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2018 ANNUAL REPORT

Tracking Work-Related Deaths in Michigan



Michigan State University
Department of Medicine • Occupational and Environmental Medicine
909 Fee Road, 117 West Fee Hall • East Lansing, MI 48824
1-517-353-1846 • <https://oem.msu.edu>



2018 Annual Report

Tracking Work-Related Deaths in Michigan

A Joint Report
of
Michigan State University
Department of Medicine
909 Wilson Road, Room 117 West Fee
East Lansing, Michigan 48824-1315
(517) 353-1846

Anthony N. Oliveri, PhD, MPH
Assistant Professor of Medicine

Debra A. Chester, MS
Industrial Hygienist

Kenneth D. Rosenman, MD
Professor of Medicine

and

Michigan Department of Labor and Economic Opportunity
Michigan Occupational Safety and Health Administration
P.O Box 30643
Lansing MI 48909
Barton G. Pickelman, Director

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Executive Summary

The Division of Occupational and Environmental Medicine (OEM) at Michigan State University (MSU) began tracking work-related fatalities in the state of Michigan in January 2001. This is the 18th annual Michigan Fatality Assessment and Control Evaluation (MIFACE) report on acute traumatic work-related deaths in Michigan. There were **159 work-related deaths in 2018**, an increase of 6 deaths compared to 2017. There were 154 separate incidents (two deaths occurred in each of five separate incidents) and 157 separate employers. A narrative summary of each work-related fatality is in [Appendix I](#). MIFACE educational material, including on-site Investigation Reports, Summaries of MIOSHA Investigations, MIFACE Data Fact Sheet, and Hazard Alerts can be accessed on the Michigan State University Division of Occupational & Environmental Medicine ([MSU OEM](#)) website, Work Related Injuries and Illnesses, Work Related Fatalities ([MIFACE](#)) webpage.

Key findings for 2018:

- The number of work-related deaths (159) and the fatal injury rate (3.4 deaths/100,000 workers) were up compared to 2017 (153 work-related fatalities, 3.3/100,000 workers). Although there has been slight variation between the years, there has been no appreciable change in the number of deaths or rates since 2010.
- The *overall* rate of work-related deaths in Michigan is lower than the rate in the United States (3.5 deaths/100,000 workers).
- The industry sector with the highest employment-based industry rate was Mining (36.6 deaths/100,000 workers), followed by Agriculture (26.9 deaths/100,000 workers) and then Utilities (19.7/100,000 workers). Construction had the largest number of work-related deaths (29 deaths, 19.0% of all fatalities) followed by Agriculture, Forestry, Fishing and Hunting (23 deaths, 14.5%).
- Struck-by incidents were the leading cause of a work-related death (36, 22.6%). Motor vehicle crashes were the second leading causes of death (24, 15.1%) followed by homicides (22, 13.8%) and falls (21, 13.2%).
- Individuals who died were most likely to be men (91.2%) and Caucasian (88.0%). The average age was 49.2 years old and ranged from 20 to 89 years of age.
- Illegal drugs, alcohol or side effects of prescribed and over-the-counter medication were potential factors in 17.2% of the non-suicide and non-drug abuse deaths.
- By occupational group, Management had the largest number of work-related deaths (46) followed by Transportation & Material Moving (26) and then Construction & Extraction (18).
- Forty-nine of Michigan's 83 (59.0%) counties had a work-related fatality. Wayne County had the highest number of deaths (29, 18.2%), followed by Oakland (13, 8.2%), and Macomb and Washtenaw (10 each, 6.3%).
- Of the 159 work-related fatalities, 38 (23.9%) were MIOSHA program-related and were investigated by a MIOSHA compliance officer.

Definitions

A **traumatic injury** is any unintentional or intentional wound or damage to the body resulting from acute exposure to energy or from the absence of such essentials as heat or oxygen caused by a specific event, incident or series of events within a single workday or shift.

Work is defined as legal duties, activities or tasks that produce a product as a result and that are done in exchange for money, goods, services, profit or benefit.

A **work relationship** exists if an event or exposure results in the fatal injury or illness of a person:

- (1) ON the employer's premises and person is there to work; or
- (2) OFF the employer's premises and person is there to work, or the event or exposure was related to the person's work or status as an employee.

Incidence means the number of new cases of an illness, injury, or other health-related event that commence during a specified time period in a specified population.

Background

In 2001, MSU OEM instituted a tracking program for all traumatic work-related deaths, first with financial assistance from the Michigan Department of Labor and Economic Opportunity (LEO) and then from the National Institute of Occupational Safety and Health (NIOSH). This is a joint project of LEO/MIOSHA and MSU OEM.

The purpose of the MIFACE tracking project is three-fold:

- Identify the types of industries and work situations where workers are dying from acute traumatic incidents;
- Identify the underlying causes of the work-related fatality, and
- Formulate and disseminate prevention strategies to reduce future work-related fatalities.

MIFACE uses the National Institute of Occupational Safety and Health (NIOSH) Fatality Assessment and Control Evaluation (FACE) as a model. Since 1982, NIOSH has funded selected states to operate a state FACE program. MIFACE investigations have provided aggregate data to identify high-risk industries and work practices as well as provided the stories or “faces” necessary to make the statistics real and influence change in the workplace. Emphasis on information dissemination and translation of information into user-friendly materials is an important part of the MIFACE program.

The MSU OEM webpage has many resources available to assist employers, employees, safety and health professionals and others to understand more about work-related illnesses, injuries and deaths.

Who is Included? Any individual of any age who meets the criteria of “at work”, including volunteers and prison inmates, who are exposed to the same work hazards and perform the same duties or functions as paid employees. Suicides are included, following the protocol established by the NIOSH FACE program and the Bureau of Labor Statistics (BLS), which collects the official work-related death statistics in all states.

Who is Not Included? Individuals who die while “at work” from diseases, such as a heart attack or stroke, individuals commuting to/from work, volunteers not working for a non-profit, students, and homemakers.

Methods

MIFACE utilizes multiple sources to identify work-related fatalities in Michigan: MIOSHA, Death Certificates, Newspapers, Medical Examiners, Police/Fire/EMT Departments, Workers' Compensation Agency, MSU Extension, Michigan Farm Bureau, Federal Agencies (MSHA, NTSB, etc.), Internet searches, and Michigan citizens reporting a work-related death.

IDENTIFY INDIVIDUALS	GATHER INFORMATION	CONTACT EMPLOYER/FARM FAMILY	MIFACE SITE VISIT
<ul style="list-style-type: none"> ◇ Receive Report of Death ◇ Determine if WR Death <ul style="list-style-type: none"> - Paid employee, self-employed? - Working at job or family business? - Traveling "while on-the-clock" or compensated travel? - Volunteer? - In parking lot of business? 	<ul style="list-style-type: none"> ◇ Contact MIOSHA <ul style="list-style-type: none"> - If fatality is program-related ◇ Gather source documents <ul style="list-style-type: none"> - Reports from agencies that investigated the death/provided emergency services when event occurred - Death certificate - Medical examiner report and, when appropriate - MIOSHA fatality investigation narrative 	<ul style="list-style-type: none"> ◇ Send MIFACE Introduction Letter and Brochure ◇ Follow-up phone contact <ul style="list-style-type: none"> - Answer questions - Ask if employer and/or family will voluntarily participate <ul style="list-style-type: none"> ➤ If Yes, schedule date and time for MIFACE site visit ➤ If No, write case summary or MIFACE Summary of MIOSHA Investigation 	<ul style="list-style-type: none"> ◇ Explain MIFACE program ◇ Complete appropriate research forms ◇ Conduct interviews with appropriate personnel <ul style="list-style-type: none"> - Learn about process, equipment involved, work activities of deceased, training, safety programs, etc. ◇ Observe area and/or equipment involved ◇ Take pictures, ensuring identifiers are removed
<p>ALL work-related deaths MUST be reported to MIOSHA within 8 hours of the death.</p> <p>The toll-free hotline to report a work-related death is: 1-800-858-0397</p>		<p>MIFACE INVESTIGATION REPORT</p> <p>Site Visit Report Includes:</p> <ul style="list-style-type: none"> - Summary statement - Background information - Detailed investigation narrative - Cause of death as determined by the Medical Examiner - Prevention recommendations, including discussion - References - Pictures, drawings, sketches - Review process 	

FOLLOW-UP ACTIVITIES

◇ Identify Stakeholders

- Internet search for similar companies and/or trade groups

◇ Update Database

- Information collected from each site visit and statewide tracking entered into a database

◇ Analyze Data

- Annual Report developed analyzing and discussing data

◇ Educational Outreach

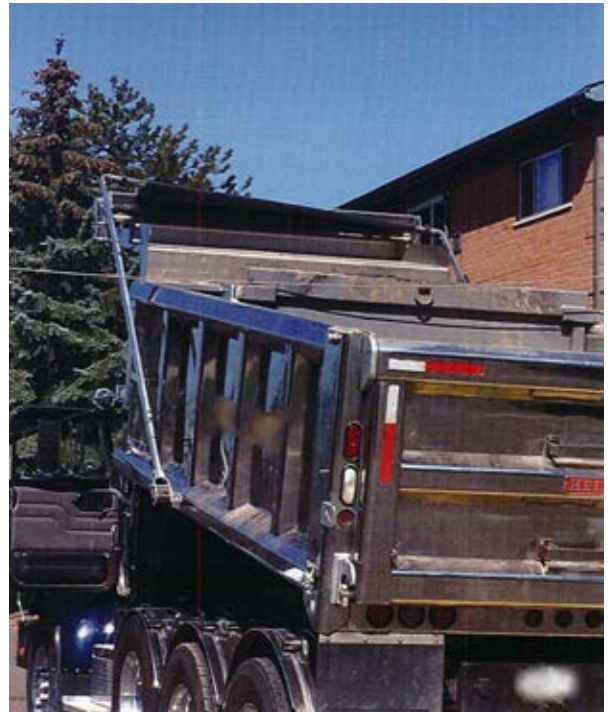
- MIFACE Summary of MIOSHA Investigation if MIOSHA investigation takes place
- Hazard Alert
- Post on MSU OEM website:
 - Investigation Report
 - MIFACE Summary of MIOSHA Investigation
 - Hazard Alert
- Send notice of posted publications to MIFACE e-mail distribution list
- Guest speaker, display booths at health and safety conferences, industry trade group training programs

The level of information collected for each fatality depended on the type of incident.

For homicides, suicides and most transportation-related fatalities that occurred while the individual was at work, MIFACE collected only source documents.

For many of the remaining work-related fatalities including agricultural fatalities, MIFACE initiated contact with employers or farm family members to request permission for an on-site investigation. It is important to note that MIFACE investigators did not enforce compliance with Michigan Occupational Safety and Health Act (MIOSHA) rules and regulations and did not assign fault or blame. However, to decrease the burden to the employer of multiple investigations, MIFACE accompanied the MIOSHA compliance officer with employer agreement. In addition, MIFACE interviewed the compliance officers about their investigation.

All photographs used in this annual report are courtesy of MIOSHA, the responding police department or pictures taken at the time of the MIFACE investigation. Photographs have been modified as necessary to remove identifiers.



A truck driver for a landscaping firm in his 50s was electrocuted when he touched an energized conductor while standing next to his truck.

Results

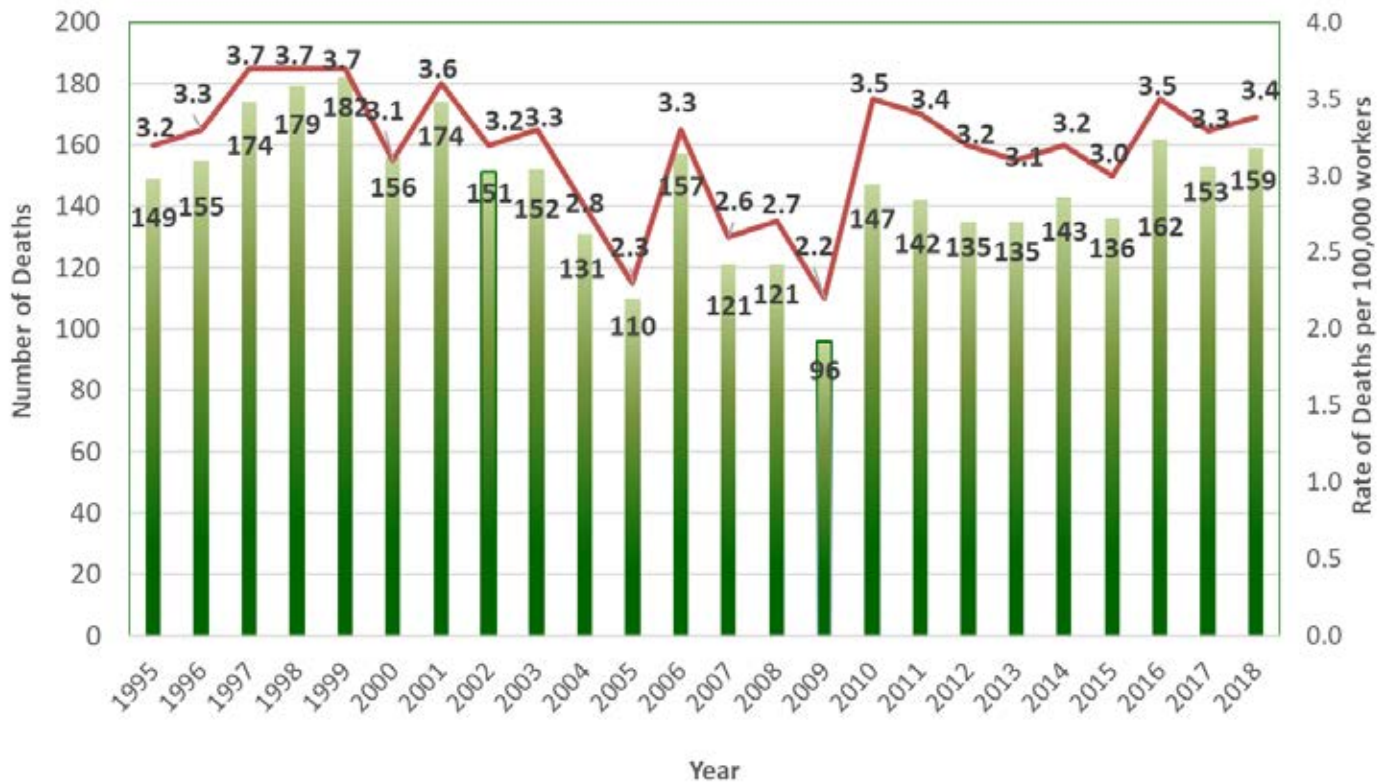
There were 159 acute traumatic work-related fatalities in 2018. One hundred fifty-one (95.0%) of the 159 work-related traumatic incidents occurred in 2018; a description of the eight individuals who died in 2018 due to complications from a work-related injury sustained in a previous year follows:

- A male in his 50s died from complications 36 years after a construction-related fall that paralyzed him.
- A truck driver in his 60s died from complications of a fall off a truck or trailer in 1989.
- A restaurant manager in his 50s died from complications from spinal injuries from slipping and falling 20 years ago while working in a restaurant.
- A highway construction laborer in his 30's died from complications 20 years after injuries sustained after being struck by a vehicle in a highway construction zone.
- A logger in his 60s died from complications 12 years after spinal injuries that paralyzed him. The decedent was operating a trail groomer when the grooming blade suddenly dropped, stopping the machine. The decedent was unrestrained and was thrown into the steering column.
- The owner/operator of a tool and die business in his 50's died from complications 12 years after a traumatic brain injury. The decedent had been operating a CNC machine when a piece of metal was flung from the machine and struck a window. The window flexed and hit the decedent in the head, knocking him to the floor, where he further injured his head.
- A butcher at a grocery store in his 40s died from complications several years after a fall at work. The decedent was attempting to lift a box of meat off a pallet on top of the meat freezer case, which he was accessing via a ladder. The decedent lost his balance and fell from the ladder approximately six feet to the concrete floor below.
- A driver for a used car dealership in his 60s died from complications four years after becoming a quadriplegic after a motor vehicle collision. The decedent was transporting a passenger vehicle that his employer had purchased at auction back to the dealership. He was traveling east on a three-lane highway with a posted speed limit of 70 mph in the right-most lane. He attempted to change lanes to the left but struck the rear passenger-side panel of a pickup truck already in the lane. Both vehicles traveled off the road to the left, striking the median barrier and coming to a rest on the median shoulder. The decedent was not wearing the equipped seatbelt, although his airbags did deploy. The decedent had an elevated blood alcohol level at the time of the crash of 0.141.

