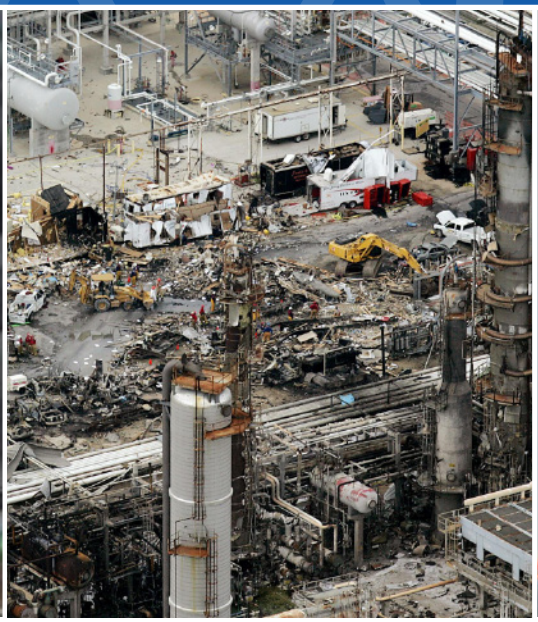
Is your site at risk?

All of these accidents and more were ignited by runaway diesel engines.

Diesel engines are a proven source of ignition in the hydrocarbon, oil and gas industries. The risk can be mitigated by simple additions to vehicles and engines.

Thailand Tank Farm Fire, December 1999



Texas City Refinery Explosion, March 2005

Macondo-Deepwater Horizon, April 2010

Diesel Engine Safety Solutions
Overview

amot CHALWYN RIGSAVER RODADEACO

Hydrocarbon Release and Diesel Engine Runaway

'Internal combustion engines present an ignition hazard when used in facilities processing flammable liquids and gases. If flammable vapors or gases are released in these facilities, an internal combustion engine could ignite the flammable materials with catastrophic consequences. Investigations by OSHA and the U.S. Chemical Safety Board (CSB) document a history of fires and explosions at workplaces (oilfields, refineries, chemical plants, and other facilities) where an internal combustion engine was identified as or suspected to be the source of ignition.'
Extract quote from US OSHA Factsheet 3589 (full Factsheet pdf copy available on request)

All industry professionals recognise that ignition sources must be controlled or eliminated when working near potentially flammable leaks of Hydrocarbons. For this reason the use of petrol engines with spark ignition and hot exhausts is generally forbidden inside refineries and gas plants. Canadian and USA drilling regulations will not allow these vehicles and engines within 25 metres or 75 feet of the well. Diesel engines and their fuel are fundamentally safer and so allowed inside these policy-controlled sites and defined hazardous zones such as process areas.

However the design of diesel engines with no throttle plate in the intake means that any external gas or vapour flammable source is drawn in and consumed, so adding energy to the natural fuel / air governor process of power control. At tiny mixture levels the engine's fuel governor can compensate for this by reducing the injected fuel volume, but when there is a gas cloud of around 2% and rising mixture, the diesel engine will begin to overspeed and (if not stopped) will runaway to destruction. This phenomenon was understood by Chalwyn in the UK in the early 1970s. The Chalwyn automatic valve was developed to automatically prevent both engine damage and the explosive flashback that has led to fatal explosions (see examples in this brochure) outside the UK.

The 'lessons learned' of accident investigation have helped introduce a progression of both private company and national sales policies that require the preventative measure of an 'automatic air intake shut down valve' to be fitted to vehicles and equipment working in these refinery, gas plant and fuel storage or processing areas. Stopping the engine this way naturally eliminates potential flames and sparks being emitted before the leaking gas concentration rises into the flammable range.

One of two trucks destroyed in a fatal accident in Texas (2003) due to engine runaway.

