

The background of the slide is a photograph of an oil drilling rig. The rig is a tall, dark silhouette against a sky that is transitioning from a deep orange at the horizon to a darker, almost black, at the top. The rig's structure is complex, with many vertical and horizontal beams. The overall mood is industrial and somewhat somber due to the low light.

# Injuries in Oil and Gas Extraction and NIOSH Safety Initiatives

Kyla Retzer, National Institute for Occupational Safety & Health

IADC Rig Move Committee Meeting  
Irving, Texas

## Session Objectives

1. Explain NIOSH and its involvement in Oil and Gas Extraction (OGE).
2. Describe fatalities to workers in OGE and common causes.
3. Motor vehicle safety initiatives involving NIOSH, including IVMS and Journey Management.

## NIOSH Mission

- Part of the Centers for Disease Control & Prevention (CDC)
- Generate new knowledge in the field of occupational safety and health
- Transfer that knowledge into practice
- Not regulatory



# Publications

## Topics:

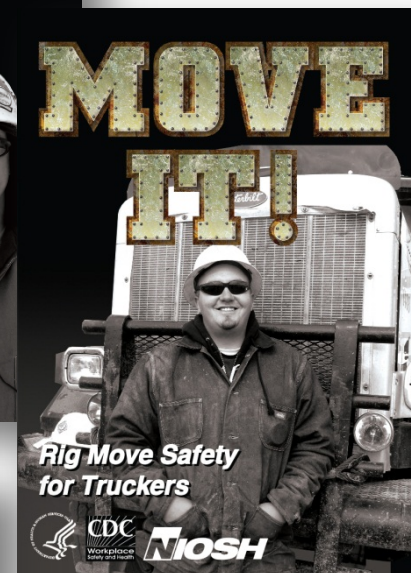
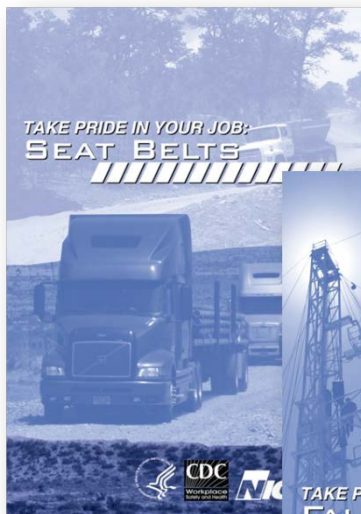
Fatal injuries, silica hazards, motor vehicle safety, culturally relevant training, off-shore fatalities, business case for safety

## Journals:

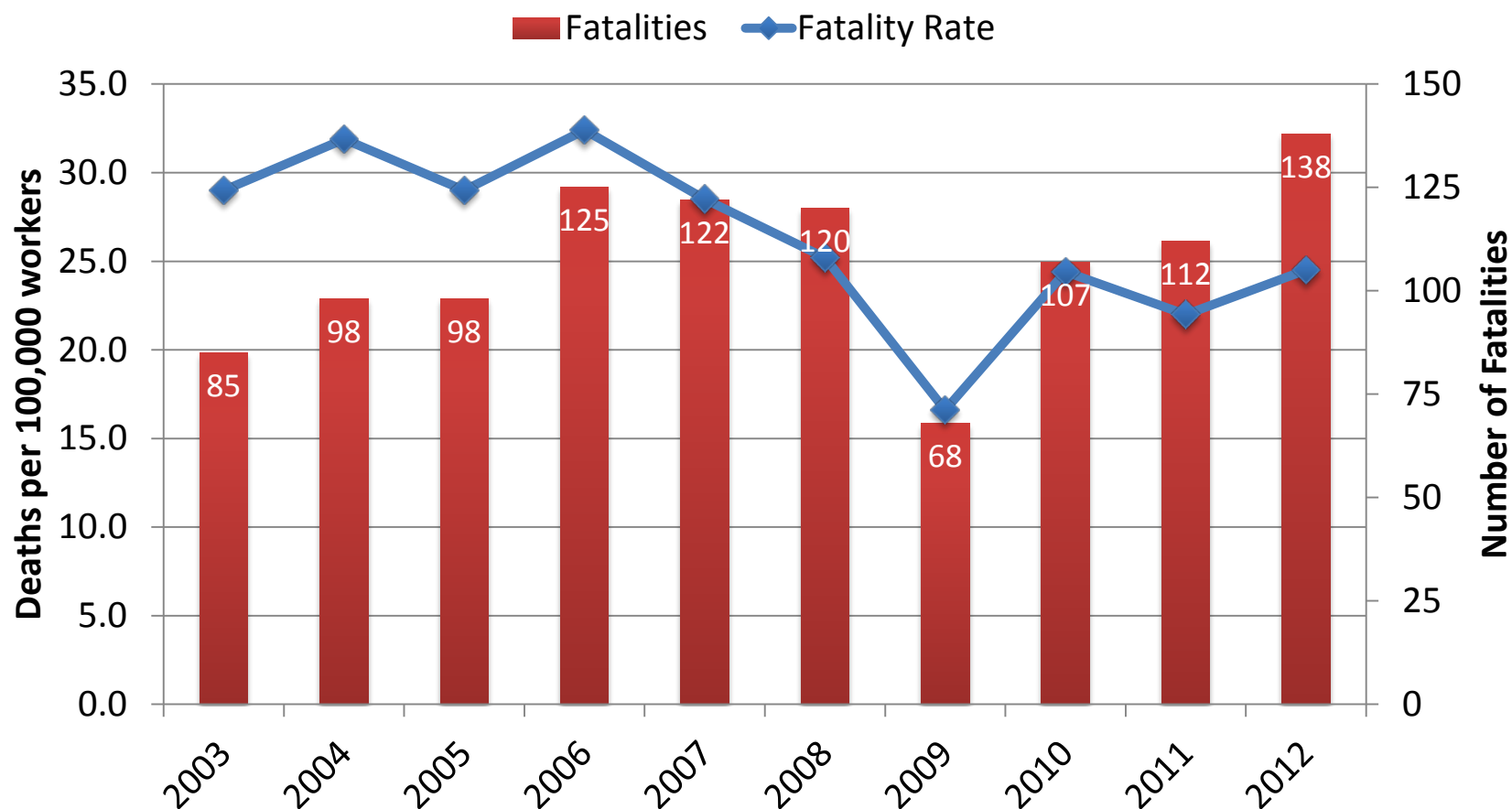
Accident Analysis & Prevention, MMWR, Professional Safety, SPE Conference Papers, Well Servicing Magazine, Drilling Contractor Magazine