The 159 individuals who died had 157 different employers. One city had three separate incidents involving a police officer (2 incidents) and a firefighter (one incident). One utility company had two employees die in two separate incidents.

Figure 1 shows the number of acute traumatic work-related deaths and incidence rate per year in Michigan since 1995.

Figure 1. Number and Incidence Rate of Work-Related Fatalities in Michigan, 1995-2018



In Figure 1, the **red** line shows incidence rate per 100,000 workers. The **green** columns show the number of work-related deaths per year. Incidence rates shown from 1995-2000 were obtained from the [BLS](#) website. Rates shown for 2001-2018 were determined from MIFACE statistics.



A tow truck driver in his 40s died when he was struck by a vehicle as he was securing a pickup truck on his flatbed tow truck.

Demographics

Table 1 shows the demographic characteristics of the 159 traumatic work-related fatalities in Michigan in 2018. Demographic characteristics were obtained from the individual's death certificate.

Race

Of the 145 males who died, 125 were Caucasian, 17 were African American and one was an American Indian/Alaskan Native. One man's race was reported as Hispanic. For one man, his race was unknown. Fourteen Caucasian women died in a work-related incident.

Eight individuals were of Hispanic ethnicity, all men. Death certificates indicated the race as Caucasian for 7 of the 8 Hispanic individuals.

Age

The age at time of death ranged from 20 to 89 years. The average age was 49.2 years, up by more than a year from 47.6 years of age in 2017. For men, the ages ranged from 20-89 years, and for women, the ages ranged from 25-71 years. The average age for men at the time of death was 49.0 years; for women, it was 50.3 years (**Table 1**).

Twenty individuals were 66 years of age or older when they died compared to 23 individuals in 2017; the average age of these was 77.3 years and included 19 men and one woman.

Six (30.0%) of the 20 individuals aged 66 years or older died due to a fall, five (25.0%) due to a motor vehicle collision, four (20.0%) to a machine-related incident, three (15.0%) from a struck-by incident, one (5.0%) each from a suicide and one (5.0%) from asphyxiation.

Table 1. Demographic Characteristics* of 159 Work-Related Fatalities, Michigan 2018

Demographic Characteristics	Number	Percent
Gender		
Male	145	91.2
Female	14	8.8
Race		
White	139	88.0
Black	17	10.8
Hispanic	1	0.6
American Indian/Alaskan Native	1	0.6
Unknown	1	0.6
Age		
<20	0	--
20-29	22	13.8
30-39	27	17.0
40-49	28	17.6
50-59	40	25.2
60-69	24	15.1
70-79	9	5.7
80-89	9	5.7
Education		
Less than High School	17	11.3
High School Graduate	71	47.3
GED	5	3.3
Some College (1-4 years)	48	32.0
Post College (5+ years)	3	2.0
Vocational School	6	4.0
Unknown	9	6.0
Country of Origin		
United States	149	93.7
Mexico	2	1.3
Canada	2	1.3
Boznia/Herzegovina	2	1.3
Iraq	1	0.6
Lebanon	1	0.6
Poland	1	0.6
Panama	1	0.6
Totals	159	--

* Source: Death Certificate (percent may not add to 100 due to rounding)

Table 2 describes the age distribution of the victims across industry sectors.

Table 2. Traumatic Work-Related Fatalities by Age of Victim and Industry Sector, Michigan 2018				
Industry Sector (NAICS Code)	0-17	18-65	66+	Total
	#	#	# (%)	
Agriculture, Forestry, Fishing & Hunting (11)	--	15	8 (34.8%)	23
Mining (21)	--	1	1 (50.0%)	2
Utilities (22)	--	4	--	4
Construction (23)	--	22	2 (8.3%)	24
Manufacturing (31-33)	--	17	1 (5.9%)	18
Wholesale Trade (42)	--	4	--	4
Retail Trade (44-45)	--	12	1 (8.3%)	13
Transportation & Warehousing (48-49)	--	18	1 (5.6%)	19
Information (51)	--	1	--	1
Real Estate & Rental & Leasing (53)	--	3	1 (33.3%)	4
Administrative & Support & Waste Management & Remediation Services (56)	--	13	1 (7.7%)	14
Educational Services (61)	--	3	--	3
Health Care & Social Assistance (62)	--	2	--	2
Arts, Entertainment & Recreation (71)	--	4	1 (25.0%)	5
Accommodation & Food Services (72)	--	7	--	7
Other Services (except Public Administration) (81)	--	9	3 (33.3%)	12
Public Administration (92)	--	4	--	4
Totals	--	139	20	159

Nationally, the hours-based fatal work injury rate (per 100,000 FTE workers) for individuals aged 65 and over was 9.6 (<https://www.bls.gov/charts/census-of-fatal-occupational-injuries/rate-of-fatal-work-injuries-per-100000-fte-by-age.htm>). Although not directly comparable, Michigan's employment-based fatality rate for workers aged 65 and over was 8.7/100,000 in 2018. While the percentage of individuals 65 years of age and older (16.1%) was smaller than other age categories, this age group had the highest fatality rate of all age groups (**Table 3**).

Table 3. Employment Number, Percent of the Civilian Non-institutional Population Employed and Fatality Rate by Age Group^a, Michigan 2018

Age Range (in years)	Employment		Number of Deaths	Fatality Rate (per 100,000)
	Number (in thousands)	% of Civilian non- institutional Population within age category that is employed		
16-19	194	34.8	0	--
20-24	443	69.7	11	2.5
25-34	1,027	79.1	23	2.2
35-44	901	79.0	33	3.7
45-54	1,097	79.5	27	2.5
55-64	776	58.3	42	5.4
65 and older	265	16.1	23	8.7

^a [Employment status of the civilian noninstitutional population by sex, race, Hispanic or Latino ethnicity, marital status, and detailed age, 2018 annual averages](#)

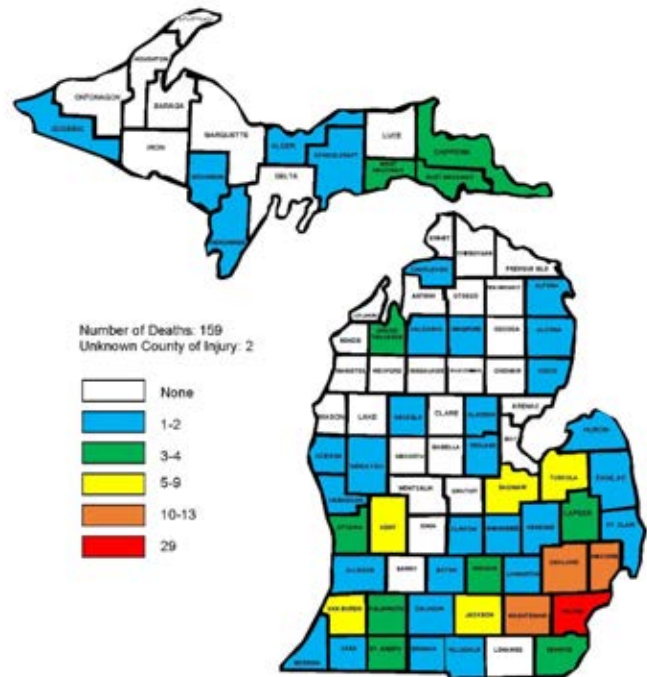
Geographic Distribution

Forty-nine (59%) of the 83 Michigan counties had at least one work-related fatality (**Figure 2 and Table 4**).

Table 4. County of Fatal Work-Related Injury, Michigan 2018

County	Number	Percent*	County	Number	Percent	County	Number	Percent	County	Number	Percent
Alcona	1	0.6	Dickinson	1	0.6	Lake	--	--	Oceana	1	0.6
Alger	1	0.6	Eaton	1	0.6	Lapeer	3	1.9	Ogemaw	--	--
Allegan	2	1.3	Emmet	--	--	Leelanau	--	--	Ontonagon	--	--
Alpena	1	0.6	Genesee	1	0.6	Lenawee	--	--	Osceola	1	0.6
Antrim	--	--	Gladwin	1	0.6	Livingston	1	0.6	Oscoda	--	--
Arenac	--	--	Gogebic	1	0.6	Luce	--	--	Otsego	--	--
Baraga	--	--	Grand Traverse	4	2.5	Mackinac	3	1.9	Ottawa	3	1.9
Barry	--	--	Gratiot	--	--	Macomb	10	6.4	Presque Isle	--	--
Bay	--	--	Hillsdale	2	1.3	Manistee	--	--	Roscommon	--	--
Benzie	--	--	Houghton	--	--	Marquette	--	--	Saginaw	5	3.2
Berrien	2	1.3	Huron	1	0.6	Mason	--	--	St. Clair	2	1.3
Branch	2	1.3	Ingham	3	1.9	Mecosta	--	--	St. Joseph	4	2.5
Calhoun	2	1.3	Ionia	--	--	Menominee	1	0.6	Sanilac	1	0.6
Cass	2	1.3	Iosco	1	0.6	Midland	2	1.3	Schoolcraft	1	0.6
Charlevoix	1	0.6	Iron	--	--	Missaukee	--	--	Shiawassee	2	1.3
Cheboygan	--	--	Isabella	--	--	Monroe	3	1.9	Tuscola	3	1.9
Chippewa	4	2.5	Jackson	6	3.8	Montcalm	--	--	Van Buren	3	1.9
Clare	--	--	Kalamazoo	3	1.9	Montmorency	--	--	Washtenaw	10	6.4
Clinton	2	1.3	Kalkaska	1	0.6	Muskegon	2	1.3	Wayne	29	18.5
Crawford	1	0.6	Kent	6	3.8	Newaygo	1	0.6	Wexford	--	--
Delta	--	--	Keweenaw	--	--	Oakland	13	8.3	Unknown	2	1.3

Figure 2. County of Fatal Work-Related Injury, Michigan 2018



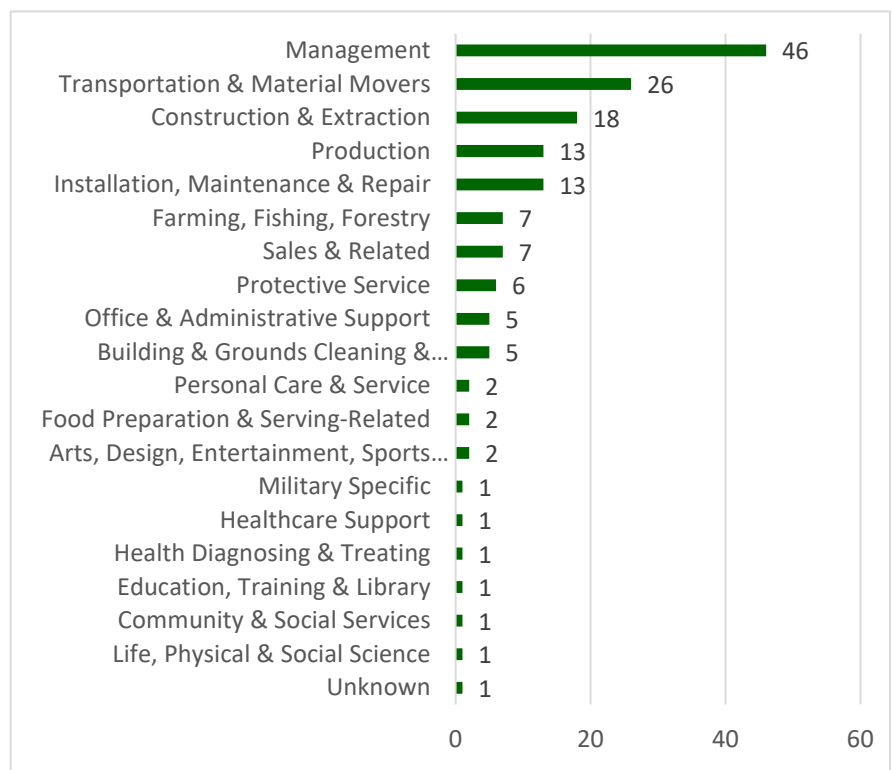
Occupation

Figure 3 shows the occupation distribution of the 159 work-related deaths utilizing 2018 Standard Occupational Classification (SOC) categories; the occupation of one individual was unknown. Occupation was determined from the reporting source data. The SOC categories are divided into 23 major groups. These major groups combine occupations according to the nature of the work performed, placing all people who work together into the same group regardless of their skill level.

The Management occupations major group had the largest number of deaths (46, 29.1%). Management occupations are varied, such as general managers, legislators, sales and marketing managers, education and childcare administrators as well as the self-employed and owner/co-owner of a business, farmers, ranchers and other agricultural managers.

The Transportation and Material Movers group had the second highest number of deaths (26, 16.5%), followed by Construction and Extraction Occupations (18, 11.4%), Production Occupations (13, 8.2%), and Installation, Maintenance & Repair Occupations (13, 8.2%).

Figure 3. Number of Deaths by Standard Occupational Classification, Michigan 2018



Four of the twenty-three SOC major groups (Business and Financial Operations, Computer and Mathematical Occupations, Architecture and Engineering, Legal,) had no deaths this year.

Working Status of the Decedent

One hundred and fifty-seven employers were associated with the 159 individuals who died in 154 separate incidents.

The employer/employee status was known for 156 of the 159 (98.1%) work-related deaths. Ninety-seven (62.2%) individuals were employees, one of whom was a contract/temporary worker. Fifty-five (35.6%) were self-employed or the owner/co-owner of the business, and four (2.6%) individuals were volunteer workers.

The decedent was working alone in 93 (61.6%) incidents and with a coworker in 58 (38.4%) incidents. The work status was unknown in eight incidents. For homicides, the decedent was working alone in eight (40.0%) incidents and with a coworker in 12 (60.0%) incidents. For two homicides, it was unknown if the decedents were working alone or with a coworker at the time of the incident.

