

**OIL AND GAS WORKPLACE SAFETY:**  
**Implications for State Finance Considerations**  
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How shall we make an accurate accounting of costs, on both sides of the balance sheet, related to SB19-0181? I should like to bring to the forefront in this debate, a finance dilemma that has not been mentioned. What does it cost the state of Colorado to have a dangerous industry where death and severe injury outpace the norms for other industries in our society? What hidden burdens exist when employees are harmed and can no longer hold a job? These will, it turns out, be largely rhetorical questions, but I argue that the costs are great, if very difficult to calculate.

I heard with wonder oil and gas industry claims to be the seventh safest industry (made on March 18, 2019, in testimony before the Colorado House Energy and Environment Committee). For four generations members of my family, myself included, worked (or are working) in oilfield drilling, production, and servicing, and this assertion seemed optimistic, to say the least. Using a comprehensive understanding of the components that comprise the oil and gas industry (those activities overseen by the COGCC, from site preparation, to spudding a well, through drilling and completion, into production, and during subsequent work-over and abandonment procedures), I reviewed government data on severe injuries and deaths. The safety truths became clearer: the oil and gas industry is among the most dangerous industries in the US.

As to severe injuries (those causing hospitalization or loss of a body part), the rate of severe injuries outpaces all other US industry occupations on average (OSHA). Oil and gas production's so-called "pre-cursor" activities represent the most dangerous group of occupations in all of US industry with a rate of almost 150 severe injuries per 100,000 employees. With 30,000 oil and gas industry employees in Colorado (Denver Post, March 23, 2019), this equates to 45 severe injuries expected per year.

Severe injury rates (2015-16) (Soraghan, 2017)

Industry	Severe injuries	Average annual employment	Rate per 100,000 workers
Support activities for oil and gas operations	349	234,403	148.9
Industrial building construction	153	114,591	133.5
Poultry processing	180	139,848	128.7
All other plastics product manufacturing	164	136,387	120.2
Power and communication line and related structures construction	117	102,974	113.6
Commercial and institutional building construction	341	333,071	102.4
Oil and gas pipeline and related structures construction	95	100,181	94.8
Highway, street and bridge construction	267	292,619	91.2
Commercial and industrial machinery and equipment (except automotive and electronic) repair and maintenance	87	123,461	70.5
General freight trucking, local	86	138,932	61.9

In order of occurrence, injuries include amputation (primarily of fingers/fingertips), fractures (mostly of legs), falls or being struck by objects, and fires and explosions. These data suggest a very high incidence, in spite of OSHA data not including key oil and gas producing states such as California, New Mexico, Utah, and Wyoming (who report to their states) (Soraghan, 2017). Oil and gas *production* operations worker safety statistics can be misleading since the production facet of the industry has high fatality rates, but low injury rates (which prevent this narrow sector of the industry being characterized as a "high-

hazard” employer) (Soraghan 2017). This is related primarily to significant under-reporting of injuries (low by an estimated 30-60%) and consistent with oil and gas worker culture (according to Michaels, a scholar on oil and gas workplace safety and injuries, referenced in Soraghan 2017).

As to deaths, data from Bureau of Labor Statistics indicate that (between 2008 and 2017) 1,566 workers died in drilling and related fields, the same number as US troops killed in Afghanistan over the same period. Let that fact sink in, the oil and gas industry (especially during drilling) proves as deadly as military combat. The annual fatality rate (based on 2003-2006 data) amounted to 30.5 deaths per 100,000 oilfield workers, about 7 times the rate for all US workers, a rate relatively consistent since the early 1990s (CDC Morbidity and Mortality Weekly Report, as analyzed by Walter 2008). *Drilling* worker deaths occur at an almost 5-fold rate compared to all US industry occupations (Morris, 2018). Rates of death increase during boom times with production pressures (and temptations to cut corners) and with increased drilling activities (Morris, 2018). Industry deaths track with the amount of activity, so vary regionally and across boom and bust times. With 30,000 oilfield workers in Colorado, this equates to 9 deaths expected per year.

To examine the variations in deaths across types of oil and gas industry companies and types of operations, the National Institute of Occupational Safety and Health (NIOSH 2017) examined 101 fatalities in oil and gas extraction for 2014, as summarized below:

Fatalities by company type and types of operations

Company type	Type of operation	Number of Fatalities	Percent of Total Fatalities
Servicing Companies		45	45
	During completion	14	
	During production	11	
	Well servicing, work-over, & intervention	5	
Drilling companies		27	27
	Drilling operations	20	

Also, across all types of companies, drilling operations represented 26 total fatalities (26%). But material handling (using a crane, forklift, or winch truck) was the activity that saw the most fatalities (12) across all companies and all operations, as summarized below:

Causes of fatalities

Cause of fatality	Number of Fatalities	Percent of Total Fatalities
Roadway vehicle incidents	18	18
	Drivers without seatbelts	9
	5 drivers fatigued	7
Contact injuries	24	24
	Specifically from falling objects	15

At least 75% of contact injuries came from activities common across all phases of well life: material handling (using a crane, forklift, or winch truck); laydown or pickup of tubulars; makeup or break out of tubulars, or rigging up or down (NIOSH, 2017).

Overall, work in the oil and gas industry cannot be misconstrued as inherently safe, though some aspects of operations are much more dangerous than others. Drilling stands out as significantly more dangerous, but completion operations cannot be overlooked. In fact, any time any operation uses a rig – whether for

drilling, workover, well-servicing, or other intervention – the chances for severe injuries and death increase. Because all of these operations are central to the very nature of the oil and gas industry, even during the ostensibly safer time of production, these deaths and injuries are not only deeply regrettable, but also a consideration in state finance discussions.

The cost to the state for these deaths and severe injuries proves incalculable. But because oilfield workers are often the major wage earner in families, and these sorts of injuries common to the industry can limit wage-earning potential, risk the economic well-being of workers' families, and create a circumstance where families are left without the sorts of safety net benefits that come from industry employment, these families may need to turn to state services and subsidies for their livelihood, their medical care, and other substantive necessities.

I for one, as a former petroleum engineer and member of a proud family with deep roots in the petroleum industry, was very disappointed in industry testimony that misrepresented the dangerous nature of the work its employees face day in and day out. And, I could not help but wonder at the end of the day, if the oil and gas industry could lie about something that could so easily be refuted, what else of their testimony might be suspect.

Respectfully,



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#### SOURCES

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