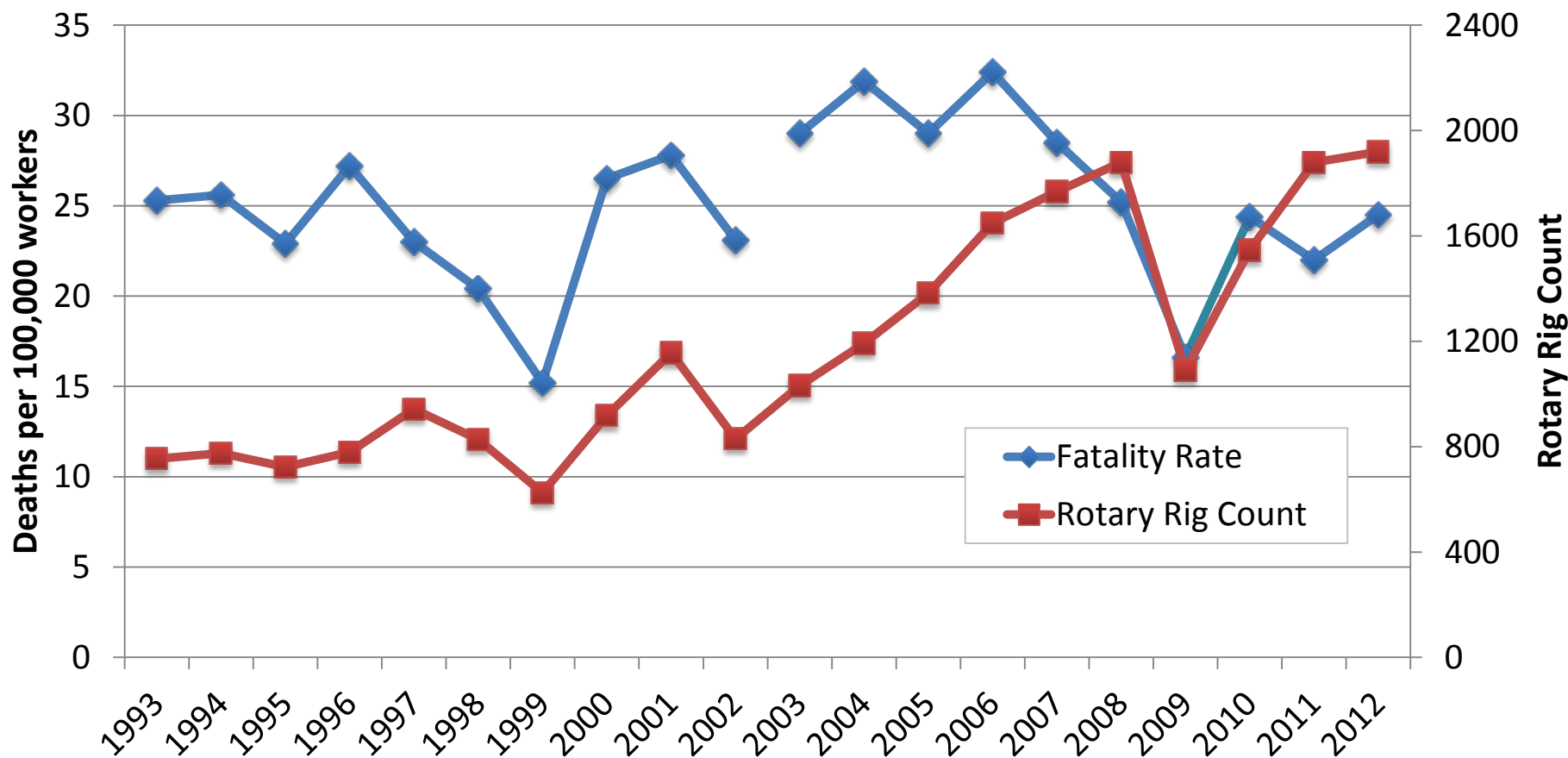


# Number and Rate of Occupational Fatalities, Oil and Gas Extraction Industry, 2003-2012\*



