



### Rail/Truck/Barge Terminal



Laser Based – Open Path Gas Detection is **positioned** on either side of the Rail Loading Terminal and on the cat-walk to protect personnel.

**Photo Credit:** Carbis Solutions (Original Photo has been edited)

**Problem: High Hazard Rank Application**  
Due to frequency of occurrence & severity of harm

**Challenge: Detectors Surviving Exposures**  
From continuous making/breaking of connections

**Opportunity: Warn Adjacent Areas of Leak**  
Lethal plumes of gas extend beyond area of release

**Solution: Achieve Risk Mitigation Targets**  
Is with Laser Based – Open Path Gas Detection

### Transportation via Pumps

**Problem: Mechanical Probability of Failure**  
Centrifugal Pump failure likely 6.20 in 100 times<sup>1</sup>

**Challenge: Detection of Small Seal Leaks**  
Most Acid Gas E-Chem's have T90 Res. >30 seconds

**Opportunity: Have Early Warning of Failure**  
Used for passive Leak Detection & Repair (LDAR)

**Solution: Find & Fix Leaks While Still Small**  
With Laser Based – Open Path Gas Detection

**Reference<sup>1</sup>:** DNV GL Failure Frequency Guide



Paths are placed on the **upwind and downwind sides** of the banks of pumps to provide suitable coverage regardless of wind direction.

### Product Storage in Tank Farm



Paths oriented around the tank farm have been **proven to be effective to detect fugitive plumes** from pressure relief devices.

**Problem: Tank Farm Risk Mitigation Needed**  
Due to the quantity of product stored

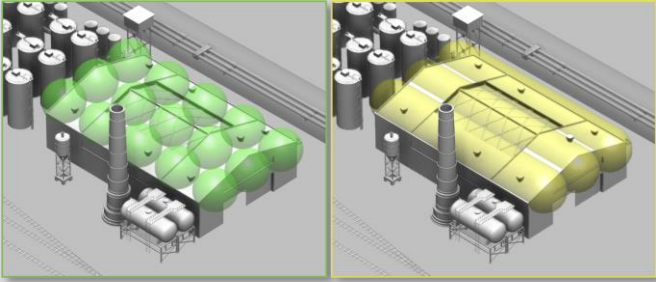
**Challenge: Sufficient Detector Coverage**  
Large perimeter stresses the projects feasibility

**Opportunity: Capital and Operational Costs**  
Reduce the device count, infrastructure, & cabling

**Solution: Most Economical Option Available**  
Is with Laser Based – Open Path Gas Detection

# Geographic Area Coverage

**Traditional – Fixed Point Gas Detectors** vs. **Laser Based – Open Path Gas Detectors**



Laser Based – Open Path Gas Detection is the most economically viable option to minimize both the **Total Install Cost + Total Operational Cost (TIC-TOC)** in High Hazard Rank Applications.

**Definition:** The fraction of the geometric area or volume of a defined monitored process area that would be detected.

**Exceed your Area Coverage Requirements**  
With Laser Based – Open Path Gas Detection

**Increasing the Probability of Detection**  
Offers the greatest Risk Reduction Factor return<sup>1</sup>

**To Mitigate Risk in a Grade A Hazard Rank**  
You will need 90% Geographic Area Coverage<sup>1</sup>

**Laser Based – Open Path Gas Detection**  
Easiest & most economical way to Mitigate Risk

<sup>1</sup>: As stated in ISA-TR84

# Safety Availability

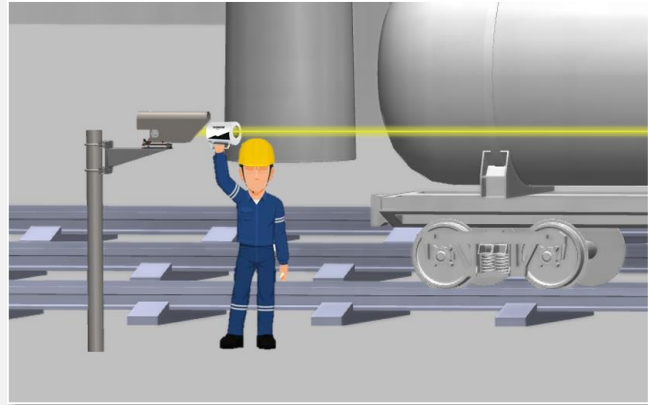
**Surpass Safety Availability Requirements**  
With Laser Based – Open Path Gas Detection

**Survive & Continue to Detect after a Leak**  
Lifespan/performance not effected by exposure

**Smart Fail-Safe Device + SIL2 Suitable**  
Only outputs gas concentrations if ‘fully functional’

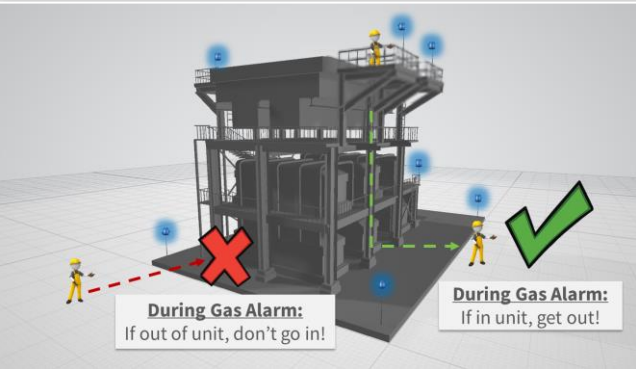
**Eliminate your Maintenance Burden**  
No Calibration and easily perform Functional Tests

**Definition:** The availability of the FGS function designed to automatically mitigate the consequences of hazards.



To perform **Function Test**, simply hold the **Response Cell** in the Laser Beam to ‘Bump’, ‘Challenge’, or ‘Verify a Response’.

# Mitigation Action Effectiveness



**During Gas Alarm:**  
If out of unit, don't go in!

**During Gas Alarm:**  
If in unit, get out!

**During a Release:** Prevent personnel from entering the area or evacuate personnel from that area.

**Definition:** The confidence that the final element(s) actions will successfully mitigate the consequence of the hazard.

**Alarm Faster and at Lower Concentrations**  
With Laser Based – Open Path Gas Detection

**Confidently Detect Incipient Level Leaks**  
Lowest Actionable Concentrations clearly stated

**Gain an Instantaneous Response to a Leak**  
New and independent sample every second

**Importance of Timely Personnel Evacuation**  
Rapid recovery actions prevent escalating event