Location of Injury

The location of injury for the fatal incident was identified for 158 (99.4%) of the 159 deaths. Beginning in 2012, MIFACE began using a coding system for location as follows: a) Designations of specific buildings (such as “house, apartment” or “bar, nightclub”) include both the building itself and the area directly outside, such as a driveway, porch, or front walk; b) If a victim was injured in a variety of locations (e.g., the victim was stabbed on a bus and was pursued by the attacker off the bus and into a store and stabbed a second time), the location at which the victim was first injured was coded; c)

Events that occurred on public sidewalks were coded as “street,” with the exception of those occurring on sidewalks that were the private property of an adjacent building, which were coded to the building. For example, an incident that occurred on a walkway on the front lawn of a home was coded as “house, apartment”. If an incident occurred in a garage at a private home, “house, apartment” was coded. If an incident occurred in a commercial parking garage, parking lot, or a garage used by four or more different households (e.g., a garage serving a large apartment building), the location “parking lot/public parking

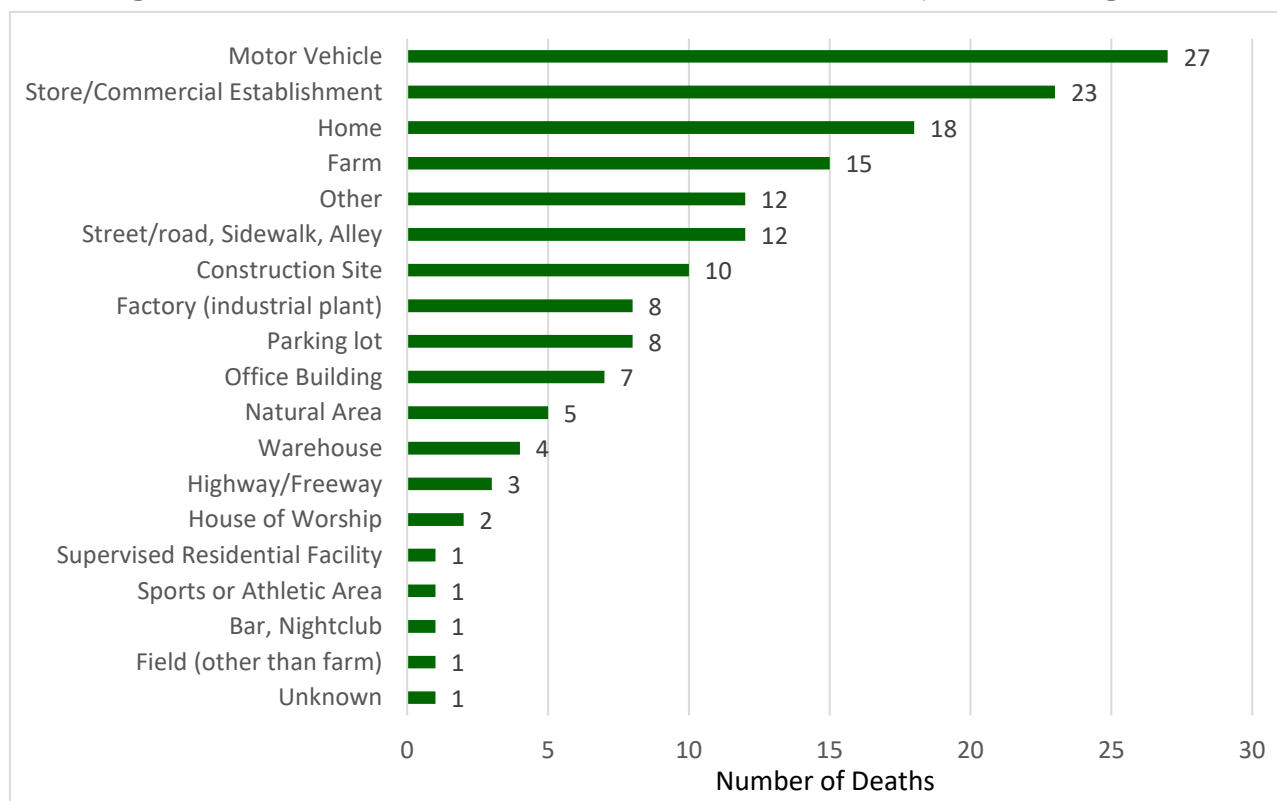


A male farmer in his 80s died when a tree he was limbing and bucking shifted and pinned him under a tree trunk.

garage” was used; d) If an incident occurred while the victim was in a motor vehicle, the place of injury was coded as a “motor vehicle” - for annual report years 2001-2011, MIFACE coded the location (street/road) rather than “motor vehicle”.

Figure 4 depicts the distribution of incident locations for the 2018 traumatic deaths. A motor vehicle was the location where the largest number of the fatal injuries occurred (27, 17.1%). A commercial establishment was the site of 23 (14.6%) incidents. Eighteen (11.4%) of the incidents occurred at a home and fifteen (9.5%) at a farm. Twelve (7.6%) locations did not strictly meet the locations used by medical examiners on death certificates; examples include a truck stop, military base, quarry, fire station, recording studio, etc. A street/road (12, 7.6%) and construction sites (10, 6.3%) were the sites 10 or more fatal incidents.

Figure 4. Location and Number of Fatal Work-Related Injuries, Michigan 2018



Location of Death

For 83 (52.2%) individuals, the death certificate, or in the absence of a death certificate, other source documents indicated the death occurred at the scene of the traumatic incident, for 67 (42.1%), in the hospital, seven (4.4%), at home, and for two (1.3%), in hospice.

Illegal Drug/Alcohol/Medication Use

Among the 134 individuals whose death was not a suicide (15 deaths) or a drug overdose (10 deaths), 35 (26.1%) individuals had detectable levels of alcohol, illegal drugs or medications in their system. Twenty-three (17.2% of total non-suicide/drug overdose

deaths) had levels that were considered to possibly have contributed to the fatal incident (Table 5).

Several states have adopted a legal limit of 5 µg/l (5 ng/ml) for marijuana (THC) in blood for being impaired while driving. Although this level does not directly correlate with impairment as does blood alcohol levels, the THC level of 5 µg/l was used to define that marijuana use was possibly related to the death. It was unknown if the presence of hydrocodone, fentanyl, amphetamine, morphine and marijuana measured in the deceased's body fluids was from the use of a prescribed medication or from illegal use.

Table 5. Type of Work-Related Fatal Incident and Drug Found in Toxicological Analysis Among 28 Individuals Where the Substance Detected was Considered a Possible Contributor to the Individual's Death, Michigan 2018

Incident Type	Alcohol level (blood %)	Prescription	Marijuana &/or marijuana metabolite	Cocaine, Heroin, metabolites	Other Illegal	Unknown Prescription/Non-Prescription
Struck By	0.54			√		
Homicide	0.086					
Machine	0.153					
Struck By				√	Levamisole Fentanyl	
Machine	0.18	Sertraline				
Struck By					Amphetamines	
MVC					Ketamine	
MVC				√	Amphetamine Methamphetamine Levamisole	
MVC			√	√	Fentanyl	
Homicide			√			
MVC				√		
Fall			√			
MVC			√			
Homicide			√			
Drowning			√			
Homicide			√			
Electrocution						Hydrocodone
Struck By		Tramadol				
MVC		Oxcarbazepine				
MVC		Tramadol				
Asphyxiation		Citalopram	√			Fentanyl
Struck By						Hydrocodone
Struck By		Loperamide				Diphenhydramine

Work-Related Fatality Incidence Rates by Industry

Employment-based incidence rates measure the risk of fatal injury for those employed during a given period of time, regardless of hours worked.

Hours-based incidence rates measure fatality risk per standardized length of exposure. Hours-based rates use the average number of employees at work and the average hours each employee works (40 hours/week, 50 weeks/year).

The BLS uses hours-based incidence rates to measure fatality risk for industry sectors.

Employment-based and hours-based incidence rates will be similar for industries which mainly have full-time employees. However, differences will be observed for industries that employ a high percentage of part-time workers, such as in the fast food industry.

The number of hours worked was not available for several industry sectors. When provided, MIFACE calculated the hours-based work-related fatality incidence rate (See **Table 6**).

Michigan data shows that in industry sectors with many part-time workers (30 hours or less), the work-related fatality hours-based rate is higher than the employment-based incidence rate, such as in Retail Trade and

Accommodation & Food Services. When the number of hours worked is 40 hours or more, the hours-based incidence rate is similar to or lower than the employment-based incidence rate, such as in Construction, Manufacturing, and Wholesale Trade.

Industry Highlights, Michigan 2018

Table 6 shows the number of traumatic work-related fatalities and Michigan's annual incidence rate by industry sector for number of employees and hours worked.

Highlights from Table 6:

Seven industry sectors had fewer work-related deaths and a lower employment-based incidence rate in 2018 compared to 2017:

Industry	Decrease in Number of Deaths from 2017	Number of 2018 WR Deaths	2018 Incidence Rate	Number of 2017 WR Deaths	2017 Incidence Rate
Construction	5	24	14.2	29	17.9
Wholesale Trade	4	4	2.3	8	4.6
Finance & Insurance	1	0	--	1	0.7
Professional, Scientific & Technical Services	2	0	--	2	0.7
Health Care & Social Assistance	3	2	0.3	5	0.8
Arts, Entertainment & Recreation	6	5	9.4	11	20.8
Public Administration	4	4	1.6	8	3.3

Nine industry sectors had a higher number of work-related deaths and a higher employment-based incidence rate in 2018 compared to 2017:

Industry	Increase in Number of Deaths from 2017	Number of 2018 WR Deaths	2018 Incidence Rate	Number of 2017 WR Deaths	2017 Incidence Rate
Agriculture	4	23	26.9	19	22.1
Mining	1	1	36.6	0	--
Utilities	4	4	19.7	0	--
Manufacturing	7	18	2.9	11	1.8
Retail Trade	1	13	2.8	12	2.5
Transportation & Warehousing	7	19	12.9	12	10.1
Real Estate & Rental & Leasing	1	4	7.3	3	5.5
Administrative & Support & Waste Management & Remediation Services	4	14	4.8	10	3.5
Educational Services	1	3	0.8	2	0.3

Three industry sectors had the same number of work-related deaths in 2018 compared to 2017 (although the Incidence Rate varies due to fluctuating levels of employment).

Industry	Number 2017 & 2018 WR Deaths	Incidence Rate 2018	Incidence Rate 2017
Information	1	1.8	1.8
Accommodation & Food Services	7	1.8	1.9
Other Services	12	8.6	8.7

The industry sector with the highest employment-based industry rate was Mining (36.6 deaths/100,000 workers), followed by Agriculture (26.9 deaths/100,000 workers) and then Utilities (19.7/100,000 workers). The industry subsector with the highest overall incidence rate was Support Activities for Agriculture (under Agriculture), which had an incidence rate of 64.4 deaths/100,000 workers.

Table 6. Number of Traumatic Work-Related Fatalities by Industry and Incidence Rates by Number of Employees and by Hours Worked, Michigan 2018

Industry Sector (NAICS Code)	Number	Percent	Employment-Based		Hours-Based	
			Number Employees ^a	Rate ^d	Number Hours ^e	Rate ^g
Agriculture, Forestry, Fishing & Hunting (11)	23	14.5	85,584^b	26.9	**	47.4^j
Crop Production (111) (Owners/Operators)	12	7.5	51,156 ^b	23.5	**	**
Crop Production (111) (Hired Workers)	4	2.5	59,903 ^b	6.7	38.5 ^f	10.7
Animal Production (112) (Hired Workers)	4	2.5	17,572 ^b	22.8		
Forestry & Logging (113)	1	0.6	1,865	53.6	**	**
Support Activities for Agriculture (115)	2	1.3	3,107	64.4	**	**
Mining, Quarrying, & Oil & Gas Extraction (21)	2	1.3	5,469	36.6	**	**
Mining (Except Oil and Gas) (212)	2	1.3	3,374	59.3	**	**
Utilities (22)	4	2.5	20,279	19.7	**	9.6
Utilities (221)	4	2.5	20,279	19.7	**	**
Construction (23)	24	15.1	168,632	14.2	40.6	14.0
Construction of Buildings (236)	4	2.5	41,409	9.7	39.0	9.9
Heavy & Civil Engineering Construction (237)	7	4.4	17,967	39.0	**	**
Specialty Trade Contractors (238)	13	8.2	109,257	11.9	40.2	11.8
Manufacturing (31-33)	18	11.3	627,608	2.9	43.3	2.6
Wood Product (321)	1	0.6	10,249	9.8	**	**
Paper (322)	1	0.6	12,097	8.3	**	**
Chemical (325)	1	0.6	30,422	3.3	**	**
Primary Metal (331)	1	0.6	22,714	4.4	**	**
Fabricated Metal Products (332)	4	2.5	81,176	4.9	42.7	4.6
Machinery (333)	6	3.8	74,878	8.0	43.2	7.4
Transportation Equipment (336)	5	3.1	191,482	2.6	48.3	2.2
Wholesale Trade (42)	4	2.5	171,442	2.3	39.3	2.4
Merchant Wholesalers, Durable Goods (423)	2	1.3	104,594	1.9	39.9	1.9
Merchant Wholesalers, Non-durable Goods (424)	2	1.3	51,448	3.9	**	**
Retail Trade (44-45)	13	8.2	469,199	2.8	30.2	3.7
Motor Vehicle & Parts Dealers (441)	4	2.5	63,984	6.3	37.9	6.6
Electronics and Appliance Stores (443)	1	0.6	13,974	7.2	**	**
Food & Beverage Stores (445)	2	1.3	78,062	2.6	**	**
Health and Personal Care Stores (446)	1	0.6	35,406	2.8	**	**
Gasoline Stations (447)	2	1.3	27,351	7.3	**	**
Sporting Goods, Hobby, Book and Music Stores (451)	1	0.6	17,309	5.8	**	**
General Merchandise Stores (452)	2	1.3	107,667	1.9	**	**
Transportation & Warehousing (48-49)	19	11.9	146,772	12.9	**	9.6
Air Transportation (481)	1	0.6	14,572	6.9	**	**
Truck Transportation (484)	9	5.7	47,503	18.9	**	**
Transit & Ground Passenger Transportation (485)	2	1.3	9,955	20.1	**	**
Support Activities for Transportation (488)	5	3.1	15,441	32.4	**	**
Postal Service (491)	1	0.6	20,800 ^c	4.8	**	**
Warehousing and Storage (493)	1	0.6	20,917	4.8	**	**

Table 6. Number of Traumatic Work-Related Fatalities by Industry and Incidence Rates by Number of Employees and by Hours Worked, Michigan 2018, Cont.