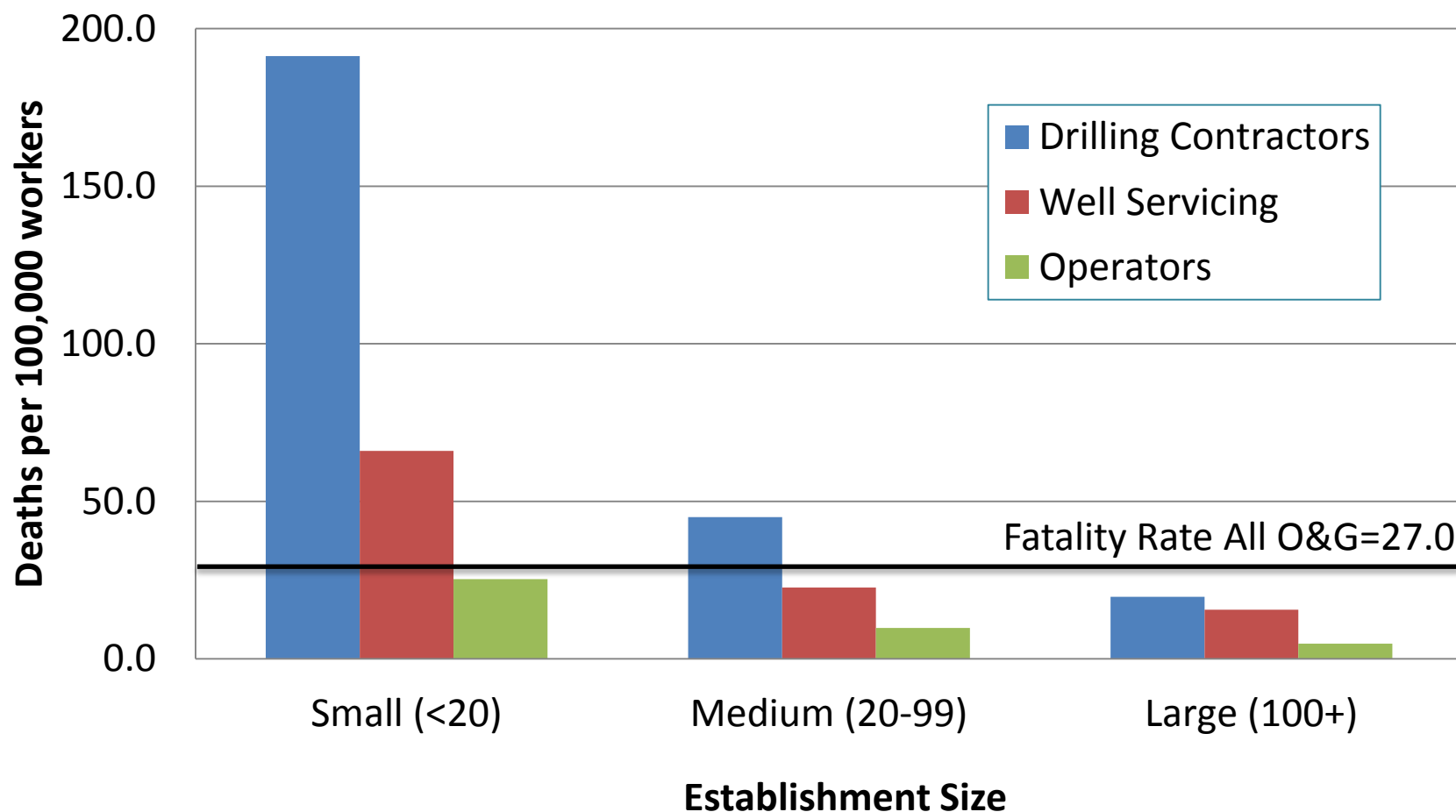
Note: BLS CFOI/QCEW (2013). Rate per 100,000 workers per year. Includes NAICS 211, 213111, 213112. \*2012 data are preliminary.

