## **AIGA 2008 MEETING**

#### **Product Vehicle Safety & Accident Prevention**





Asia Industrial Gases Association



**FMM MIGMA** 

**Co-organiser:** 

FMM Malaysian Industrial Gases Manufacturers Group

## Advanced Vehicle Safety Control Equipment Application and Users' Experience

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## **Safety Topics**

Vehicle Safety Control Equipment
Driver ergonomics
Safety analyses performed
Driving behavior modification
Applications and experiences

Safety results achieved





#### **Safety Improvement Process**

Collect real-time operating data
 Provide immediate driver alerts
 Store data for historical analysis
 Analyze historical data for trends
 Provide coaching / training to drivers



## **Vehicle Safety Control Equipment**

- >Engine control module (ECM)
  - >Odometer Readings
  - ➤Vehicle Speed
  - >Engine speed (RPM)
  - ≻Transmission gear
- Trailer hub odometer
- ≻Tire air pressure
- Anti-lock brakes





#### **Collision Warning - Side Object Alerts**

Turn signal is 'ON' and Object detected

 Red LED lights and Alert sounds



2008 Meeting



#### **Collision Warning - Frontal Alert**











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## **Collision Warning - Cruise Control**



Uses collision warning with vehicle data bus

- Decelerates to maintain following distance
  - De-fueling the engine
  - Engaging the engine retarder
  - Downshift automated transmission





#### **Collision Warning - Experiences**

Real-time driver alerts

- Active vehicle speed control
- Incident investigation
- False alerts
- Data retrieval inconvenient



# Why Roll Stability – Many Factors Cause Rollovers









#### Roll Stability Control Experiences

**Driver Reactions** 

- ➢Initially apprehensive then accepting
- Driver noticed changes in vehicle behavior
- Large Transportation Carrier
  - Increased driver awareness of thresholds
  - Speed is the main contributing factor





#### **Rollover Statistics**

#### Large Transportation Company



#### **Total Rollover Events**

#### Praxair World-wide



AIGA



## **Praxair Rollover Events**

#### **Causal Factors**



Driver fatigue is leading causal factor (46%)



## **Roll Stability Control - Reports**

- Analyze trailer brake actuations including
   ABS and RSC events.
- Number of brake applications
- Duration of brake applications
- Brake pressure
- Profiles for ABS and RSC events





#### **OBC Driver Ergonomics**

- ➢ Easy to read screen
- ➤Easy to use
- Real-time driver alerts
- >Text-to-speech messaging
- ➢OBC display mounting in vehicle



## **OBC Safety Benefits**

- ➢Real-time alerts
- Driver "hours of service" compliance
- Logistics schedule planning
- Incident investigation
- Unsafe driving behavior analysis





#### **OBC Safety Data Analysis**

#### Vehicle / Engine Data

Vehicle speed
Vehicle hard braking
Engine speed (RPM)
Vehicle GPS location
Critical event data



#### **OBC Data Analysis** Safety – Distribution Site



# **OBC** Data Analysis

#### Safety - Driver





## **OBC Data Analysis**

Safety Results Achieved

➤40 distribution sites in USA  $\geq$ 6 to 12 months Speeding and critical deceleration events ≥90% decrease Sustained Results Monitoring driver behaviors Active Safety Program  $\geq$ Incentives, training and coaching



#### **Video Cameras**

#### **Backing and Lane Change**

#### Camera systems – rear and side



6.7m Rear Coverage



102° Horizontal View







#### **Video Cameras**

**Backing and Lane Change** 

Side camera monitor
 Too distracting during driving
 Distraction increased with night driving
 Rear camera
 Cone placement process
 Difficult to judge rear distances
 UPS - 100,000+ installed worldwide



#### Lane Departure Systems

Digital imaging and road line markings
Lane change without signaling
Vehicle drift within lane
Many false alarms – 2 lane roads
Vehicle leaving the road
Sensitivity set to 6" over road line
Low driver approval rating



## **Driver Fatigue Monitor**

Digital imaging and analysis
 Eyelid droop, eye blink rate, head nod
 Head turn
 Distracted driving
 Facial expressions
 Very promising during initial tests



#### Questions... ©

# Thank you for your attention !