Industry Sector (NAICS Code)	Number	Percent	Employment-Based		Hours-Based	
			Number Employees ^a	Rate ^d	Number Hours ^e	Rate ^g
Information (51)	1	0.6	56,247	1.8	33.9	2.1
Motion Picture and Sound Recording Industries (512)	1	0.6	6,356	15.7	**	**
Real Estate & Rental & Leasing (53)	4	2.5	54,739	7.3	**	**
Real Estate (531)	4	2.5	40,637	9.8	**	**
Administrative & Support & Waste Management & Remediation Services (56)	14	8.8	291,562	4.8	**	**
Administrative & Support Services (561)	11	6.9	279,026	2.6	**	**
Waste Management & Remediation Services (562)	3	2.0	12,536	23.9	**	**
Educational Services (61)	3	1.9	373,386	0.8	**	**
Educational Services (611)	3	1.9	373,386	0.8	**	**
Health Care & Social Assistance (62)	2	1.3	629,395	0.3	32.5	0.4
Ambulatory Health Care (621)	1	0.6	207,181	0.5	**	**
Nursing and Residential Care Facilities (623)	1	0.6	105,454	0.9	**	**
Arts, Entertainment, & Recreation (71)	5	3.1	53,159	9.4	21.7	17.3
Performing Arts, Spectator Sports, & Related Industries (711)	3	1.9	9,586	31.3	**	**
Museums, Historical Sites, and Similar Institutions (712)	1	0.6	4,492	22.3	**	**
Amusement, Gambling & Recreation Industries (713)	1	0.6	39,081	2.6	**	**
Accommodation & Food Services (72)	7	4.4	379,132	1.8	23.3	3.2
Accommodation (721)	1	0.6	43,338	2.3	**	**
Food Services & Drinking Places (722)	6	3.8	335,793	1.8	**	**
Other Services (except Public Administration) (81)	12	7.5	139,968	8.6	31.2	11.0
Repair & Maintenance (811)	7	4.4	41,768	16.8	**	**
Personal and Laundry Services (812)	1	0.6	41,455	2.4	**	**
Religious, Grantmaking, Civic, Professional & Similar Organizations (813)	4	2.5	42,589	9.4	**	**
Public Administration (92)	4	2.5	244,400	1.6	**	3.8
Justice, Public Order, & Safety Activities (922)	4	2.5	**	**	**	**
Totals	159		4,699,000ⁱ	3.4		3.4

^a Employment numbers from Michigan Department of Technology, Management and Budget (DTMB), Bureau of Labor Market Information and Strategic Initiatives, QCEW Industry Employment and Wages (<https://milmi.org/DataSearch/QCEW>) unless otherwise noted.

^b 2017 United States Department of Agriculture Census of Agriculture, Michigan-level data, Table 75. Summary by North American Industry Classification System ([https://www.nass.usda.gov/Publications/AgCensus/2017/Full Report/Volume 1, Chapter 1 State Level /Michigan/st26_1_0075_0075.pdf](https://www.nass.usda.gov/Publications/AgCensus/2017/Full%20Report/Volume%201.%20Chapter%201%20State%20Level/Michigan/st26_1_0075_0075.pdf)). Number of owners/operators are defined as the number of producers in Table 75. Total number of workers in NAICS Sector 11 defined as total number of producers (owner/operators). See below for discussion.

^c Total number of United States Postal Service workers in Michigan taken from Michigan DTMB CES estimates (<https://milmi.org/DataSearch/CES>).

^d Employment-based incidence rates calculated per 100,000 full-time equivalent (FTE) workers.

^e Average number of hours worked per week by industry taken from Michigan DTMB CES estimates (<https://milmi.org/DataSearch/CES>) unless otherwise noted.

^f Number of hours worked per week by hired farm workers in the Lake Region for 2018 as reported in the Quick Stats Search Option from the USDA National Agricultural Statistics Service.

<https://quickstats.nass.usda.gov/#254B031F-6509-33A5-90C1-BB38DB46B6A6> Corresponding hours-based rate is calculated using the number of hired farm worker fatalities from the Crop and Animal production sectors combined.

^g Hours-based incidence rates calculated as $(N/EH) \times 200,000,000$, where N is the number of fatalities, EH is the total employee-hours (number of employees * average number of hours worked per week * 50 weeks), and 200,000,000 is the benchmark number of hours worked by 100,000 FTE (40 hour/week) employees in one year.

^h The number of workers in the Public Administration sector was calculated as the sum of Federal, State, and Local government employees in Michigan, minus the number of USPS, state and local hospital, and state and local education workers. All numbers from Michigan DTMB CES estimates (<https://milmi.org/DataSearch/CES>).

ⁱ Total 2018 state employment taken from Michigan DTMB LAUS report (<https://milmi.org/DataSearch/LAUS>).

^j Michigan CFI 2018 hours-based incidence rate <https://www.bls.gov/iif/oshwc/cfoi/staterate2018.htm>

** No data available from corresponding sources.

Table 7 compares the employment-based and hours-based work-related fatality incidence rates by industry in Michigan to national hours-based rates for 2018 as computed by the Bureau of Labor Statistics (BLS). When calculating the fatal injury rates for the United States, BLS excludes workers under the age of 16 years, volunteers and the resident military.

In 2018, both the overall employment-based fatality rate per 100,000 workers (3.4) calculated by the MIFACE program and the hours-based fatality incidence rate calculated by BLS (3.4) were lower in Michigan than the BLS-calculated hours-based fatality incidence rate (3.5/100,000 FTEs) in the United States.

Hours-based fatal injury rates should not be directly compared to employment-based rates because of the differences in the denominators used. When available, MIFACE used Michigan-specific hourly rates from Michigan DTMB CES; when unavailable, MIFACE used the BLS CFI State-based hourly rate for Michigan.

Overall, Michigan's hours-based work-related fatality rate was lower than the U.S. national rate (3.4 vs 3.5). For the industries for which MIFACE or BLS calculated a Michigan-specific, hours-based rate, most Michigan industry groups had a higher hours-based rate than the U.S. rate for that industry. Exceptions included the Wholesale Trade (2.4 vs 5.3), and Health Care & Social Assistance (0.4 vs 0.8) industries (**Table 7**).



[A construction firm owner in his 60s died when he fell from an 8-foot step ladder to a concrete floor.](#)

Table 7. Traumatic Work-Related Fatalities by Industry Sector, Michigan Incidence Rates Compared to US Incidence Rates, 2018

Industry Sector (NAICS Code)	Number of Fatalities	2018 MI Employment-based Rate ^a	2018 MI Hours-Based Rate ^a	2018 US Hours-Based Rate ^b
Agriculture, Forestry, Fishing and Hunting (11)	23	26.9	47.4	23.4
Mining, Quarrying, & Oil & Gas Extraction (21)	2	36.6	**	14.1
Utilities (22)	4	19.7	**	2.6
Construction (23)	24	14.2	14.0	9.5
Manufacturing (31-33)	18	2.9	2.6	2.2
Wholesale Trade (42)	4	2.3	2.4	5.3
Retail Trade (44-45)	13	2.8	3.7	1.9
Transportation & Warehousing (48-49)	19	15.1	**	14.0
Information (51)	1	1.8	2.1	1.2
Finance & Insurance (52)	0	--	--	0.4
Real Estate & Rental & Leasing (53)	4	7.3	**	2.6
Professional & Business Services (54)	0	--	--	0.7
Administrative & Support & Waste Management & Remediation Services (56)	14	4.8	**	8.0
Educational Services (61)	3	4.7	**	0.7
Health Care & Social Assistance (62)	2	0.3	0.4	0.8
Arts, Entertainment, & Recreation (71)	5	9.4	17.3	3.0
Accommodation & Food Services (72)	7	1.8	3.2	1.9
Other Services (except Public Administration) (81)	12	8.6	11.0	2.6
Public Administration (92)	4	-	3.8	1.8
Total	159	3.4	3.4	3.5

^a From Table 5

^b US Bureau of Labor Statistics Census for Fatal Occupational Injuries (CFOI), Hours-based fatal injury rates by industry, occupation, and selected demographic characteristics, 2018 (<https://www.bls.gov/iif/oshcfoi1.htm#rates>)

Means of Work-Related Death

The means of death was known for all 159 work-related deaths in Michigan in 2018 (Table 8). Struck by incidents were the leading cause of a work-related death (36, 22.6%) and motor vehicle crashes were the second leading cause of a work-related death (24, 15.1%), followed by homicides (22, 13.8%) and falls (21, 13.2%).

Struck by incidents were the leading (or tied for the leading) means of death in five of 17 (29.4%) industry sectors, including Mining (50.0% of deaths within the sector), Construction (41.7%), Manufacturing (27.8%), Administrative & Support & Waste Management & Remediation Services (50.0%), and Health Care & Social Assistance (50.0%).



A heat treat operator in his 60s died from complications of a cut/scratch sustained when he dropped either a carbon plate or a part onto his ankle.

Motor vehicle crashes were the, or one of the, leading means of death in three industry sectors (17.6%), including Agriculture, Forestry, Fishing & Hunting (5 deaths, 21.7%), Construction (4 deaths, 16.7%) and Transportation & Warehousing (5 deaths, 26.3%).

Homicides were the, or one of the, leading means of death in 5 industry sectors (29.4%), including Retail Trade (5 deaths, 38.5%), Real Estate & Rental & Leasing (3 deaths, 75.0%), Health Care & Social Assistance (1 death, 50.0%), Accommodation & Food Services (2 deaths, 28.6%), and Other Services (3 deaths, 25.0%).

Fatal falls occurred in 11 of 17 (64.7%) industry sectors and were one of the leading means of death in four sectors: Agriculture, Forestry, Fishing and Hunting (3 deaths, 13.0%), Construction (4 deaths, 16.7%), Transportation & Warehousing (3 deaths, 15.8%) and Other Services (3 deaths, 25.0%).

Work-related suicides occurred in 10 (58.8%) of the industry sectors and were a leading means of death in Manufacturing (3 deaths, 16.7%), Wholesale Trade (2 deaths, 50.0%) and Retail Trade (3 deaths, 23.1%).

The leading means of death in Agriculture, Forestry, Fishing and Hunting were machine-related incidents (6, 26.1%); these six deaths comprised sixty percent of all 2018 machine-related incidents.

Table 9 displays the number of fatalities across leading means of death by year from 2001- 2018. Certain means of death, such as “medical”, have been omitted from this table for space due to a low number of deaths. There are variations in the means of death each year and because of small numbers in any given means of death, it is difficult to identify any temporal trends.

A review of the MIFACE database was performed to standardize the categorization of death by motor vehicle in 2018. All motor vehicle entries were reviewed



An owner of a tree trimming/removal service in his 60s died when he was thrown from the bucket of a bucket truck when the 12-inch diameter cottonwood tree branch he was cutting struck the bucket.



A male farmer in his 50s died when he was pinned between the bucket and frame of a skid steer.

and if the death was a result of the deceased being a driver or passenger in a motor vehicle crash, the death was categorized as a motor vehicle crash. If the death was caused by a motor vehicle striking a pedestrian or a worker on a machine, then the categorization of the death was changed from motor vehicle to struck by. Additionally, any death from an aircraft crash was changed from motor vehicle to aircraft.

In 2018, there was a 150% increase in the number of fatal drug overdoses at Michigan workplaces (4 in 2017 to 10 in 2018). Nearly 20% of all drug overdoses in the workplace from 2001-2018 occurred in 2018. This increase mirrors national trends of increasing opioid (such as fentanyl, heroin and hydrocodone), stimulant (such as cocaine and methamphetamine) and alcohol use both at home and at work. According to NIOSH [Opioids in the Workplace](#) data, nearly half of workplace overdose deaths occurred in three industries: Transportation & Warehousing, Construction, and Healthcare & Social Assistance. In Michigan, between 2001 and 2018, Manufacturing had eight overdose deaths and four industries had seven deaths each: Transportation & Warehousing, Healthcare & Social Assistance, Arts, Entertainment & Recreation, and Accommodation & Food Services.



A camp worker in his 40s died from a propane gas explosion in a camp cabin. The propane cylinders were used to raise the temperature inside the cabin to 1400 F-1600 F to exterminate bed bugs.

Table 8. Traumatic Work-Related Fatalities by Means of Death and Industry Sector, Michigan 2018

Industry Sector (NAICS)	Aircraft	Animal	Asphyxiation	Drowning	Drug Overdose	Electrocution	Explosion/ Fire	Fall	Homicide	Machine	Motor Vehicle	Struck by	Suicide	Toxic Exposure	Total
Agriculture, Forestry, Fishing & Hunting (11)	1	1	1	--	--	--	2	3	1	6	5	2	1	--	23
Mining, Quarrying, & Oil & Gas Extraction (21)	--	--	--	--	--	--	--	--	--	1	--	1	--	--	2
Utilities (22)	--	--	--	--	--	1	--	1	--	--	--	1	1	--	4
Construction (23)	--	--	1	--	2	--	--	4	1	1	4	10	1	--	24
Manufacturing (31-33)	1	--	1	--	1	2	--	1	1	1	1	5	3	1	18
Wholesale Trade (42)	--	--	--	--	1	--	--	--	--	--	1	--	2	--	4
Retail Trade (44-45)	--	--	--	--	--	--	--	2	5	--	2	1	3	--	13
Transportation & Warehousing (48-49)	1	--	--	--	3	--	--	3	2	1	5	3	1	--	19
Information (51)	--	--	--	--	--	--	--	--	--	--	--	--	1	--	1
Real Estate & Rental, & Leasing (53)	--	--	--	--	--	--	--	1	3	--	--	--	--	--	4
Administrative & Support & Waste Management & Remediation Services (56)	--	--	--	1	--	2	--	1	1	--	2	7	--	--	14
Educational Services (61)	--	--	--	--	--	--	--	1	--	--	1	1	--	--	3
Health Care & Social Assistance (62)	--	--	--	--	--	--	--	--	1	--	--	1	--	--	2
Arts, Entertainment, & Recreation (71)	--	--	--	--	1	--	--	--	1	--	1	1	1	--	5
Accommodation & Food Services (72)	--	--	--	--	2	--	1	1	2	--	--	--	--	1	7
Other Services (except Public Administration) (81)	--	--	1	--	--	--	1	3	3	--	1	2	1	--	12
Public Administration (92)	--	--	--	1	--	--	--	--	1	--	1	1	--	--	4
Total	3	1	4	2	10	5	4	21	22	10	24	36	15	2	159

