The Fatalities in Oil and Gas (FOG) database: trends, insights, and how you can use FOG reports

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The findings and conclusions in this report are those of the author(s) and do not necessarily represent the views of the National Institute for Occupational Safety and Health.
Outline

About FOG

2014 report and data

How you can use FOG data

November 29-30, 2016
Fatality rates and trends

- Overall
- Event type
- Age
- Company size
- Company type

In-depth analysis

- Offshore
- Motor vehicle
- Falls
Oil and gas extraction is...

- Diverse
- Dynamic
- Specialized
- Complicated
- High hazard
Oil and gas extraction is...

an intricate machine
The problem...

Important information was not captured in available databases.
The solution...

The Fatalities in Oil and Gas Extraction (FOG) database

A database specific to the oil and gas extraction industry.
FOG captures what is missing
50 industry specific variables
Constructing the Information Pipeline

Peer Reviewed Articles
Stories
Surveillance
Evidence Based
Data
Recommendations
Training Examples

FOG

OSH Professionals
Government
Workers
FOG data in use

Suspected Inhalation

Data and Cases

Data Source

The NIOSH Oil and Gas Sector Program maintains a database, Fatalities In Oil and Gas Extraction (FOG), that collects data on fatal events in the oil and gas exploration and production industry. Fatalities were identified through a variety of sources including OSHA, media reports, and professional contacts.

November 29-30, 2016
Fatalities in Oil and Gas Extraction (FOG) database

Included
• All oil and gas extraction related fatalities
• Non-traditional commutes
• Cardiac events

Excluded
• Non-fatal injuries
• Midstream and downstream

Limitations
• Roadway motor vehicle fatalities
• Chronic illness

November 29-30, 2016
2014 industry activity

High industry activity

Rig count
Average 1862 rigs

Workforce
Largest in 10 years

November 29-30, 2016
Fatalities in FOG, 2014

102 fatalities
89 incidents
Fatalities in FOG by industry group, 2014

Industry group
- NAICS codes
- Primary business
- One per fatality

Oil and gas extraction NAICS
- 211 - operators
- 213111 - drilling
- 213112 - service

FOG includes all fatalities related to oil and gas extraction regardless of NAICS

Service
- 45%
- n=46

Drilling
- 26%
- n=27

Operators
- 10%
- n=10

Unknown
- 8%
- n=8

Other industry
- 11%
- n=11

Other industry
- 8%
- n=8

n=102
Fatalities in FOG by event type, 2014

- **Transportation**
  - How fatality occurred
  - FOG has its own event types
  - Initial event
  - One per fatality

- **Explosion (combustion) or fire**
  - Initial event
  - One per fatality

- **Exposure**
  - **Explosion (pressure)**
  - Cardiac event with no identified exposure are not included in these data

- **Falls**

- **Electrocution**

November 29-30, 2016
Transportation

28 total fatalities

- 18 roadway
- 8 on-site
- 2 other location

Event type

November 29-30, 2016
Contact injuries

25 total fatalities

14 falling object
6 caught between/crushed
5 stuck by

November 29-30, 2016
Operations in FOG by operation, 2014

Operations by stages

- Site preparation: 2
- Drilling operations: 26
- Casing installation: 5
- Well completion: 1
- Hydraulic fracturing: 8
- Flowback: 7
- Production: 11
- Well servicing, intervention, or workover: 9

Operation

- Stages or distinct processes
- One per incident

November 29-30, 2016
## Fatalities in FOG by operation, 2014

### Operation that occur throughout oil and gas extraction

<table>
<thead>
<tr>
<th>Operation</th>
<th>Fatalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site maintenance</td>
<td>2 fatalities</td>
</tr>
<tr>
<td>Tank refurbishment and custom fabrication</td>
<td>2 fatalities</td>
</tr>
<tr>
<td>Vehicle repair or maintenance</td>
<td>2 fatalities</td>
</tr>
<tr>
<td>Waste fluids treatment and disposal</td>
<td>1 fatality</td>
</tr>
</tbody>
</table>

### Unspecified

<table>
<thead>
<tr>
<th>Location</th>
<th>Fatalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off-wellsite</td>
<td>13 fatalities</td>
</tr>
<tr>
<td>Wellsite</td>
<td>10 fatalities</td>
</tr>
</tbody>
</table>

### Offshore

<table>
<thead>
<tr>
<th>Location</th>
<th>Fatalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offshore</td>
<td>3 fatalities</td>
</tr>
</tbody>
</table>
Activities

42 total activities

• Steps within operations
• Carried out several times
• As many as appropriate per incident

7 Associated with 8+ fatalities

18 Associated with 3–7 fatalities

17 Associated with 1–2 fatalities

November 29-30, 2016
42 total activities

- 7 associated with 8+ fatalities
- 18 associated with 3–7 fatalities
- 17 associated with 1–2 fatalities
<table>
<thead>
<tr>
<th>Activity</th>
<th># of occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor vehicle travel</td>
<td>18</td>
</tr>
<tr>
<td>Material handling: crane, forklift, winch truck</td>
<td>13</td>
</tr>
<tr>
<td>Rig or equipment repair or maintenance</td>
<td>10</td>
</tr>
<tr>
<td>Commuting: non-traditional</td>
<td>10</td>
</tr>
<tr>
<td>Make up or break out tubulars</td>
<td>8</td>
</tr>
<tr>
<td>Production rig activities</td>
<td>8</td>
</tr>
<tr>
<td>Rigging up or down</td>
<td>8</td>
</tr>
</tbody>
</table>
Fatalities in Oil and Gas (FOG) database

