



# Hydraulically operated truck scales ensure safety at chemical facility

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## New Solutions to Plant Problems

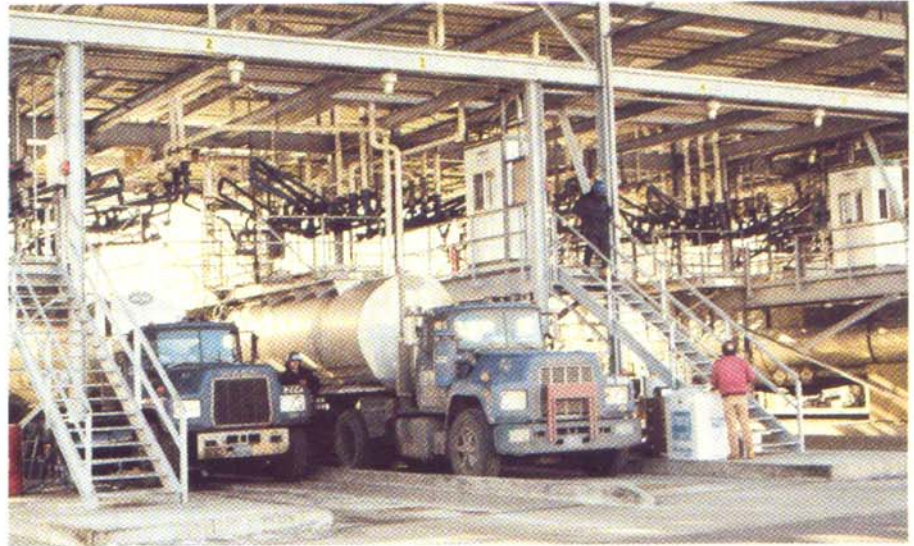
**Problem:** Safety was the major factor in the minds of management at Powell Duffryn Terminals, Inc., Bayonne, NJ, when the firm decided it needed truck scales for its chemical storage facility. The truck weighing system would have to be explosion-proof, and be able to provide reliable performance in a hazardous environment.

**Solution:** Powell Duffryn selected a certain brand of explosion-proof scales for what is now the nation's largest multiple truck installation at an independent chemical storage terminal. The installation includes eight truck scales, each equipped with eight computer-connected, hydraulic load cells.

The safety factor is ensured in the scales because they are all hydraulically operated. Since there are no electronics in the pit, the scales are explosion-proof and chemical-resistant in case of spillage.

The Bayonne facility is expected to handle weighing and loading of 100 trucks each day. The new scale design combines hydraulic load cell weight-sensing with electronic instrumentation and controls, which the manufacturer calls Hytronic technology. This technology makes it possible to keep electronic equipment away from the scale platform and pit. The weight signal is transmitted to a computer housed in Powell Duffryn's office building adjacent to the scale installation.

Benefits, in terms of both safety and the practicalities of cleaning and servicing, can be attributed to the lack of electronic equipment and wiring. The scale pit is three feet deep, sloped to a valved drain which leads to the terminal's cachement tanks. When stones, leaves,



*Tanker trucks load and weigh simultaneously on the eight-scale installation at Powell Duffryn Terminals*



*A section view of the loading/weighing installation. The shallow-pit scales are controlled by computer*

and other debris collect in the pit or a spillage occurs, a high-pressure water-wash with a hose easily and safely cleans the pit.

Because the scales are shallow-pit in design, they were easily installed with a minimum of excavation required. Also, these scales allow road-level access with no driveway ramps needed.

Each scale platform is 80' in length and 10' wide. The truck is totally on the scale platform for product loading, thereby eliminating the need for human monitoring of truck placement on the scales to ensure true weight. The biggest problem that could happen is having a load cell suddenly go out. However, the company has spares on hand and the people trained by the manufacturer to replace them. Each scale on the loading dock is outfitted with an air-purged, water-tight, NEMA-4 instrument panel

which is connected electronically to the computer. A human operator supervises the loading of the product while the computer controls, monitors, and records the weighing/loading operation. Upon the receipt of a product order, each truck is scheduled for day and time. The computer is programmed for the type and number of pounds of product required.

When the truck arrives at the Powell Duffryn facility, it is inspected for damage affecting product transport and for improper or unsafe residues in the tank. When accepted, the truck is driven onto the scale platform assigned to load the product required.

Beneath the scales' protective roof are suspended the product feeder lines and 66 load arms. The truck is positioned beneath the appropriate loading arm and the digital indicator of the scale's control panel reads out the truck's weight at tare.

The computer records the tare weight and begins to transmit to the indicator the truck's increasing weight as the human operator initiates the loading process. When the load is 3500 lb from the pre-programmed total weight desired, the computer transmits to the air valve the message to slow the pumping rate until the total weight is reached.

The computer stops the flow at the total weight required unless the human operator manually "jogs" the loading line by means of controls on the control panel. When the operator presses the "read" pushbutton control, the computer allows no more loading of that truck, thus fixing the final weight.

The operator gives the truck driver a manually inscribed list of the tare and gross weights for proof of weight during



*Loading deck operator monitors the computer-connected control panel for one of the truck scale platforms*

highway travel. However, the official manifest of the loading/weighing transaction is a computer print-out of the customer, truck number, product(s), tare and gross weights. The storage terminals and the customer each receive copies of the official computer records. This same

process is also followed in the case of carriers of more than one tank for more than one product.

**Results:** The scales have been installed almost a year, with no complaints received from customers regarding the accuracy of weights. The scales' performance in this respect has been excellent. Additionally, in case of a heavy rainstorm which brings flooding, the scales cannot be damaged because of the hydraulic rather than electronic nature of the load cells. ■

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