Table 9. Leading Means of Death by Year, 2001-2018

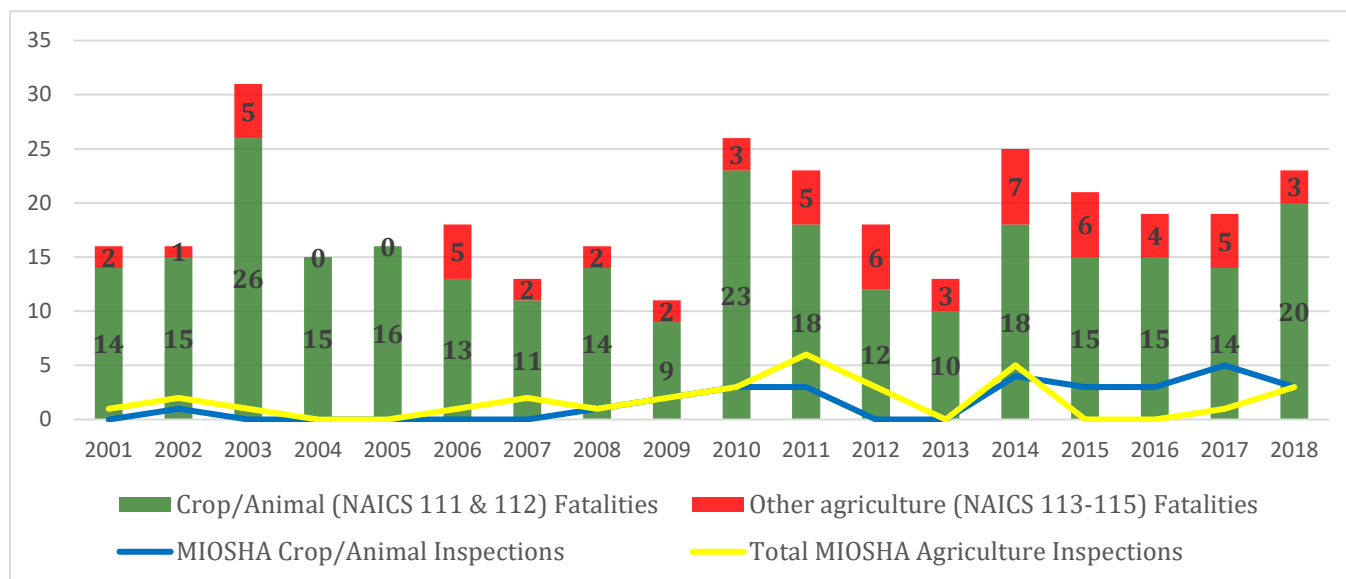
Year	Motor Vehicle	Struck-by	Fall	Homicide	Machine	Suicide	Electrocution	Aircraft	Toxic Exposure	Fire/Explosion	Drug Overdose	Drowning	Asphyxiation	Animal	Heat/Cold
2001	29	19	26	24	32	12	4	6	4	6	1	2	3	1	2
2002	28	21	21	22	20	11	8	5	4	4	--	2	1	2	2
2003	27	20	19	15	36	5	10	2	3	4	3	1	4	2	1
2004	26	16	16	22	26	4	7	4	4	3	1	--	1	1	--
2005	23	11	20	16	18	2	4	6	2	4	3	1	--	--	--
2006	32	34	24	11	14	8	10	8	6	4	1	2	1	2	--
2007	26	19	17	21	16	6	4	--	4	1	2	--	--	2	1
2008	22	23	26	14	12	9	5	--	2	3	2	1	1	1	--
2009	18	19	14	11	7	12	5	2	--	--	4	--	1	2	--
2010	23	20	24	26	16	11	7	4	6	3	2	2	--	--	1
2011	22	16	21	15	20	16	7	7	4	3	1	1	2	2	2
2012	31	19	18	28	14	12	3	--	--	--	2	3	--	--	--
2013	24	27	19	16	10	22	2	2	1	3	3	--	1	--	1
2014	26	30	24	19	11	9	5	5	--	1	4	3	3	3	--
2015	25	23	18	22	15	12	5	3	4	3	3	2	2	1	--
2016	28	19	32	22	19	13	5	1	9	2	5	3	1	1	1
2017	28	27	26	25	9	17	5	--	--	4	4	6	1	--	--
2018	24	36	21	22	10	15	5	3	2	4	10	2	4	1	--
Total	462	399	386	351	305	196	101	58	55	52	51	31	26	21	11

Highlights and Discussion by Select Industries and Means of Death

Agriculture, Forestry, Fishing & Hunting (NAICS 11)

Figure 5 shows the number of fatalities in the Agriculture, Forestry, Fishing and Hunting sector (NAICS 11), split between crop and animal-raising industries (NAICS 111 and 112, respectively) and other agricultural industries (NAICS 113-115), by year for 2001-2018. The Figure also shows the number of fatalities which were investigated through MIOSHA fatality inspections by year.

Figure 5. Number of Agriculture Fatalities and MIOSHA Inspections, 2001-2018



In providing funding for Occupational Safety and Health Administration (OSHA) and hence the MIOSHA program, the U.S. Congress placed restrictions on use of federal funds for program activities regarding two categories of employers: small farming operations and small employers in low-hazard industries. This is solely a restriction on expending federal funds; it does not prohibit state-funded MIOSHA activities at these worksites.

The MIOSHA Act defines Agriculture as “agricultural operations as the work activity designated in major groups 01 and 02 of the Standard Industrial Classification (SIC) manual, United States Bureau of the Budget, 1972 edition. Agricultural operations include any practices performed by a farmer or on a farm as an incident to or in conjunction with farming operations including preparation for market delivery to storage or market or to carriers for transportation to market (MCL 408.10004(1))”.

The federal Appropriations Act exempts small farming operations from federally-funded activities. Only State funds can be used by MIOSHA for interventions at farming operations when a farm operation:

- Employs 10 or fewer employees currently and at all times during the preceding 12 months; and
- Has not had an active temporary labor camp during the preceding 12 months.

It is important to note that immediate family members of farm employers are not counted when determining the number of employees. Most agricultural work-related deaths in Michigan have occurred on family farms with fewer than 10 employees and who did not have an active temporary labor camp. Therefore, few MIOSHA work-related fatality inspections on family farm operations have been performed.

The average age of those who died working in Agriculture was 58.4 years, with a range of 26-88 years. **Table 10** shows the average age at the time of death for the past 18 years for those employed in Agriculture. In 14 of the 18 previous years (77.8%), the average age of the individual was in their 50s or 60s.

Table 10. Age at Time of Death, Agriculture, Michigan 2001-2018			
Year	Age (in years)	Year	Age (in years)
2001	47.4	2010	53.0
2002	48.0	2011	56.6
2003	58.1	2012	52.2
2004	59.7	2013	56.6
2005	54.9	2014	46.8
2006	49.9	2015	55.3
2007	54.2	2016	61.0
2008	67.9	2017	52.5
2009	51.5	2018	58.4

Special Considerations Regarding Employment Estimates in Agriculture

Traditional farm operations (Crop and Animal Production) accounted for 20 of the 23 (87.0%) deaths in 2018. Twelve of the 20 (60.0%) known work-related deaths were identified as a farm owner/operator, while eight (40.0%) were identified as hired labor.

Hired labor includes paid family members, bookkeepers, office workers, maintenance workers, etc., if their work was primarily associated with agricultural production on the operation. Hired labor excludes contract (migrant) laborers. Unpaid workers likely make up a significant portion of the agricultural workforce – the 2017 USDA Census of Agriculture reports 77,475 hired workers and 54,839 unpaid workers

([https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume 1, Chapter 1 State Level/Michigan/st26_1_0075_0075.pdf](https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1_Chapter_1_State_Level/Michigan/st26_1_0075_0075.pdf)).

The number of migrant workers was not noted on the 2017 Agricultural Census, only the number of farms utilizing migrant labor. The 2013 Michigan Migrant and Seasonal Farmworker Enumeration Profiles Study estimated 49,135 migrant and seasonal farm laborers in 2013. Seasonal farm labor was described as “an individual whose principal employment is in agriculture on a seasonal basis, who has been so employed within the last twenty-four months” (https://www.michigan.gov/documents/dhs/FarmworkerReport_430130_7.pdf).

Migrant farm workers were defined as meeting the seasonal farm labor definition but “establishes for the purposes of such employment a temporary abode” (U.S. Code, Public Health Services Act, “Migrant Health”). Migrant farm workers include both individuals who met the definition of a migrant but only travel within the state of Michigan (intrastate migrants) and others who come from outside the state to work in Michigan (interstate migrants). The 2017 USDA Census of Agriculture reports that 11,907 farms in Michigan reported using hired labor, while only 828 reported using migrant labor

If the total number of Agricultural operators (80,432), hired farm labor (77,475), and unpaid workers (54,839) identified in the 2017 Agriculture Census are added to the above estimate for migrant and seasonal farm laborers (49,135), as well as to the number of employees working in Forestry & Logging (1,865), Fishing, Hunting and Trapping (180) and Agricultural Support Activities (3,107) estimated by the Michigan DTMB in 2018, the total number of workers in Agriculture was 267,033. The increase in the number of workers in Agriculture, Forestry, Fishing & Hunting would dramatically lower the NAICS 11 Agriculture, Forestry, Fishing & Hunting

work-related fatality incidence rate from 26.9 deaths/100,000 workers to 8.6. Both rates are appreciably lower than the BLS CFOI hours-based rate for Michigan of 47.4, which only includes hired employees. If only employment estimates from the Michigan DTMB Industry Employment and Wages report are used, the number of workers in agriculture totals only 30,329, which would drive the employment-based rate up to 75.8/100,000 workers.



A farm hand in her 60s died when she was struck/pinned by a dairy cow and/or a bull while moving them from a penned area.

The transient nature of crop production complicates the picture of Agricultural employment. A single farm may produce several crops utilizing hired labor to harvest. Workers may come and go (leave the state) to harvest other crops. Given that many of these work stints may be for durations significantly shorter than a year, it is possible that many hired and/or migrant workers will work at multiple farms in a year, each of which may count the worker in their reported number of hired workers, leading to overestimation of total employment in the industry.

Due to uncertainties regarding the true total number of hired, unpaid, and seasonal/migrant workers, and which of these categories may be overlapping or enveloped by others, the employment-based incidence rate of work-related fatalities across Agriculture (26.9/100,000 workers) utilizes only the total number of operators in Crop and Animal Production reported by the USDA Census combined with employee counts for Forestry & Logging, Fishing, Hunting and Trapping and Agricultural Support Activities from the Michigan DTMB. It is likely that the most accurate employment-based incidence rate lies somewhere between this number and the rate given when all possible counts of hired, unpaid, and migrant labor are combined (8.6/100,000 workers).

Construction (NAICS 23)

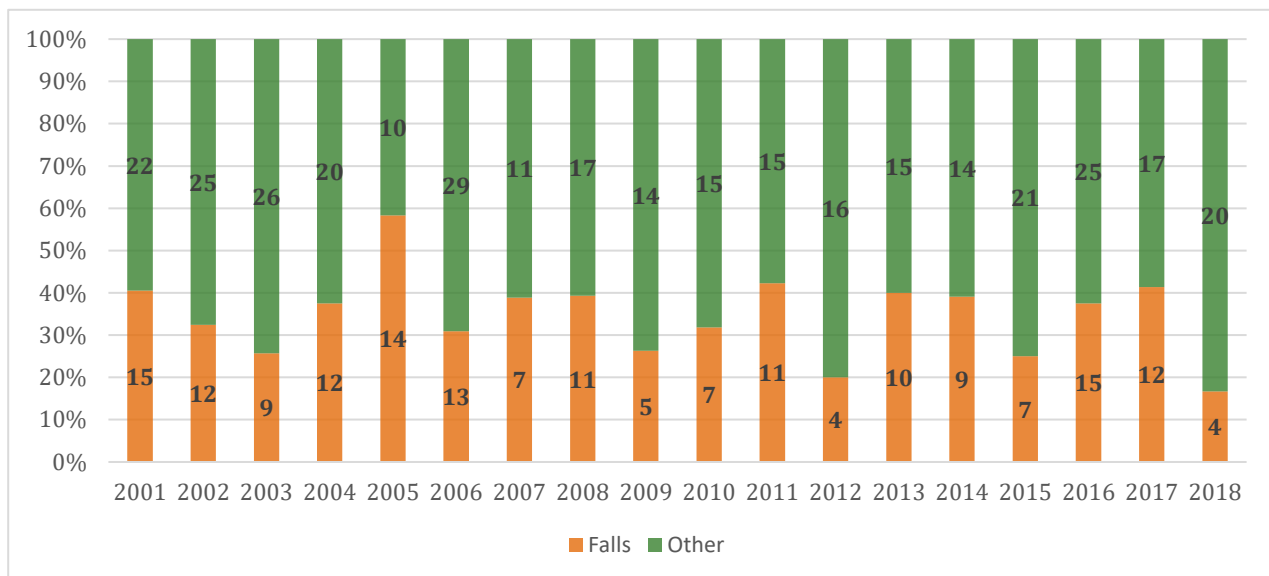
The number of deaths in Construction decreased by 5 (24 deaths in 2018 compared to 29 deaths in 2017) despite an increase of 5 deaths in the Heavy & Civil Engineering Construction (NAICS 237) subsector (7 deaths in 2018 compared to 2 deaths in 2017). The overall decrease in Construction occurred because of the decreased in the number of deaths of the Specialty Trade group subsector (NAICS 238), which encompasses roofers, painters, drywall installers, carpenters, etc., with 13 deaths in 2018 compared to 20 in 2017.

Struck by incidents were the primary cause of death in Construction (10 of 24 deaths, 41.7%) in 2018. Five of the ten struck-by deaths occurred at road construction sites; four individuals were struck by vehicles and one individual was struck by a backing asphalt truck; the other individual who was struck by a vehicle was running across a roadway to access his work building. The remaining four struck by incidents involved an electrical meter bank that came loose from a wall, an unsecured scaffold plank that was blown off a building roof, a cast iron plate while dismantling a traveling grate spreader stoker chain and a water pump pinning an individual against a road grader tire.

There were only four fatal falls in Construction in 2018. Two falls occurred in the Construction of Buildings subsector (both were the owner of the business) and two occurred in Specialty Trade group subsector (one roofer and one construction laborer). **Figure 6** shows the number of fatal falls in Construction by year and the percentage of Construction work-related deaths the fatal falls represent.

Both the number of fatal falls in Construction, and the proportion of all Construction fatalities comprised of fatal falls, reached or matched their lowest levels since 2001. Between 2001 and 2018, the number of fatal falls in Construction ranged from a low of four falls in 2012 and 2018 to a high of 15 falls in 2001 and 2016. The percentage of fatalities in Construction secondary to a fall ranged from 16.7% in 2018 to 58.3% in 2005.