Drilling down

Making connections

Incident descriptions
Making connections

Industry group

Activities

Event Type

Operation

Industry activity and location

Multiple fatality incidents
Making connections

- Industry group
- Activities
- Event Type
- Operation

Industry activity and location

Multiple fatality incidents

November 29-30, 2016
Each circle = 1 fatality

- Contact injury
- Electrocution
- Explosion (combustion) or fire
- Fall
- Transportation

Fatalities in FOG by event type and operations in stages, 2014

- Site preparation (2)
- Drilling operations (26)
- Casing installation (5)
- Completions (16)
- Production (11)
- Well servicing, workover, or intervention (9)

November 29-30, 2016
# Fatalities in FOG by activity and event type, 2014

<table>
<thead>
<tr>
<th>Most common event type</th>
<th>Other event types</th>
<th>Activity (# of associated fatalities)</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>1</td>
<td>Motor vehicle travel (18)</td>
</tr>
<tr>
<td>7</td>
<td>6</td>
<td>Material handling: crane, forklift, winch truck (13)</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>Commuting: non-traditional (10)</td>
</tr>
<tr>
<td>3</td>
<td>7</td>
<td>Rig or equipment repair or maintenance (10)</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td>Make up or break out tubulars (8)</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>Production rig activities (8)</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>Rigging up or down (8)</td>
</tr>
</tbody>
</table>

Each circle = 1 fatality  
- Contact injury  
- Electrocution  
- Explosion (combustion) or fire  
- Explosion (pressure)  
- Exposure  
- Fall  
- Transportation

November 29-30, 2016
Multiple fatality incidents, 2014

11% of incidents

23 fatalities
Fatalities from multiple fatality incidents by operation and event type, 2014

- Each circle = 1 fatality
- Fatalities from multiple fatality incidents are colored

- Electrocution
- Explosion (pressure)
- Explosion (combustion) or fire
- Transportation

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**Operations and Event Types:**

- **Site preparation** (2)
- **Drilling operations** (26)
- **Casing installation** (5)
- **Completions** (16)
- **Production** (11)
- **Well servicing, workover, or intervention** (9)

**Unspecified:**
- Off-wellsite (13)
- Offshore (3)

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November 29-30, 2016
Incident description

- Operation
- Event type
- Activities
- Fatality count
- Industry group (NAICS)
- FOG ID

**Drilling Operations Incident Descriptions**

**23 Incidents (26 Fatalities)**

**Caught Between or Crushed**

<table>
<thead>
<tr>
<th>Activities:</th>
<th>Rigging up or down</th>
</tr>
</thead>
</table>

The crew was rigging up the substructure (derrick tower). There was a Job Safety Analysis (JSA) conducted for the operation, but the crew had deviated from it because it was a short rig move. The fatally injured worker was trying to scope out the derrick. The worker was directed to knock pins out of a section of the derrick. The worker used a 12-pound sledge hammer to remove an 8-inch long by 3-inch diameter pin from the left crown support bracket. The worker was not in the correct position to be removing the pins and was under a suspended load. When the pin was removed, the right crown support bracket broke. The middle section of the derrick dropped approximately 16 inches and fatally crushed the worker between the section of derrick and the fifth wheel on the transport truck.

FOG ID: 2014-018

Fatalities: 1
NAICS: 213111
Contact injuries (25 fatalities)

11 on the rig floor

3 while unsecuring loads or equipment

3 due to unsecured forklift attachments
Explosion (combustion) or fire (14 fatalities)

- 9 involved ignition of gases and vapors from tanks
- 7 the ignition source was diesel powered equipment
Exposure (11 fatalities)

8 while working in or around tanks

7 working unobserved
Vehicle incident: roadway (18 fatalities)

- 9 not wearing seatbelt
- 7 due to worker fatigue
- 5 occurred on unlit roads at night
- 4 while the driver was under the influence
Using FOG data

http://www.cdc.gov/niosh/topics/fog/
Using FOG data

- FOG ID
- Industry group (NAICS)
- Event type
- Operation
- Activities
- Incident description
Find patterns
Find patterns

Electrocutions

- 5 Fatalities
- Material handling: crane, forklift, winch truck
- Overhead powerlines

November 29-30, 2016
Target your interventions
Target your interventions

Contact injuries

Activities
- Material handling: crane, forklift, winch truck
- Laydown and pickup tubulars
- Make up and break out of tubulars
- Rigging up or down

72% of fatalities
Support your initiatives

FOG
Support your initiatives

Man down detection

17 fatalities while working alone on-site*

5 fatalities while working unobserved*

*Includes undetermined and cardiac events with no known exposure
Tell a story