



Fracking-related Commercial Motor Vehicle Crash Risk

BACKGROUND

The combination of two energy extraction technologies—hydraulic fracturing (fracking) and horizontal drilling—has transformed the U.S. energy system by providing access to natural gas and oil in tight shale formations. Fracking operations involve significant trucking activity; drilling one fracking well requires 1,200–2,300 truck trips. Most of these trips occur in the initial drilling phase, creating a burst of commercial motor vehicle (CMV) traffic when wells are initiated.

Because fracking opens access to previously untapped energy resource reserves, some areas’ transportation infrastructure is subjected to heavy commercial/ industrial traffic for the first time, and fracking wells even in States with a history of energy production tend to rely on rural roads. Also, anecdotal evidence

suggests that fracking has attracted smaller carriers without extensive energy-sector experience.

PURPOSE

This study reviewed Motor Carrier Management Information System (MCMIS) and other data for calendar years 2000 to 2016 across three fracking-involved States (North Dakota, Pennsylvania, and Texas) to assess whether CMV traffic associated with fracking raises crash risk, both in absolute terms and relative to other industries. Findings are intended to facilitate more efficient use of Federal Motor Carrier Safety Administration (FMCSA) enforcement resources, to mitigate CMV crash risk associated with fracking activities.

Table 1 summarizes the research questions addressed by this study.

Table 1. Research questions, key findings, and potential next steps.

Research Question	Finding
How has fracking activity and crash risk changed over time in the three States studied?	Increases with crash risk correlated with increases in fracking activity. The strength of the correlation varied by State.
How does fracking activity affect the geographical location of CMV crashes? (North Dakota only)	Fatal crashes were more likely near fracking wells than in comparable non-well locations. The difference varied from a 51.9-percent increase to a 1- to 7-percent increase depending on analytical method.
How is CMV crash risk different for carriers involved in fracking related operations from those not involved?	No clear, nationwide trend distinguished the safety record of fracking-associated carriers from others. There were differences, but results were mixed.
Are fracking-associated carriers being inappropriately granted hours-of-service (HOS) exemptions?	Anecdotal evidence suggests lower HOS compliance than in other motor carrier sectors. Limited available data did not show a statistically significant result.

METHODS

Each of the States studied represents a different environment and past relationship with large-scale energy resource extraction. For each State, researchers performed statistical analyses to: (1) compare crash rates to national averages, (2) measure changes in crash rates over time, and (3) ascertain how proximity to fracking wells impacted crash risk (where the data permitted). All studied crashes involved at least one CMV, and the report considered all reported crashes based on location, not merely crashes confined to particular road types. The study also sought to gather data about fracking-associated carriers' safety performance and operational practices.

FINDINGS

Crash Risk

There is a positive correlation between new well initiation and crash risk. This correlation was clearest for North Dakota (see Figure 1). Fracking activities in North Dakota are concentrated in the northwestern quarter of the State, a region with a sparse roadway network. This suggests that the presence of transportation infrastructure not designed for heavy industrial traffic plays a significant role in increasing crash risk. Increases in crash risk coincided with the drilling of new wells in all three States, suggesting that increases in fracking rather than continuous well operation are the main driver of crash risk.

Crash Distribution

Only North Dakota supplied detailed spatial CMV crash data, allowing precise pinpointing of crash locations anywhere in the State. Overall, the study found increases in fatal crash frequency near fracking wells. The size of the increases depended on the analytical method and the size of the analyzed area. At the highest resolution (crashes within a 1-mile radius of wells), the study found no increase in fatal crashes, but the small sample size may have distorted results.

Fracking-associated Carrier Safety Performance

The study found that the safety performance of fracking-associated carriers relative to those in other heavy industries varied with the metric used and by State. No clear, nationwide trend emerged. The increase in crash risk documented throughout the study is rooted more in increased traffic volume than in carrier-specific practices.

HOS Exemptions

Based on anecdotal evidence, fracking-related carriers showed lower levels of HOS compliance than other carriers. Analysis of available data did not reveal statistically significant differences.

To read the complete report, please visit:
<https://rosap.ntl.bts.gov/view/dot/56183>

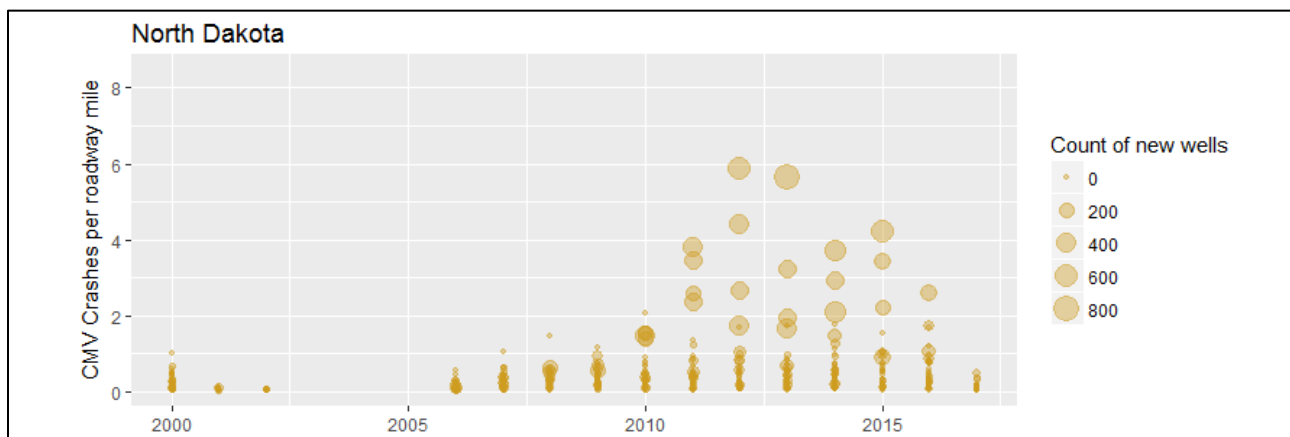


Figure 1. Scatterplot. Patterns of CMV crashes per roadway mile and fracking well initiation by county, over the study period 2000–16, for North Dakota.