# Occupational Fatality Rate and Industry Activity, Oil and Gas Extraction, 1993-2012\*



Note: BLS CFOI/QCEW (2013); Baker Hughes Rotary Rig Count. Rate per 100,000 workers per year. Includes NAICS 211, 213111, 213112. \*2012 data are preliminary.

# Occupational Fatality Rate by Company Size and Type, Oil & Gas Extraction, 2003-2009



Data Source: NIOSH, with restricted access to BLS CFI microdata. Rate per 100,000 workers per year. NIOSH, using a restricted data set provided by BLS CFI under an MOU.



# Most Frequent Fatal Events, US Oil and Gas Extraction Industry, 2003-2012\*

| Injury Event  | Fatalities   | % Total      |
|---|--------------|--------------|
| Transportation incidents<br><i>Highway crashes (n=342)</i>              | 433          | 40.4         |
| Contact with object/equipment<br><i>Struck by (n=209)</i>               | 283          | 26.4         |
| Fire or Explosion<br><i>Explosion (n=101)</i>                           | 157          | 14.6         |
| Exposure to harmful sub/environment<br><i>Electrical current (n=48)</i> | 96           | 8.9          |
| Fall, slip, trip  | 83           | 7.7          |
| Other   | 21           | 2.0          |
| <b>Total</b>  | <b>1,073</b> | <b>100.0</b> |

Note: BLS CFOI/QCEW (2013). Rate per 100,000 workers per year. Includes NAICS 211, 213111, 213112. \*2012 data are preliminary.

## Off-Duty crashes also an issue

- Statistics on off-duty deaths are not tracked nationally.
- However, since 2001, Helmerich & Payne has tracked the number of off-duty motor vehicle deaths as compared to on-duty.
- The Ratio: 63 off-duty motor vehicle deaths to 1 on-duty motor vehicle death

Conclusion: Oil and gas workers are even more at risk off-duty.

# Emerging Issues - 2012

Almost twice as many workplace deaths due to:

- Older workers (ages 55 and above)
- Falls from height
- Fire/explosions

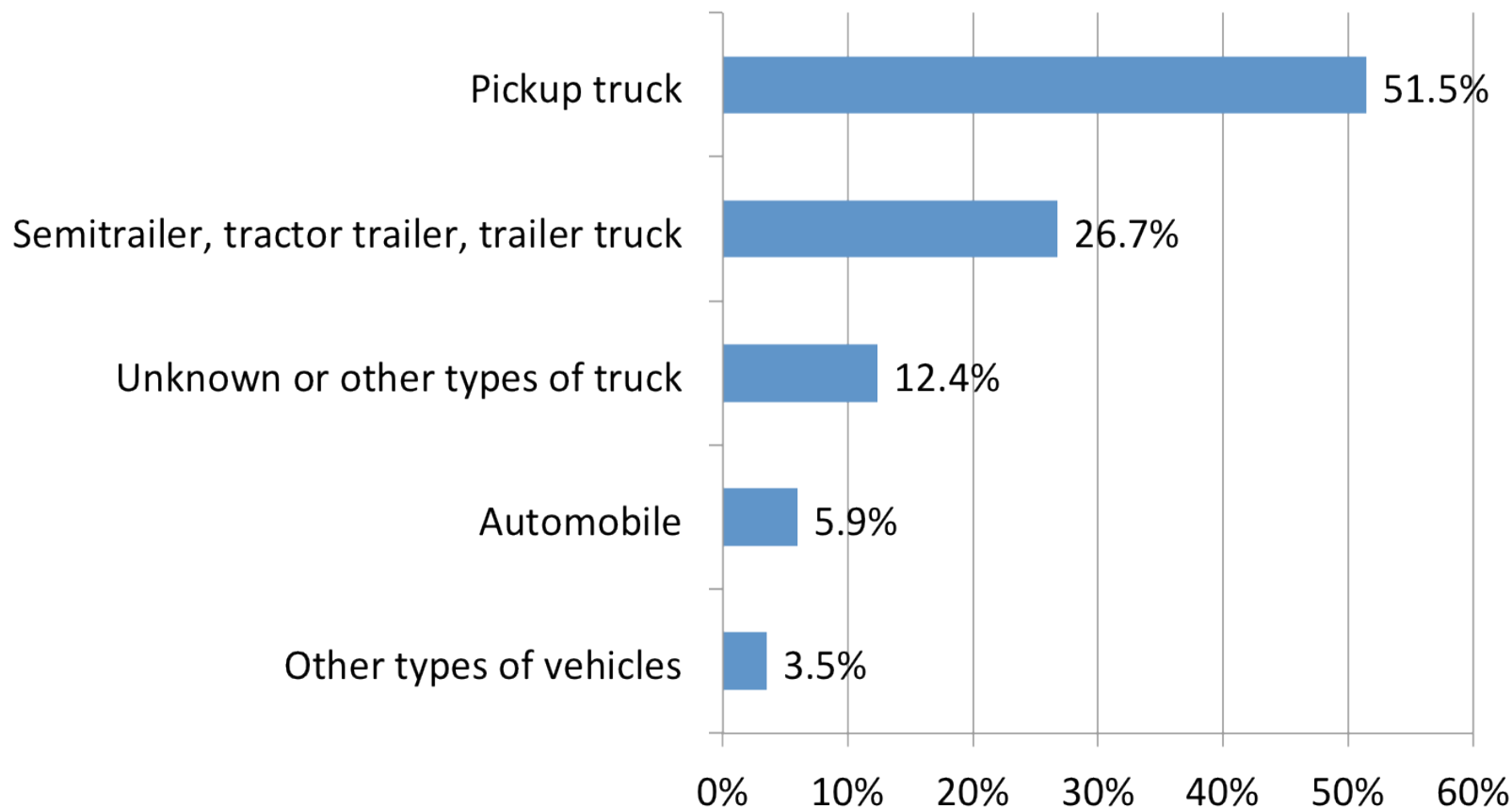
## Research to Practice

- Analysis of highway motor vehicle fatalities
- Literature review of 'best practice'
- Interviews of industry experts on road safety
- Formation of Oil and Gas Motor Vehicle Committee
- IVMS guide and Journey Management Guide