Figure 6. Fatal Falls as Percent of Total Construction Deaths by Year, 2001- 2018

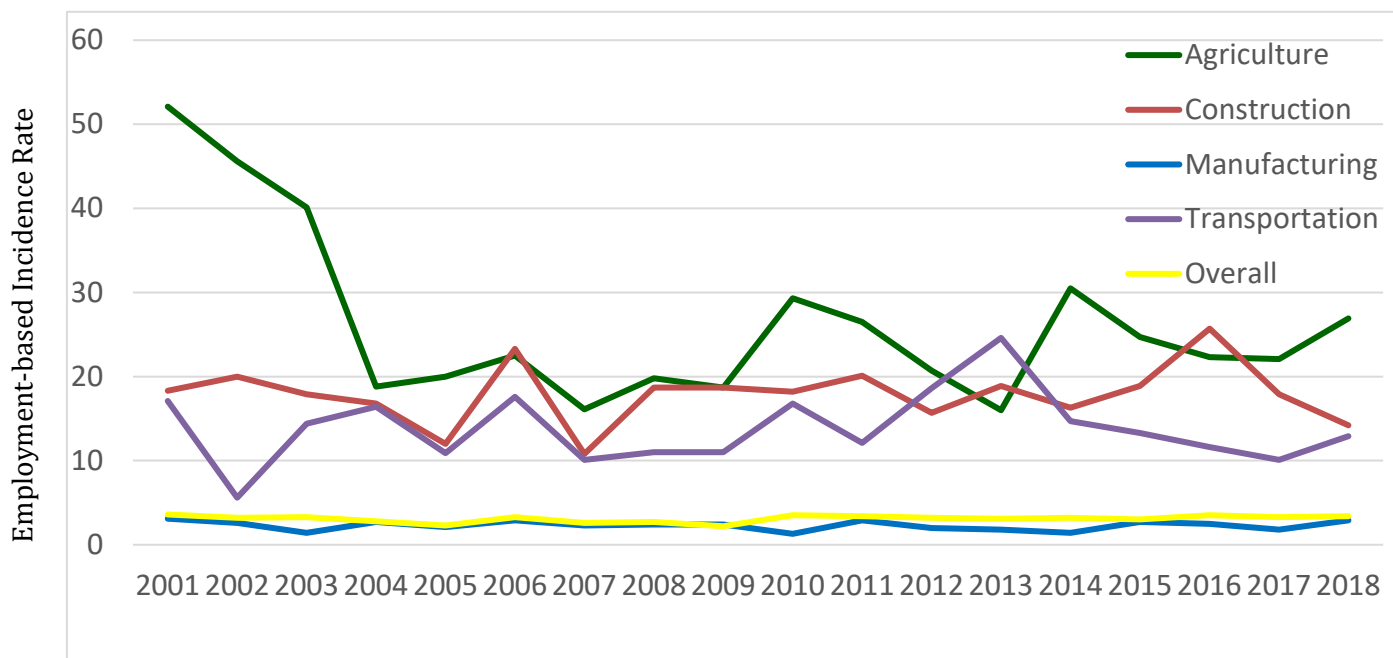


Manufacturing (NAICS 31-33)

The employment-based incidence rate for selected industry sectors shows that except for 2009, the Manufacturing industry sector has had a lower employment-based incidence rate per 100,000 full-time workers compared to Michigan's overall employment-based incidence rate (**Figure 7**). The data demonstrates that, counter to perceptions, Manufacturing is not one of the more hazardous industry sectors in Michigan.

There was one machine-related death in Manufacturing in 2018. Machine-related incidents have historically been the leading means of death in the Manufacturing sector; 66 (26.5%) of the 249 total deaths in Manufacturing from 2001-2018 were from machine-related incidents. However, the second leading means of death, struck-by incidents (46 incidents, 18.5%), was the highest in 2018, with 5 deaths (27.8% of total Manufacturing deaths for the year).

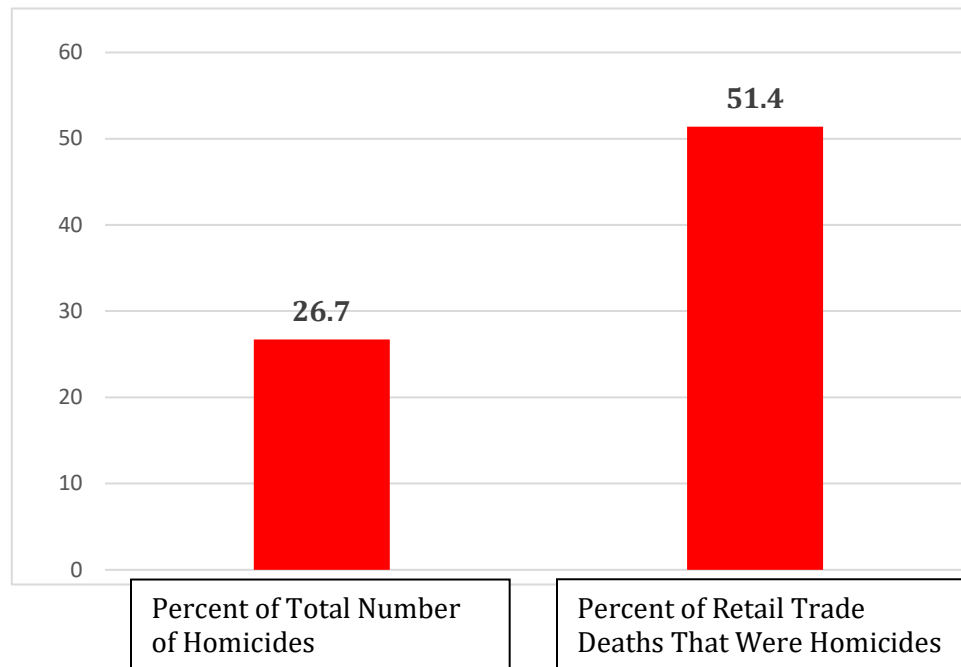
Figure 7. Manufacturing Employment-based Incidence Rate Compared to Selected Industry Sectors, Michigan 2001-2018



Retail Trade (NAICS 44-45)

The Retail Trade industry sector (NAICS 44-45) has the largest number and percent of homicides (**Figure 8**). Homicides account for 51.4% of all fatalities in this industry sector from 2001-2018. The next highest means of death in Retail Trade are motor vehicle crashes, falls, and suicide (15.3%, 12.6%, and 12.0%, respectively). Conversely, decedents in the Retail Trade industry have made up the largest portion of total homicide deaths (26.7%) of any sector; homicides in the Accommodation & Food Services sector make up the next highest proportion of total homicides at 12.8%.

Figure 8. Relationship between the Retail Trade Industry Sector and Homicides, 2001-2018



Transportation & Warehousing (NAICS 48-49)

Motor vehicle crashes were the most common means of death in the Transportation & Warehousing industry sector in 2018 (5 deaths, 26.3% of total sector deaths). A motor vehicle crash has historically been the most common means of death in the Transportation & Warehousing industry sector since 2001; a motor vehicle crash accounts for 40.2% of all deaths in Transportation & Warehousing, with struck-by incidents being the next highest type of fatality (15.4% of all deaths). Furthermore, this industry accounts for nearly a quarter (115 deaths, 24.9%) of all motor vehicle crash deaths from 2001-2018, the largest proportion of all industry sectors (**Table 11**).

In 2018, 37.5% of all work-related motor vehicle crashes involved either the decedent or another driver not stopping as directed by a stop sign. Nearly 11% of all work-related motor vehicle crashes occurring between 2001 and 2018 involved an individual running a stop sign; in Agriculture, 34.6% of all fatal work-related motor vehicle crashes involved either the decedent or another driver running a stop sign. Similarly, national statistics show that one-third of all intersection crashes in the United States occur at stop sign controlled intersections. Reasons drivers may not stop at a stop sign include inattention; impatience; failure to come to a complete stop (rolling stop); obstructed view; distracted driving; speeding/reckless driving; and driving under the influence of alcohol/drugs. At least annually, all intersection crashes should be evaluated by county/state traffic engineers and law enforcement to determine when/if any changes to traffic controls, including signage should be made.

Table 11. Number of Motor Vehicle Crash Work-Related Deaths by Industry Sector, Michigan 2001-2018	
<i>Industry Sector</i>	<i>Number (%)</i>
Agriculture, Forestry, Fishing & Hunting	26 (5.6)
Mining	3 (0.6)
Utilities	3 (0.6)
Construction	61 (13.2)
Manufacturing	22 (4.8)
Wholesale Trade	29 (6.3)
Retail Trade	28 (6.1)
Transportation & Warehousing	115 (24.9)
Information	17 (3.7)
Finance & Insurance	6 (1.3)
Real Estate & Rental & Leasing	1 (0.2)
Professional, Scientific, & Technical Services	14 (3.0)
Administrative & Support & Waste Management & Remediation	30 (6.5)
Education	10 (2.2)
Health Care & Social Assistance	21 (4.5)
Arts, Entertainment & Recreation	13 (2.8)
Accommodation & Food Services	5 (1.1)
Other Services	22 (4.8)
Public Administration	37 (8.0)

Comparisons to MIOSHA and CFOI Fatalities

MIOSHA Fatality Investigations

In 2018, MIOSHA personnel conducted a work-related fatality program-related compliance investigation at 38 (24.2%) of the 157 employers for 23.9% of all the deaths. A fatality was recorded as a MIOSHA “Program-Related” fatality if the deceased party was employed in an occupation included under MIOSHA jurisdiction as defined in Public Act 154 of 1974, as amended, and the fatality appeared to be related to one or more of the following conditions:

- The incident was found to have resulted from violations of MIOSHA safety and health standards or the “general duty” clause.
- The incident was considered the result of a failure to follow a good safety and health practice that would be the subject of a safety and health recommendation.



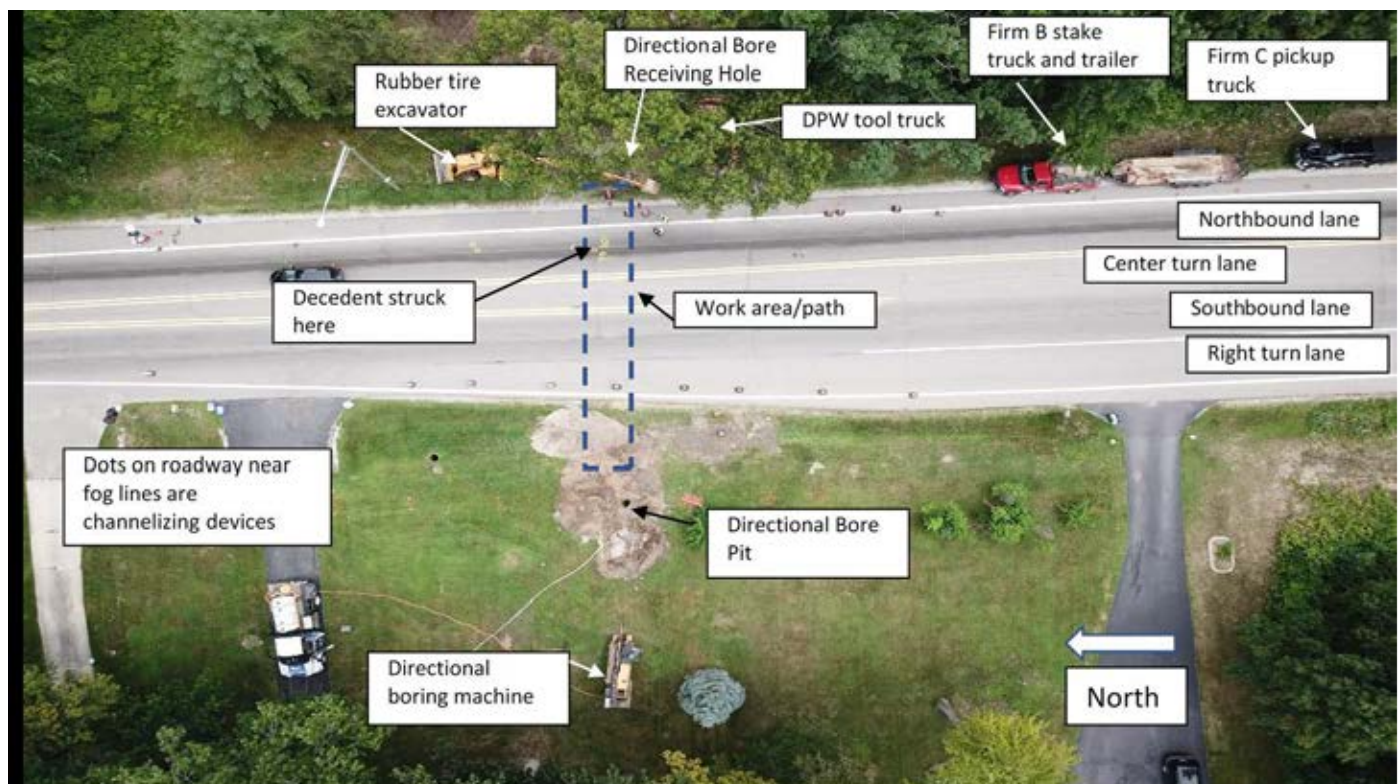
A male park ranger in his 60s died when his JD Gator XUV 625i was struck broadside by a snowmobile while grooming a ski trail.

- The information describing the incident is insufficient to make a clear distinction between a "Program-Related" and "non-Program-Related" incident, but the type and nature of the injury indicated that there was a high probability that the injury was the result of a failure to adhere to one or more MIOSHA standards, the "general duty" clause, or good safety and health practice.

Table 12 shows the number of work-related fatalities in Michigan in 2018 by industry sector and the number of MIOSHA work-related fatality compliance inspections for each industry sector.

For each company that had a work-related fatality, MIFACE accessed the Federal OSHA Integrated Management Information System (IMIS) to determine any previous MIOSHA compliance activity at the company. Seven of the 38 (18.4%) employers having a MIOSHA work-related fatality compliance inspection in 2018 were identified as having a MIOSHA work-related compliance inspection prior to 2018. Of the seven companies, which had a work-related fatality in 2018 and were previously inspected by MIOSHA, one was in Utilities, four were in Construction, one was in Manufacturing, and one was in Arts, Entertainment & Recreation.

MIOSHA issued a violation citation to the firm at the conclusion of the fatality investigation in 25 of the 38 (65.8%) investigations. Citation penalties assessed at the conclusion of the compliance inspection (not the penalties decided after appeal) ranged from a low of \$700 to a high of \$35,000.



An underground equipment locating field manager in his 40's died when he was struck by a vehicle while taking a drilling depth measurement in an active roadway.

Table 12. Work-Related Fatalities and Number of MIOSHA Work-Related Fatality Compliance Inspections, Michigan 2018

Industry	Number of Work-Related Fatalities	Number of Work-Related Fatality MIOSHA Compliance Inspections (%)
Agriculture, Forestry, Fishing & Hunting (11)	23	3 (13.0%)
Mining (21)	2	1 (50.0%)
Utilities (22)	4	1 (25.0%)
Construction (23)	24	10 (41.7%)
Manufacturing (31-33)	18	7 (38.9%)
Wholesale Trade (42)	4	0
Retail Trade (44-45)	13	0
Transportation & Warehousing (48-49)	19	4 (21.1%)
Information (51)	1	0
Real Estate & Rental & Leasing (53)	4	0
Administrative & Support & Waste Management & Remediation Services (56)	14	5 (35.7%)
Educational Services (61)	3	2 (66.7%)
Health Care & Social Assistance (62)	2	0
Arts, Entertainment, & Recreation (71)	5	1 (20.0%)
Accommodation & Food Services (72)	7	1 (14.3%)
Other Services (ex. Public Administration) (81)	12	1 (8.3%)
Public Administration (92)	4	1 (25.0%)
Total	159	38 (23.9%)

Number of 2018 Deaths Compared to Michigan CFOI

The Census of Fatal Occupational Injuries (CFOI) is the surveillance system funded in most states by the US Department of Labor, Bureau of Labor Statistics. The Michigan CFOI program reported 155 work-related deaths in 2018). (<https://www.bls.gov/iif/oshwc/cfoi/tgs/2018/iiffw26.htm>)

MIFACE was notified in early 2020 of four work-related fatalities; two drug overdoses, a suicide and a struck-by incident involving a tree limb. These deaths were not included in the 2018 CFOI final tally due to their identification falling outside of the deadline for CFOI data finalization.