Why all international fuel refineries should introduce similar safety policies

Accident history investigation has confirmed the rapid speed rise of engines in a runaway condition when exposed to an external release of Hydrocarbons. Simply turning off an engine's ignition key will not stop the flashback and explosion if the gas concentration is rising up through 5% (test results confirmed from mining industry independent tests). This simple addition of the 'passive' automatic intake valve is therefore superior to slower gas detection alarms and delayed manual stopping of engines that require human decisions and therefore added risks to those personnel.

Complete Solutions

The latest cleaner diesel vehicles have technology to improve efficiency, but the proven risk of runaway is not reduced.

AMOT offers a comprehensive range of diesel engine safety solutions, including AMOT, Chalwyn and Roda Deaco air intake shutoff valves and systems. These sense the rise in engine speed and rapidly stop the engine safely before critical overspeed and flashback. AMOT has the solution to meet the specific requirements of each customer:

- Automatic, self-contained valves
- Complete shutdown systems
- Custom engineered valves and systems

Selecting the appropriate Air Intake Shutoff Valve

Selecting the most suitable air intake shutoff valve requires specific information about the application and engine.

- Application type
- Environment - Inland / Offshore
- Actuation method
- Electric - power to close
- Pneumatic - manual or automatic reset
- Position indication - optional
- Piping diameter
- Charge air temperature
- Ambient temperature environment

Valve Type and Features

Automatic Self-contained Valves

- Simple, cost effective design
- No power input or speed signal required
- Automatic reset after engine stops
- Easy to install

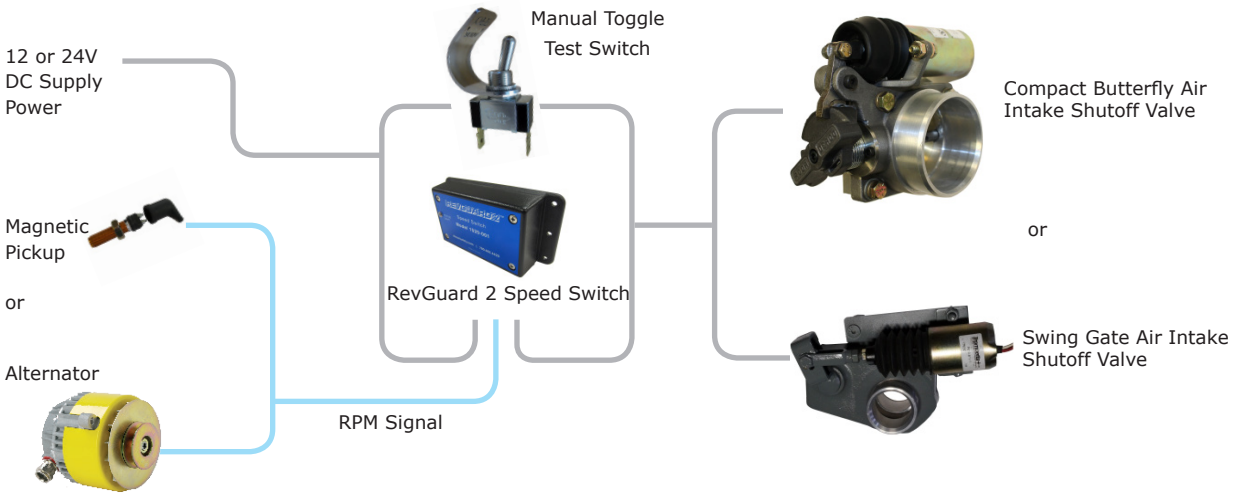
Butterfly Valves

- Compact, light weight design
- Fast acting closure
- Activated by speed sensing switch

Swing Gate Valves

- Slim swing gate design
- Fast acting positive spring closure
- Wide variety of inlet pipe connections
- High temperature options
- Flange mount options

Automatic Shutdown System Concept



System Components and Added Safety Options

Speed Switch & Magnetic Pick up

Actuation Kits

Wiring Harness Kit

Installation Kits

Flameproof Alternators

Exhaust Spark Arrestors

Contact us for more information

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