place through a nozzle connection in the rear of the tank using air pressure as a means of propulsion. As can be seen from the photograph at the time of failure the tank is tipped up vertically so that all of the contents can be discharged.

The tank can be filled by two alternative methods:

- by pouring the carbon into the tanker from the top filling hatches
- through a pressurised pipe blowing the carbon into a connection at the top of the tanker.

The carbon product is highly erosive and the jet of carbon entering the tank when the filling pipe was used caused smooth wastage to a localised area at the bottom of the tank. The smooth wastage could not be detected by visual examination of the tank although it would have been possible to detect it by ultrasonic thickness checks. Spot ultrasonic thickness measurements were routinely carried out local to the unloading nozzle during periodic examinations which is a well known problem area for erosion. There was a lack of awareness that the tanker could be filled through the nozzle connection in the top of the tank and the erosive effect this had on the tank shell.

An investigation of the incident revealed that the initial failure was longitudinal at around bottom dead centre position below the loading nozzle. The failure propagated in longitudinal direction to the adjacent points where the shell was reinforced by doubling plates [chassis resting points]. The failure then continued in a circumferential direction along both reinforced areas to a point where the shell was almost separated in two. Checks on similar tankers in the fleet revealed that they also had erosion in the same area.



Failed tanker in the upright tipping discharge position

GUIDANCE

It is essential that vessels [including road tankers] that may be subject to erosion especially during filling and/or discharge operations are subject to ultrasonic thickness checks in susceptible areas. It is therefore important to understand how the equipment operates in order to identify potential problem areas.

Where there is potential for erosion then routine ultrasonic thickness checks should be specified on reports and included on the written scheme of examination for the item.

Note: potential erosion during both filling & discharge need to be considered

Engineer Surveyors should be aware that in general road tankers are manufactured to the minimum thickness allowed by standards in order to reduce vehicle weight and increase payload and that erosion/corrosion allowances may be limited.