Sensitivity of “Injury at Work” Box on Death Certificate

If the manner of death (Box 39) on the death certificate indicated accident, suicide, homicide, indeterminate or pending, the “injury at work” box (41d) is completed by the Medical Examiner with “Yes”, “No”, or “Unknown”. “Yes” signifies that the fatal injury occurred at work, “No” signifies it did not occur at work, and “Unknown” signifies that the Medical Examiner did not know if the injury occurred at work. As described in the Methods Section, MIFACE determined a death to be work-related by compiling multiple source documents, including: Workers’ Compensation forms; Police/Fire/EMT Department reports; MIOSHA 24-hour fatality log; hospital records; newspaper reports; family interviews; and Federal agencies (OSHA, NTSB, MSHA, etc.).

Table 13 shows that from 2001-2018, 13.1%-44.8% of the work-related deaths would have been missed if MIFACE had solely relied on the “Injury at Work” box being completed with “Yes”.

Table 14 shows that in 2018, the “Injury at Work” box was misidentified most frequently in the designation of an injury at work in Health Care & Social Assistance (2 of 2 deaths) and Agriculture (16 of the 23 deaths), followed by Other Services (8 of 12 deaths) and then Arts, Entertainment & Recreation (3 of the 5 deaths). For two industry sectors, Wholesale Trade and Real Estate & Rental & Leasing, 50.0% of the deaths were misidentified (2 of 4 deaths each).

Table 13. Sensitivity of Death Certificate “Injury at Work” Box Predicting Fatal Injury at Work, Michigan 2018

Year (# Deaths)	DC Coded as at work (%)	DC not coded at work (%)
2001 (174)*	133 (79.6%)	34 (20.4%)
2002 (151)	126 (86.9%)	19 (13.1%)
2003 (152)	110 (74.3%)	38 (25.7%)
2004 (131)	93 (74.4%)	32 (25.6%)
2005 (110)	88 (83.0%)	18 (17.0%)
2006 (157)	122 (79.2%)	32 (20.8%)
2007 (121)	99 (85.3%)	17 (14.7%)
2008 (121)	100 (84.0%)	19 (16.0%)
2009 (96)	72 (75.8%)	23 (24.2%)
2010 (147)	102 (70.3%)	43 (29.7%)
2011 (141)	95 (69.3%)	42 (30.7%)
2012 (135)	74 (55.2%)	60 (44.8%)
2013 (134)	82 (62.6%)	49 (37.4%)
2014 (143)	89 (62.7%)	53 (37.3%)
2015 (136)	89 (67.9%)	42 (32.1%)
2016 (158)	99 (62.7%)	59 (37.3%)
2017 (153)	85 (55.5%)	68 (44.4%)
2018 (152)	91 (59.9%)	61 (40.1%)

*All death certificates were not obtained/reviewed each year. Percentages based on number of death certificates received for that year.

Table 14. Industry and Number of Deaths and Number and Percent of Misidentified Deaths, Michigan 2018

Industry (NAICS Code)	Number of Deaths	Number of Misidentified Deaths (%)
Agriculture, Forestry, Fishing & Hunting (11)	23	16 (69.6%)
Mining (21)	2	0
Utilities (22)	4	0
Construction (23)	24	6 (25.0%)
Manufacturing (31-33)	18	5 (27.8%)
Wholesale Trade (42)	4	2 (50.0%)
Retail Trade (44-45)	13	5 (38.5%)
Transportation & Warehousing (48-49)	19	4 (21.1%)
Information (51)	1	0
Real Estate & Rental & Leasing (53)	4	2 (50.0%)
Administrative & Support & Waste Management & Remediation Services (56)	14	5 (35.7%)
Educational Services (61)	3	1 (33.3%)
Health Care & Social Assistance (62)	2	2 (100%)
Arts, Entertainment & Recreation (71)	5	3 (60.0%)
Accommodation & Food Services (72)	7	2 (28.6%)
Other Services (ex. Public Administration) (81)	12	8 (66.7%)
Public Administration (92)	4	0

MIFACE Activities

Importance of Using Multiple Data Sources

MIFACE used many data sources to ascertain if a fatal injury occurred “on the job”. Reliance on just the information in the “Injury at Work” box on the individual’s death certificate would have missed 61 (40.1%) of the work-related deaths in 2018, particularly with causes of death from motor vehicle crashes, homicides, struck-by incidents and work-related suicides. That MIFACE can capture these work-related fatalities that would otherwise be missed when relying solely on the “Injury at Work” box supports the utility, and need, for surveillance programs that collate fatality information from multiple sources.

Prevention Material Dissemination

On the MSU OEM website (<http://oem.msu.edu/>) are copies of the completed MIFACE Investigation Reports, Hazard Alerts, and MIFACE Summaries of MIOSHA Investigations (work-related fatality compliance inspection) conducted by MIOSHA personnel.

MIFACE Investigation Reports, MIFACE Summaries of MIOSHA Investigations, Hazard Alerts, and the annual MIFACE Data Fact sheet were posted on the MSU OEM website and distributed to stakeholders. MIFACE Summaries of MIOSHA Investigations included a summary of the work-related fatality and the citations issued to the employer by MIOSHA compliance personnel at the conclusion of the fatality investigation. Hazard Alerts are 1-page documents that review work-related fatalities and provide prevention recommendations that target specific industrial sectors or repeated work-related fatality incidents. The MIFACE Data Fact Sheet summarizes information received regarding the state's work-related deaths and was updated periodically when new information was received. The most current MIFACE Data Fact Sheet can be found [here](#).

For each MIFACE Investigation Report, MIFACE Summary of a MIOSHA Investigation, and Hazard Alert there was a dissemination plan to maximize awareness of the Report and Alert. Investigation Reports and Hazard Alerts were sent via email to appropriate trade associations, unions, trade journals, employers who did the same type of work, and to employers who have expressed interest in receiving the reports.

MIFACE presentations are regularly given to trade groups as well as health and safety professionals in construction, agriculture and general industry.



A crossing guard in her 50s was struck by a vehicle while in the crosswalk to stop oncoming traffic.

Case Narratives

Based on the information collected during MIFACE on-site investigations and/or from source documents, a brief narrative summary organized by industry of each of the 159 acute traumatic work-related deaths in 2018 is included in [Appendix I](#).

Table 15 provides the narrative case number and cause of death by NAICS code found in the Appendix. Each combination of industry and cause of death is hyperlinked to the beginning of the corresponding narratives. Additionally, each cause of death label is hyperlinked to its corresponding heading in the Appendix.

When the brand name of equipment was known, MIFACE included this information in the narrative. Unless noted, the inclusion of the brand does not signify that there was a defect or other problem with the equipment. Each case narrative that was a work-related fatality that had a MIOSHA work-related fatality compliance investigation is noted by a specific MIFACE case number and hyperlinked to its MIFACE Summary of MIOSHA Investigation (MIFACE Summary) on the MSU OEM/MIFACE webpage. If a MIFACE Investigation Report was written, the MIFACE Investigation number is hyperlinked to its corresponding report on the MSU OEM/MIFACE website.

Table 15. Narratives for 2018 Work-Related Fatalities

Industry Sector (NAICS)	Aircraft	Animal	Asphyxiation	Drowning	Drug Overdose	Electrocution	Explosion/ Fire	Fall	Homicide	Machine	Motor Vehicle	Struck By	Suicide	Toxic Exposure
Agriculture, Forestry, Fishing & Hunting (11)	1	2	3				4-5	6-8	9	10-15	16-20	21-22	23	
Mining (21)										24		25		
Utilities (22)						26		27				28	29	
Construction (23)			30		31-32			33-36	37	38	39-42	43-52	53	
Manufacturing (31-33)	54		55		56	57-58		59	60	61	62	63-67	68-70	71
Wholesale Trade (42)					72						73		74-75	
Retail Trade (44-45)								76-77	78-82		83-84	85	86-88	
Transportation & Warehousing (48-49)	89				90-92			93-95	96-97	98	99-103	104-106	107	
Information (51)													108	
Real Estate & Rental, & Leasing (53)								109	110-112					
Administrative & Support & Waste Management & Remediation Services (56)				113		114-115		116	117		118-119	120-126		
Educational Services (61)								127			128	129		
Health Care & Social Assistance (62)									130			131		
Arts, Entertainment, & Recreation (71)					132				133		134	135	136	
Accommodation & Food Services (72)					137-138		139	140	141-142					143
Other Services (except Public Administration) (81)			144				145	146-148	149-151		152	153-154	155	
Public Administration (92)				156					157		158	159		

Conclusion

Traumatic occupational fatalities are an important public health issue in Michigan and throughout the United States. These deaths are not random events, and information about the settings and circumstances in which work-related deaths occur is necessary to prevent their occurrence in the future. There were 9 fewer deaths occurring in Michigan in 2018 compared to 2017. The numbers and rates of these acute traumatic fatalities have fluctuated from year to year, and there has not been a clear downward trend over multiple years. Further efforts are needed to have a meaningful reduction of the occurrence of these tragedies.

The lack of a consistent and lasting decrease in the number and incidence rate of work-related fatalities, both nationally and in Michigan, is likely a result of many factors and continued investigation of the causal factors of work-related fatalities is necessary to understand and effect a meaningful reduction in these deaths. Understanding the root cause(s) of these tragic events and sharing this information with stakeholders, from individuals to groups, employees to employers, makes these information- gathering efforts worthwhile. If what we learn from any of these deaths can help prevent further tragedies, then the surveillance program has been successful in its goal. An awareness of the hazards of one's job and an attitude of safety-mindfulness on the part of labor and management is critical to prevent future fatal events.

Some important points highlighted by the deaths:

- The workforce age 65 and older continues to grow as individuals put off retirement and part-time workers enter the workforce due to economic or other reasons. Older workers have unique health and safety challenges, including resistance to change long standing work practices that may not be safe, medical issues, or strength issues, all likely contributing to the higher work-related fatality rate in this age group. Federal [OSHA](#) and [NIOSH](#), among other agencies, have developed resources which can help employers address the challenges faced by older workers and provide a safe working environment for this population group.
- Fatalities from falls remain a major concern, particularly in construction. Information regarding the National Construction Fall Prevention Campaign can be found [here](#). The campaign's goal is to prevent fatal falls from roofs, ladders, and scaffolds by encouraging construction contractors to:
 - ✓ PLAN ahead to get the job done safely.
 - ✓ PROVIDE the right equipment.
 - ✓ TRAIN everyone to use the equipment safely.
- Homicides in the retail trade and accommodations and food services sectors and workplace violence in the health care sector have been recognized as important workplace risks. [OSHA](#) and [NIOSH](#) have both developed extensive resources for employers and employees to use to address the risks associated with workplace violence, especially within certain workplaces such [hospitals](#).
- Motor vehicle crashes are a major cause of work-related fatalities. This should not be a surprise in the Transportation & Warehousing industry sector given the nature of work tasks within this industry sector, but it is also true for many industry sectors. Employers should create and maintain safe driving policies and offer driver safety training (including

defensive driving) as part of their safety program and training. MIFACE has created a [“Work-Related Roadway Collisions: Prevention Strategies for Employers”](#) hazard alert containing recommendations and resources for employers to develop motor vehicle safety policies and programs.

- Drug abuse/overdose in the workplace is a challenging issue for employers. Solutions are not straightforward. Stakeholders, including the medical, legal, insurance, safety, and regulatory community must collaborate to develop state-specific interventions and resources that Michigan’s employers and employees can utilize to address this issue. NIOSH [Opioids in the Workplace](#) webpage offers resources related to opioid use. Resources to address prescription drug use and misuse in the workplace can be obtained from the [Substance Abuse and Mental Health Services Association](#) and [National Safety Council](#).

Each of the 159 deaths in this report could have been prevented, whether through installation of engineering controls, development and implementation of health and safety plans, changes to work practice, or the identification and assistance of individuals seeking and receiving mental health counseling so they can better cope with both work and personal stressors. The descriptions of the acute traumatic work-related deaths in Appendix I highlight these tragedies and the need to act to prevent them.

Acknowledgements

We are extremely appreciative of the support of the Michigan OSHA Safety and Health personnel, the employers, the families and the experts who have worked with us to improve work conditions in Michigan.

We are also appreciative of our Advisory Board who provided constructive comments on each MIFACE Report who assisted us by providing thoughts on developing MIFACE policies and educational outreach activities, and their promotion of the MIFACE program to their employees and constituents.

MIFACE is a research effort and relies on the voluntary cooperation of employers and for the self-employed, their family members. We have received funds from the National Institute for Occupational Safety and Health to continue this program through 2020 and look forward to identifying ways to prevent work-related traumatic deaths and sharing what we have learned with those who may benefit from this knowledge.

APPENDIX I - Narratives

AGRICULTURE, FORESTRY, FISHING & HUNTING (NAICS 11)

Airplane

1. A pilot in his 20s died when his plane crashed into the ground during an aerial pesticide application. The decedent was flying an AirTractor 502B single-engine agricultural plane and had made several passes to apply a fungicide to a field of crops. Following the completion of one pass, the plane entered a near-vertical climb and then became inverted. The pilot was able to right the plane but had lost too much altitude to recover and the plane crashed nearly nose-first.

Animal

2. A farm hand in her 60s died when she was struck/pinned by a dairy cow and/or a bull while moving them from a penned area. The penned area had a roof and walls open to the outdoors. On one side of the pen there was a rolled down curtain/canvas. On the side of the pen where the curtain was located, there were stalls in which the cows could lay down. The farm owner was working outside of the pen, on the opposite side of the curtain, approximately 25-30 feet away. The decedent was moving the animals so she could scrape manure from the pen floor. The owner heard the animals rushing/moving forcefully and went to the pen to determine what was causing the commotion. The owner found the decedent lying face down in one of the stalls located near the pen opening. The sequence of events was unknown; it was thought she was struck/pinned by a cow or the bull. MIFACE Summary of MIOSHA Investigation [Case 505](#) and MIFACE Investigation Report [18MI055](#).

Asphyxiation

3. A veterinarian in his 30s died when he was buried under corn silage from an outdoor horizontal bunker silo at a dairy farm. The bunker silo was approximately 200 feet across, 30 feet high in the middle and curved down to approximately 2 feet at the silo edge. The dairy farm contracted with Firm 1 to provide office, veterinary and nutritional support services. The decedent, who worked for Firm 1, was working alongside one of the dairy employees to gather feed samples to check on the nutritional value of the feed and the dairy's feeding practices. The



A veterinarian in his 30s died when he was buried under corn silage from an outdoor horizontal bunker silo at a dairy farm.

dairy employee dropped the decedent off by his truck after the decedent gathered the necessary information. It was still early morning and dark outside. It appeared that the decedent walked away from his truck and to the 30-foot tall “feed out” face of the bunker silo. He may have been attempting to take a temperature reading; part of the hand-held thermometer used for temperature readings was found near the collapse. A large section (approximately 2000 pounds) of corn silage broke off the face, engulfing him. The dairy farm employee, who the vet had ridden with earlier in the morning, arrived at the bunker silo to gather more feed. This employee noted “something sticking out of the pile”. The dairy employee and an employee from a third company on-site pulled the decedent from under the corn silage and began CPR after first calling 911 and the dairy farm management. Emergency response arrived and the decedent was transported to a local hospital where he was declared deceased. MIFACE Summary of MIOSHA Investigation [Case 522](#).

