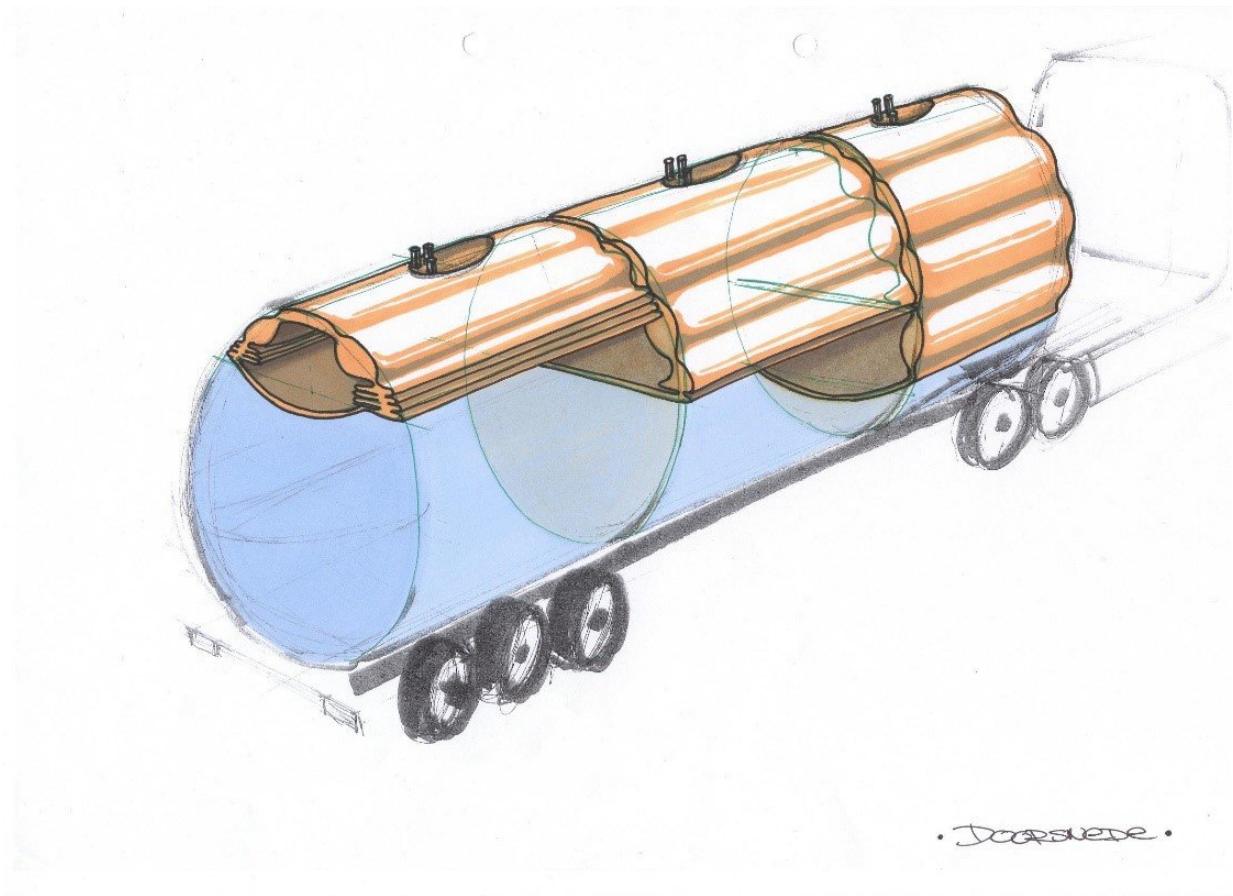


Airbag prevents tanker trucks from tipping over

November 28 2017



Credit: University of Twente

Dr Erik Eenkhoorn has designed a system that can secure liquid loads, making the transport of bulk liquids much safer. Inflatable components

prevent tanker trucks from tipping over, and reduce fuel consumption, as well. Erik Eenkhoorn recently graduated from the University of Twente with a thesis on this design.

According to the graduate, the existing legislation is part of the reason for countless accidents involving tanker trucks. There are strict rules for securing a solid load, but there are none for the [transport](#) of liquids in tanker trucks. "If you are carrying a load of tins of oil, you have to pack the tins in boxes and tie the load down with tarpaulin and ratchet straps. This prevents the load from shifting during transport. However, there is currently no way to secure a load of, for example, 20,000 litres of oil in a 40,000-litre tank. The result is that the liquid load sloshes around, which causes hazardous situations."

Inadequate solution

By law, tanker trucks that carry dangerous liquids such as oil must be fitted with perforated baffles. The baffles retard the forward movement of the liquid when braking. Mr Eenkhoorn's PhD research revealed why this is an inadequate solution. "The baffles do not provide any lateral stability, so there is still a high likelihood of the truck tipping over when cornering or in an emergency. Moreover, these baffles are not compulsory for certain liquids, such as liquid manure or milk. The research demonstrates that the dynamic behaviour of every liquid in a tanker truck causes hazardous situations if the load is not secured properly."

Cairbag

Eenkhoorn, who owns a research and development company, spent ten years trying to find an alternative for the baffles. The result is an inflatable system called the "Cairbag," a type of airbag made of rubber

or TPU that is placed inside the tank. The shape-retaining bag fills the empty space in the tank and absorbs the pressure of the bulk [liquid](#), so that the load can no longer slosh around during transport. This also has an additional advantage, says Mr Eenkhoorn. "Because the load no longer moves during transport, you save between 5 and 6% on fuel. In contrast, tankers with baffles guzzle fuel and may face heavy fines because of their environmental impact."



Credit: University of Twente

In his thesis, Eenkhoorn concludes that the existing laws will need to be

changed the world over to reduce accidents involving tanker trucks tipping over. "The same rules that apply to solid loads should be applied to bulk liquids. Lawmakers need to reconsider the compulsory use of baffles. Such laws can only be changed if there is scientific justification to do so. This research has provided such justification. It is a powerful instrument to lobby the government to make the necessary changes."

Provided by University of Twente

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