Connecting emergency systems of LPG depots and tank trucks during unloading in Belgian LPG depots

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Setting

- LPG distribution depots
- Large bulk trucks delivering LPG
- Unloading with truck pump
- Pump powered by truck engine
Risk

• **Coupling and flexible connection are week points**
  – In most depots flexible hoses are used

• **Truck engine is nearby ignition source**

• **Truck quickly inaccessible after LPG leak**
  – Truck emergency system inaccessible
  – Not possible to stop truck engine
  – Not possible to close truck valves
Existing safety

• **Depots have emergency stop system**
  – Close installation valves
  – Alert personnel
  – Can be activated from safe distance

• **Trucks have emergency stop system**
  – Close truck valves
  – Stop truck pump
Extra safety

- Connection between emergency stop systems

- Truck emergency stop, stops truck engine
  - And opens main electrical switch on the truck

- If connected, truck driving is impossible
  - truck in discharge mode
Emergency stop connection

- Connection plug standard

- Fail safe
  - Emergency stops activated if disconnected
  - No discharge possible if not connected

- Bidirectional
  - Either emergency stop activates the other one
Technical

• **Installation side**
  - 8 and 12 O’ clock pins connected by switch which is closed if truck discharge is allowed
  - Detection of truck safe state via voltage measurement (against 4 O’ clock pin)

• **Truck side**
  - Gives 24 Vdc on 8 O’ clock pin – 100-300 mA
  - Detection of installation safe state via voltage measurement on 12 O’ clock pin
How

• After unacceptable risk identification by inspectorate
• Agreement with industry federation
  – Transporters
  – Depots
• Technical standard from industry itself

• Agreement to use this for all bulk unloading with truck pump on large trucks in Seveso depots
  – But also encouraged in other situations
  – Not for small distribution trucks