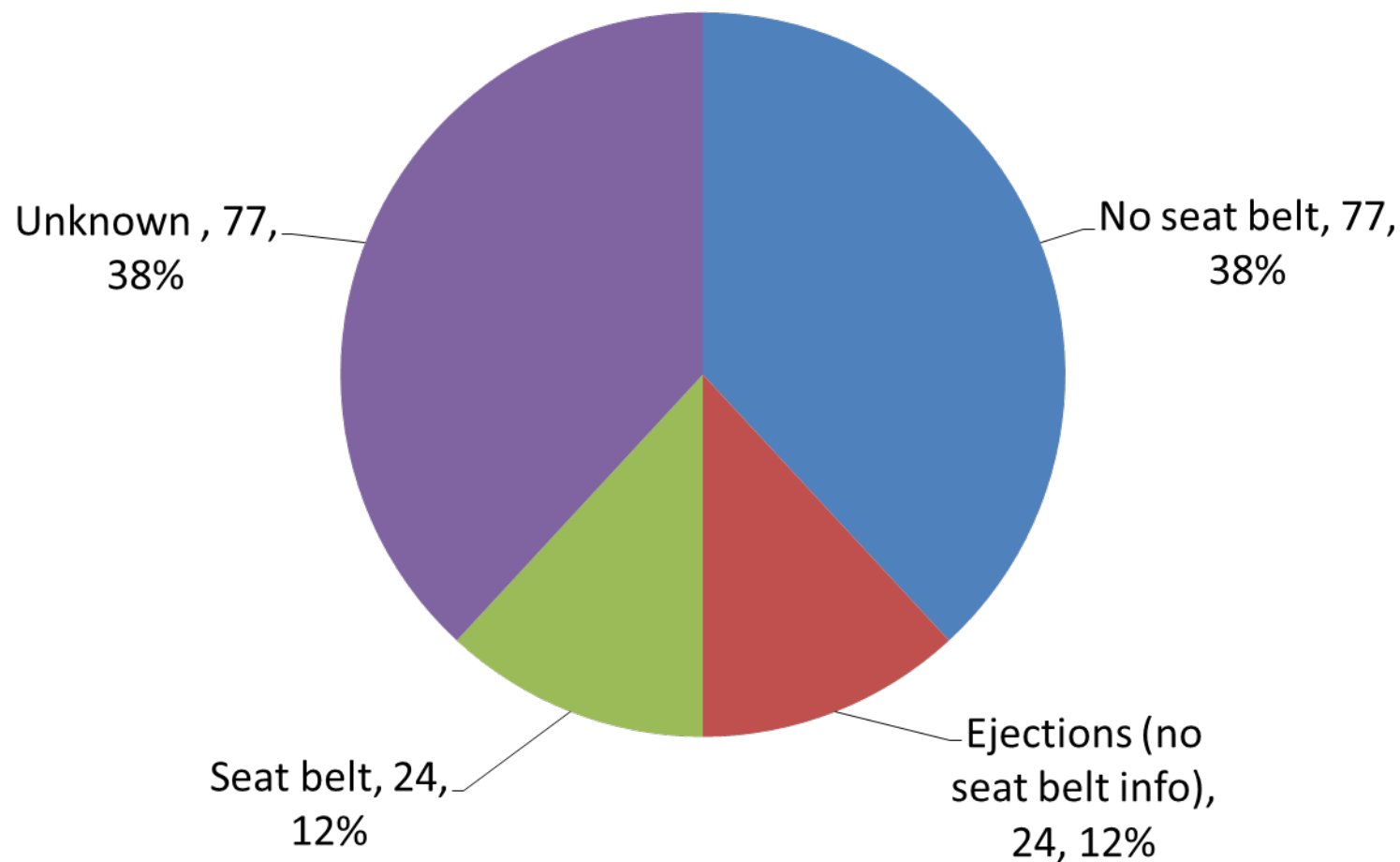




# MV Fatalities by Vehicle Type, Oil & Gas Extraction Industry, 2003-2009



# MV Fatalities by Seatbelt Status, Oil and Gas Extraction Industry, 2003-2009



## Factors contributing to fatality

- Seat belt use
- Speed
- Small companies, contractors
  - Lack of resources and experience
  - Sense of urgency; 24/7 business
  - *'Get 'er done'*
- Short service employees



# Review of the Literature – MV Best Practices

- What motor vehicle safety interventions have been evaluated in this industry and what is their reported effectiveness?





# Results

| Type of Intervention                        | Description of programs   | Number of Articles |
|---|---|--------------------|
| In-Vehicle Monitoring Systems               | Record driving behaviors- speeding, harsh acceleration/braking, night driving, etc.                 | 20                 |
| Journey Management                          | Program that minimizes unnecessary trips, distances driven, and minimize risks with necessary trips | 19                 |
| Driver Training and Qualification           | Classroom and hands-on, defensive driving, winter driving, driving simulators, etc.                 | 18                 |
| Management Systems                          | Company policies (include rewards and penalties), accident review committees                        | 12                 |
| Driver Fitness and Alertness (e.g. Fatigue) | Medical examinations, contracting of hotels, driver rest evaluation, fatigue management training    | 6                  |
| Seatbelts                                   | Seatbelt convincer, observations, IVMS  | 6                  |
| Distracted Driving                          | Cell phone policies, passenger observations, 800 numbers  | 5                  |

# Best Practice- In-Vehicle Monitoring Systems (IVMS)

- Records data such as date, time, speed, acceleration, deceleration, safety belt use of a driver/vehicle
- Measures driver performance against a predetermined set of parameters
- Has shown to be effective in realizing immediate and positive effect on driver behavior



# Reported Benefits of IVMS in Literature

Oil & Gas literature – SPE papers:

- Reduces motor vehicle crash rates (50%-93%)<sup>1</sup>
- Reduces speeding (60%)<sup>2</sup>
- Reduces miles driven (8%-20%)<sup>3</sup>

Other literature:

- Federal Motor Carriers Safety Admin (FMCSA) study found significant reduction in “safety-related” events in 2 commercial motor vehicle operations in a 17-week evaluation<sup>4</sup>
- A study of 250 emergency vehicle drivers found that it encourages safety belt use (13,500 to 4 violations)<sup>5</sup>

<sup>1</sup>Gale et. al, 2012, Mora et. al, 2010, Velasquez, et. al, 2010, Matusalen, et. al, 2006, Ballard et. al, 2004, Jutten et. al, 2002, Cocianni & Taviansky, 1998) <sup>2</sup>Twilhaar, 2000 <sup>3</sup> Lopez, 2006, Twiilar, 2000, <sup>4</sup>Hickman, 2010, <sup>5</sup> Levick, 2005

