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Agency / Organization

Federal Railroad Administration

Title

Excerpts from Federal Railroad Administration, Office of Research and Development, Final Report DOT/FRA/ORD-94-17: Vent and Burn Method of Product Removal, May 1994

Excerpts: Handbook for Vent and Burn Method of Field Product Removal (DOT/FRA/ORD-94/18, May 1994).

DEFINITION OF VENT AND BURN

Vent and Burn is an emergency response procedure designed to quickly and effectively release railroad tank car internal vapor pressure and liquid products to avoid disastrous, uncontrolled tank rupture and environmental contamination. During derailment accidents, tank cars may become structurally compromised by denting, crack initiation, or puncturing, and/or subject to external heating and associated increase in internal pressure. The Vent and Burn procedure is applied to damaged tank cars only when all other emergency product removal methods have been considered and rejected, and the consequences of not relieving the internal tank car pressure are determined to be greater than using this procedure.

The Vent and Burn procedure involves the use of two explosive charges to cut holes in the tank car. The first charge is placed at the highest point of the tank car, over the product vapor space. Its detonation relieves the tank's internal vapor pressure. A second charge is placed at the lowest point of the liquid space to allow drainage of the product into a containment pit, where it is burned in a controlled setting, both neutralizing its environmental hazard and removing the potential for uncontrolled explosion. Figure 1 depicts the application of two explosive charges on a tank car. Figure 2 portrays Vent and Burn in progress.

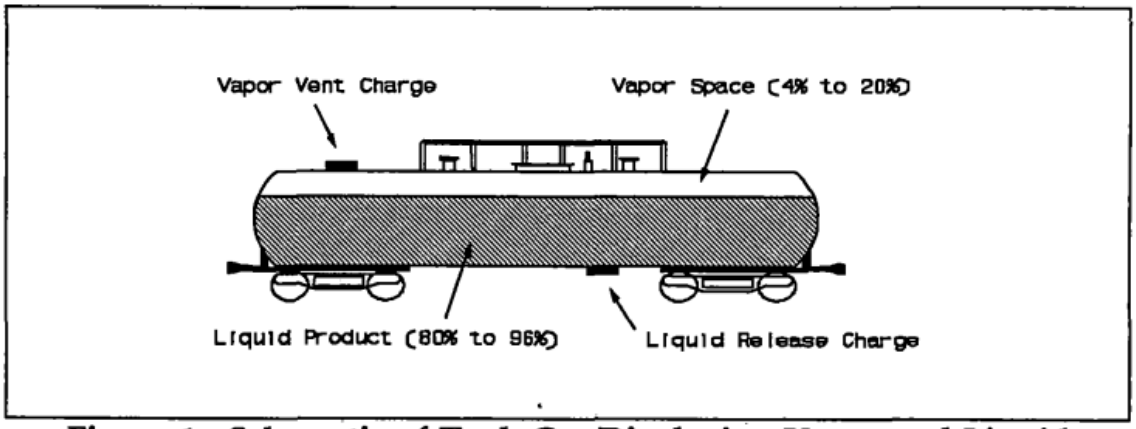

Figure 1. Schematic of Tank Car Displaying Vapor and Liquid Spaces; Recommended Application Points of Explosives Indicated

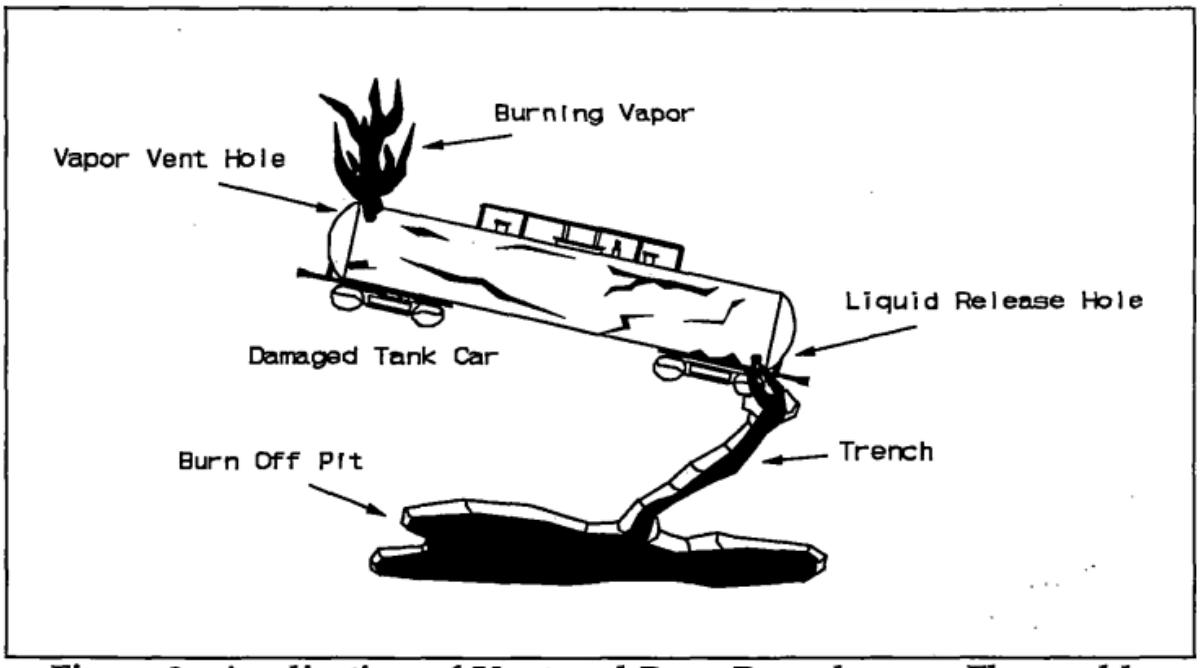

Figure 2. Application of Vent and Burn Procedure on Flammable or Combustible Liquid

CANDIDATE PRODUCTS

The Vent and Burn procedure is limited in candidate products. This procedure should be discussed with the product manufacturer for full determination of this procedure's applicability. This procedure should not be used on products that may detonate or react in some other adverse way when exposed to air.

- The product may be a flammable compressed gas such as propane, butane, or butadiene.
- The product may be a flammable or combustible liquid such as alcohols, petroleum products, esters, or ketones.
- The product may be subject to polymerization, such as acrylates, and shipped with inhibitors which can be lost in a fire situation.
- The product must have sufficient flammability characteristics to allow the material to burn.
- Products with secondary hazards of Poison-Inhalation Hazard should not be considered.
- Corrosives, oxidizers, or poisonous liquids would require evaluation on an individual basis.
- Vent and Burn may release potentially harmful by-products of thermal oxidation.