# Reported benefits of IVMS in Interviews

- Targets high risk driver behavior
- Contributes to social responsibility
- Reduces maintenance costs
- Can be used as tool for verifiable Hours of Service
- Reduces insurance premiums, claims, citations

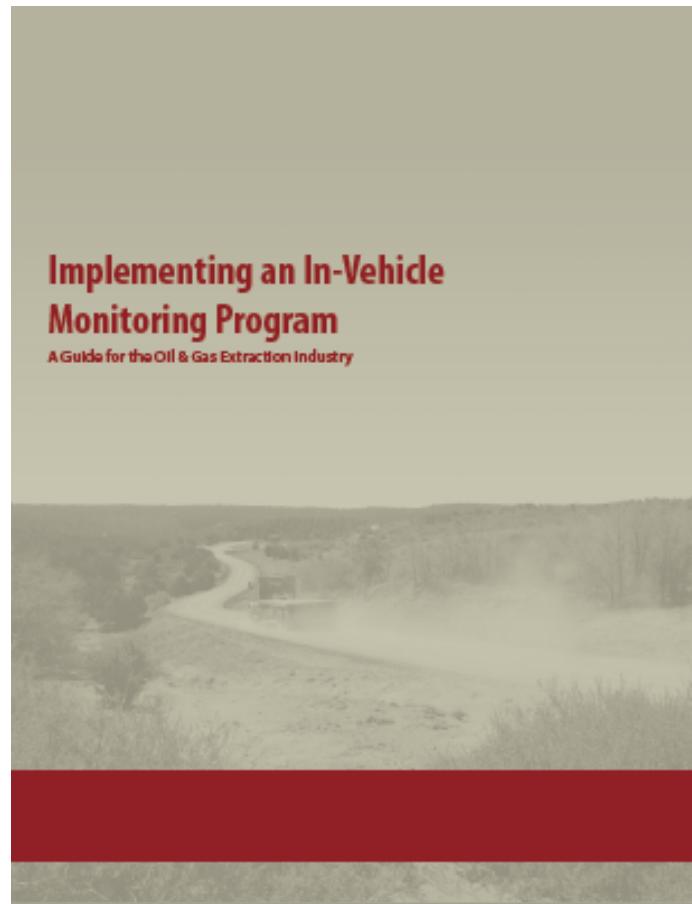




# NORA MV Committee Product

A **guide** to provide companies with a structured approach and help them to:

- Decide whether to install monitors
- Select a system that meets needs
- Successfully implement an IVMS
- Employ the data provided by monitors to improve motor vehicle safety
- Effectively track its effects on crash rates



# IVMS Guide Available

- Has been adopted by OGP as “Land transportation safety recommended practice guidance note 12 (365-12)”:  
<http://www.ogp.org.uk/pubs/365-12.pdf>
- Currently, NIOSH is conducting large IVMS evaluation to further evidence of effectiveness

# Implementing Journey Management: A Guide for O&G Extraction Industry

- Define ‘journey management’
- Identify the elements of journey management
- Assess driving risks associated with a company’s unique operations
- Assist in development of fit-for-purpose journey management plan or system



# What is Journey Management?

Objective: minimize unnecessary trips, distances driven and the risks associated with necessary trips.

- 1) formal procedure/policy with location specific assessments of hazards and how to minimize hazards (road, weather, traffic, vehicle, driver)
- 2) Process to assess need for trips
- 3) procedure for managing trips (pre-trip, trip and post-trip procedures)



# What is Journey Management?

- **Another simple definition:** It's a process that makes informed decisions about who drives, what they drive, when they drive, where they drive, how they drive and why. (Rybacki, Conoco Phillips)
- Addresses each company's local exposures.
- Personal level- planning errands during low traffic; combining trips



# Journey management vs. Trip Management

- Trip management- day to day process a supervisor and driver follow when planning and making trips. i.e. pre-trip, trip, and post-trip procedures.
- Journey management **also** takes into account bigger picture of risks routinely faced in operations environment.



# Seven Steps to Creating Your Own Journey Management (JM) Procedure



1. Establish Road Safety Policy
2. Determine Necessary Driving Activities
3. Identify Risks (road, weather, vehicle, traffic and drivers)
4. Determine administrative controls for risks
5. Develop JM procedure outlining controls
6. Implement JM procedure (share with drivers!)
7. Monitor incidence and update JM procedure

# Example Controls

- Determine administrative controls to address identified factors. For example:
- Outline alternate roads for travel during rush hours.
- Requiring drivers to do weather checks prior to each long distance trip.
- Outline the weather conditions that would require drivers to receive approvals from a supervisor prior to travel.





# JM procedure sections

## SUGGESTED SECTIONS

1. Driving Environment: Describe risks
2. Local Regulations
3. Overall Expectations: Describe rules for safe driving (e.g. seatbelts\_ and administrative controls.
4. Pre-trip planning: Checklist of items before each trip and levels of approval required to take trip
5. During the trip guidelines (i.e. restbreaks)
6. Post trip guidelines (i.e. maintenance)

## OGP Resource-

### Pre-trip assessment and approval form

<http://www.ogp.org.uk/pubs/365-2.pdf>

- Point values assigned during trip assessment
- Consider:
  - security issues
  - driving alone
  - type of vehicle and load
  - distance
- Number of points determines level of approval
  - type of road
  - day/night
  - weather
  - communications
  - hours on duty
  - vehicle inspected?
  - driver trained?

# Key Risk: Prevent Driver Sleepiness

- Plan rest breaks (every 2 hours or sooner if tired, for at least 15-20 minutes) Breaks and break locations should be planned for in advance of starting journeys. Use caffeine in emergencies.
- Set in-house limits on maximum driving distances per day and per week.
- Drivers should know they can stop the job



# Overnight Stays

- If travel distance to work is more than two hours, consider asking staff to travel the night before and stay overnight.
- Employers should make provision so that staff do not have to drive a long distance home when tired.





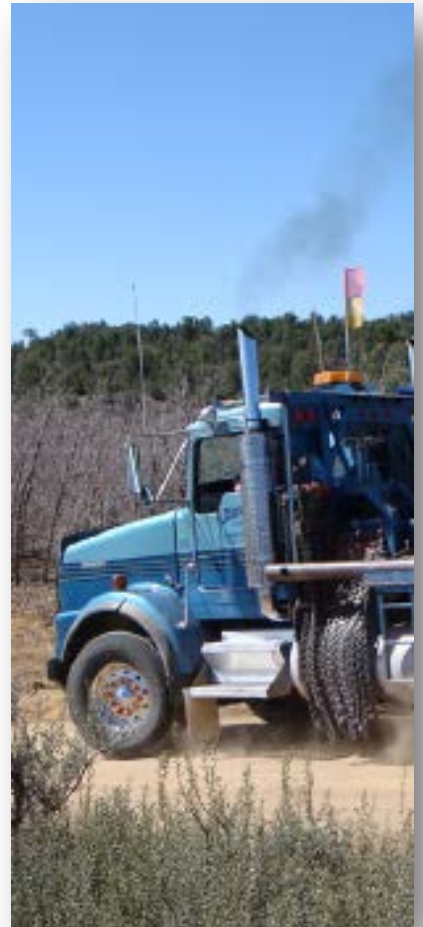
# Think about Schedules

- Allow sufficient time for drivers to account for foreseeable weather and traffic conditions  
AND
- To comply with speed limits.
- Don't expect drivers to transact business on phone!



## Conclusion

- The number of fatalities in this industry are increasing.
- Seatbelt use still an issue.
- Journey Management and IVMS are promising tools to reduce incidents (as part of a road safety program).



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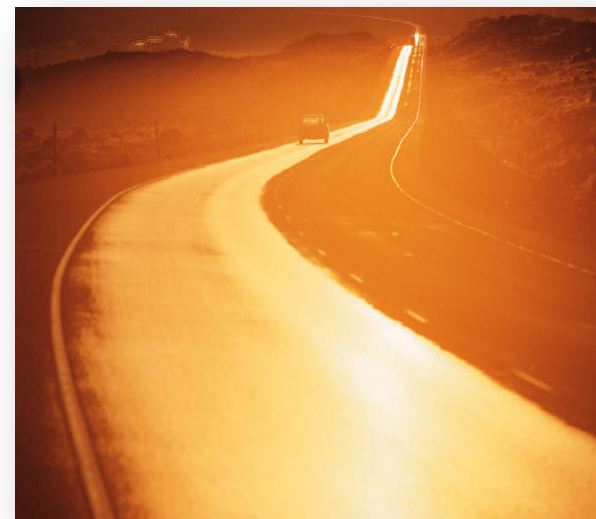
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# Rig Move Fatalities- per report

- Take a minute to read the second incident
  - What were the root causes of incident?
  - What are you currently doing to prevent such an incident?
  - What else can be done to prevent future incidents?
  - Do the same activity with the Electrocution incident and the 3<sup>rd</sup> on-site transportation incident.



# Thank You. Questions?

Kyla Retzer, MPH

Oil and Gas Sector Program Coordinator

CDC-NIOSH, Western States Office

[kgz7@cdc.gov](mailto:kgz7@cdc.gov), 303-236-5934