Explosion/Fire

4. & 5. Two male dairy farm migrant workers, both in their 30s, died when their employer-provided housing caught fire. The decedents lived with five other employees at the house; the other employees had all left the house to go to the store prior to the fire. The cause of the fire and the presence of smoke detectors were both unknown. Both decedents died from smoke inhalation.

Fall

5. A farmer in his 70s died after he fell off the bed of a pickup truck. The decedent and his wife were attempting to move the truck from a field into a shed during a windstorm. The decedent was in the bed of the truck attempting to secure the tonneau cover from blowing off while his wife drove. At some point during the trip the decedent fell from the truck bed; he was taken to the hospital where he later died from his injuries.
6. A crop farmer in his 80s died after falling in his barn. The decedent fell from either the hayloft or hayloft ladder; the fall was approximately 15 feet.
7. A farm hand in his 50s died when he fell from an 8-foot podium step ladder to the ground. The ladder was positioned on the driver’s side of a semi-tractor trailer being loaded with soybeans. The driver’s side of the semi-tractor had a second set of two steps, which were located to the side of the steps utilized to access the tractor cab. The second set of steps provided access to the 5th wheel section at the rear of the cab. The decedent had been standing on the podium section of the ladder, monitoring the loading of soybeans into the semi-trailer. The soybeans were loaded from the rear of the trailer to the front of the trailer. The decedent’s coworker (driver) was in the semi-tractor cab. When it was



A farm hand in his 50s died when he fell from an 8-foot podium step ladder to the ground.

time to move the trailer to ensure even distribution of the soybeans, the decedent used a hand signal to alert the semi-tractor driver to back the trailer. The semi-tractor driver indicated to the MIOSHA compliance officer, who investigated the death, that the decedent usually descended the ladder prior to the driver moving the tractor-trailer unit. While backing the trailer, the trailer or the tractor 5th wheels may have contacted the ladder, causing the decedent to lose his balance and fall from the ladder, striking the metal frame of the 5th wheel. He then landed on the stone gravel driveway at the base of the ladder. The ladder stayed upright. Emergency response was called, and the decedent was declared dead in the emergency room. MIFACE Summary of MIOSHA Investigation [Case 498](#).

Homicide

9. A laborer on a dairy farm in her 40s died from multiple stab wounds.

Machine

10. A farmer in his 80s died when he was crushed under his overturned tractor. The decedent was mowing grass in the ditch between his crop fields and the road. He was mowing across the ditch and attempted to turn parallel with the ditch to continue alongside the road when his tractor overturned, pinning him underneath. Neighbors passing by noticed the overturned tractor and found the decedent stuck under the tractor. He died at the scene. It is unknown if the tractor was equipped with a rollover protection structure (ROPS).
11. A farmer in his 50s died when he was crushed between the front of his tractor and the bucket of the front-loader attachment. Based on the decedent's position and that of nearby tools it appeared that the decedent was working on the hydraulic hoses linking the tractor and the bucket.
12. A male farmer in his 50s died when he was pinned between the bucket and frame of a skid steer. The decedent was loading wood into an outdoor wood burner that heated both his home and his farm office located in the barn. The decedent used the skid steer bucket to carry a log to the wood burner. He had previously bypassed the skid steer's safety lap bar. He stopped the skid steer on the concrete pad in front of the wood burner and exited the cab without turning off the machine. When the decedent's spouse arrived home from work, she noticed the decedent "dangling" and called out to him. She ran to the skid steer, and seeing his position, immediately called for emergency response. When responders arrived, they turned off the machine to assess his condition. Finding him deceased, they restarted the skid steer and tilted the bucket to lower him to the ground, and then lowered the bucket to the ground. MIFACE Investigation Report [18MI004](#).
13. A farmer in his 80s died after being run over by a tractor. The decedent was repairing a tractor in his barn while it was running. The tractor accidentally shifted into gear and began moving backwards. The decedent attempted to climb onto the tractor to shift it out of gear but became caught between the dual front tires of the tractor. He was dragged by the tractor as it crashed through the wall of the barn and traversed a nearby field until the decedent's grandson was able to chase it down and stop it.

14. A logger in his 60s died from complications of a work injury that occurred in 2006. The

decedent was operating a trail groomer. The groomer was in motion when the grooming blade suddenly dropped, stopping the machine. The decedent was unrestrained and was thrown into the steering column, which caused paralysis from a spinal injury.

15. A farmer in his 60s died when he was crushed under a bulldozer that fell off a trailer. The decedent was selling the bulldozer, and he and his son were helping to load it onto the trailer of the two individuals who were buying it and had come to pick it up. The decedent had driven the bulldozer onto the trailer but became concerned that it was not positioned properly for safe travel and attempted to operate and re-position it while it was on the trailer. The bulldozer slid off one side of the trailer onto the ground and the decedent was partially crushed underneath it.

Motor Vehicle Crash

16. A truck driver for a corn and soybean farm in his 70s died when the semi-truck he was driving struck another semi-truck. The decedent was traveling south on a two-lane road with a 55-mph posted speed limit in daylight with dry road conditions. For unknown reasons, his vehicle veered off the roadway to its right and then re-entered the roadway, crossing left into the lane of oncoming traffic and striking an oncoming semi-truck head-on. The decedent was not wearing a seat belt, and it is unknown if his airbag deployed.
17. A farmer in his 60s died when his pickup truck was struck by another vehicle. The decedent was traveling south on a two-lane road with a posted speed limit of 55 mph when a second pickup truck traveling west on an intersecting road failed to stop at a stop sign and struck the decedent's vehicle on the driver side. Both vehicles left the roadway to the southwest, striking the curb, traffic signs, and a fence. The decedent died on the scene. He was wearing his seat belt and his airbags did deploy. MIFACE Investigation Report [18MI243](#).
18. A truck driver for a corn farm in his 60s died after his vehicle was struck by another vehicle and rolled over. The decedent was traveling south in a semi-tractor with a flatbed cargo platform on a 2-lane road with a posted speed limit of 55 mph when a passenger vehicle traveling west on an intersecting road failed to stop at a stop sign and struck the front-left corner of the decedent's vehicle. The decedent's vehicle rolled over, and the decedent became trapped in the overturned cab and died on the scene. The decedent was not wearing the equipped seat belt, and his vehicle was not equipped with airbags.
19. A farmer in his 40's died when the pickup truck in which he was a passenger was struck by another vehicle and caught fire. The decedent was traveling in a pickup truck headed south on a two-lane road in daylight and dry road conditions. As the vehicle was traveling through an intersection, another vehicle heading west on the intersecting road failed to stop at a stop sign and proceeded through the intersection, striking the decedent's vehicle, causing it to leave the roadway and strike a utility pole. The vehicle became entangled with active electrical wires and engulfed in flames. It is unknown whether the decedent was wearing his seatbelt and whether his airbags deployed.
20. A farm manager in his 30's died when his pickup truck left the roadway and struck a tree. The decedent was driving south on a snowy, wet two-lane road with a posted speed limit of 55 MPH. The decedent's vehicle started to leave the roadway onto the right shoulder, then

overcorrected, crossed both lanes of travel and proceeded through a ditch to strike a tree. The decedent was not wearing a restraint, though his vehicle's airbag did deploy.

Struck By

21. A male farmer in his 80s died when a tree he was limbing and bucking shifted and pinned him under a tree trunk. The tree crown, smaller limbs and branches had been removed; only the large limbs remained. The felled tree was balanced on the exposed tree root (flare) and the remaining large diameter limbs. The decedent was working alone. He was using his chain saw to remove the larger limbs from one of the tree's trunks. During this activity, it appears the tree shifted and rolled. The tree trunk struck and pinned him against the ground. When he did not return home as planned, his wife called him on his cell phone. She was unsuccessful in finding him and called her son. Her son arrived at the incident site and, using a chain saw, cut away a section of tree lying on the decedent. Emergency response was summoned. He was declared dead at the scene. MIFACE Investigation Report [18MI213](#).
22. A farmer in his 50s died after being struck by a falling tree while cutting it down.

Suicide

23. A farmer in his 50s died from a self-inflicted gunshot wound.

MINING (NAICS 21) (n=2)

Machine

24. A co-owner of a gravel company in his 70s died when he was pinned by the articulating frame of a front-end loader tractor and the ladder, which provided access to the cab. The decedent was operating a 1972 Michigan 275 articulating front-end loader tractor, pulling a metal sled along a gravel road to maintain the property. The decedent was using the loader and sled to knockdown/clear weeds when the loader became stuck and/or slightly slid down the road embankment. With the front-end loader tractor left running, the decedent exited the cab and began to descend the ladder. One co-owner had arrived at the business and noticed the loader had been moved. He went to look for it and found the decedent pinned between the articulating frame of the front end of the loader and the ladder. After calling another co-owner, he climbed the ladder, entered the cab and turned the steering wheel, opening the articulating space enough for the decedent to slide down to a position where the two co-owners could extract him from the machine. The sequence of events leading to the fatal incident was unknown. Emergency response was called. The decedent was declared dead at the scene. MIFACE Summary of a MIOSHA Inspection [Case 508](#).

Struck By

25. A mining shift supervisor in her 40s was run over by a loaded Caterpillar 785B haul truck while sitting in a pickup truck at the crusher site. The decedent was parked near where stone was piled about 25 feet high by haul trucks to be scooped into a crusher. A fully loaded (approximately 150 tons) haul truck came around the right side of the pile and ran over the decedent's pickup truck with its right wheels. The haul truck had an approximately

100 ft. blind spot on the right side and the driver never saw the decedent's pickup. He brought the haul truck to a stop 30-40 feet past the pickup as he had felt the truck rock up and down and wanted to inspect it. It is unknown whether the decedent's pickup truck had its overhead light on. Mine Safety and Health Administration [Fatality Report #15](#).

UTILITIES (NAICS 22) (n=4)

Electrocution

26. A journeyman lineman in his 50s was electrocuted when the boom of a digger derrick contacted an energized 7200-volt power line. The work crew consisted of two workers. Worker 1 was the line worker in charge and was operating the controls of the digger derrick, which was not grounded; the ground wire for the digger derrick was rolled up on the truck. The decedent was working from the ground. He was not wearing personal protective equipment. The crew was in the process of unloading a new power pole from the truck. The truck was "leaning" toward the power lines and the pole being replaced was "leaning" toward the



A journeyman lineman in his 50s was electrocuted when the boom of a digger derrick contacted an energized 7200-volt power line.

road. The boom of the digger derrick contacted the non-covered, non-insulated energized power line while unloading the new power pole from the truck. The decedent reached for and grabbed the chains on the rack on the back of the truck while the boom was in contact with the power line. He became a path to ground for the electricity. Emergency response was initiated by Worker 1. The decedent was transported to a local hospital where he died. MIFACE Summary of a MIOSHA Inspection [Case 521](#).

Fall

27. A cleaner at an electric power plant in his 60s died from complications of a fall from standing height.

Struck By

28. An electrical distribution plant maintenance worker in his 20's died when a pipe cap he was removing from a pressurized pipe struck his head. Approximately two months prior to the incident date, the employer tasked employees with removing a section of the sprinkler/fire main pipe and capping the ends as part of a maintenance operation. Various valves were closed and tagged out to perform the removal of the pipe. At that time, the tagout position of the drain valve was in the open position. Worker 1 was then instructed to remove the tag and return the valve to its normal (closed) position because another valve was leaking

nearby onto a turbine and generator parts. The line pressure of the sprinkler system was 150 psi. On the date of the incident, the decedent and his two coworkers were tasked with re-installing the approximate 10-inch diameter, 17-foot long section of the replacement sprinkler/fire pipe. The decedent was standing on an approximate 8-foot step ladder attempting to remove the steel pipe cap from the pressurized pipe while his coworkers were preparing the replacement pipe to be installed. The pipe the decedent was working on was under pressure and when the flange coupling was loosened, the 10-inch diameter pipe cap struck the decedent's head, causing him to fall to the cement floor. MIFACE Summary of a MIOSHA Inspection [Case 518](#).

Suicide

29. A wastewater systems inspector in his 50s died by self-inflicted hanging.

CONSTRUCTION (NAICS 23) (n=24)

Asphyxiation

30. A construction laborer in his 30s died in a trench collapse. The decedent had been hired to perform a sewer cap-off in preparation for a building demolition. The decedent had previously performed "handyman" work for the employer, including snow plowing and lawn mowing. The employer paid for the rental of the excavator that the decedent used to dig the trench. The dimensions of the trench, which was oriented north-south, were: a) Length: 29-feet, b) Width at base: 7-feet, c) Width at ground level: 6 feet, and d) Depth: 9 feet. The soil composition was a



A construction laborer in his 30s died in a trench collapse.

clay/sand mix. The spoil piles were placed at the excavation edges on both sides. The north, east and west walls of the trench were undercut and nearly vertical; the south wall of the trench was sloped at approximately 70°. The excavator had been digging from the south side. The decedent had placed a folded 12-foot stepladder into the trench to provide access. The decedent was hand digging around the sewer line in preparation to cut the pipe, approximately 10 feet from the south edge of the trench just north of the stepladder. The decedent mentioned to the employer, who had just arrived and was standing on the ground at the edge of the trench, that the dirt kept collapsing around him and the pipe. Shortly thereafter, the east, west and north walls of the excavation collapsed on top of the decedent. The employer jumped in the trench and started digging by hand to uncover the employee. He was unsuccessful and climbed out of the trench, yelling for someone to call for emergency response. The excavation was not shored or sloped nor was a trench box present on site. MIFACE Summary of a MIOSHA Inspection [Case 494](#).

Drug Overdose

- 31. A construction laborer in his 30s died from a drug overdose.
- 32. A plumbing contractor in his 50s died from a drug overdose.

Fall

- 33. A roofer in his 40s died after he fell approximately 18 feet through an unguarded roof skylight to a concrete floor. The decedent's employer had been contracted to remove the existing roof and install a new roof. The decedent and a coworker were on the roof, preparing for the work to be performed that day. They used a ladder positioned at the back of the building to access the roof. There were 72 skylights on the roof; a green X was spray-painted on 42 of the skylights signifying the skylight was to be removed and then decked. Thirty skylights were in the process of being replaced (having new lenses placed on them). The decedent's coworker saw him winding up an extension cord. When the decedent took a step backward, he tripped over the edge of the unguarded skylight and fell approximately 18 feet to the concrete floor below. His coworker ran over to the skylight and after seeing the decedent not moving, ran to the ladder, descended from the roof, got in his car and drove to the front of the building. He ran to the decedent and then called for emergency response. The decedent was breathing, but weakly. Emergency responders arrived and assumed care. The decedent was transported to a nearby hospital where he died the next day. MIFACE Summary of a MIOSHA Inspection [Case 497](#).
- 34. A male in his 50s died from complications 36 years after a construction-related fall that had paralyzed him.
- 35. A construction firm owner in his 60s died when he fell from an 8-foot step ladder to a concrete floor. The decedent was a subcontractor renovating a building. While standing on the ladder, the decedent was using a cordless electric saw, cutting foam panels and a wood platform/overhead truss system. His coworker, who was working outside, heard a "crash" and ran inside of the building to find out the source of the noise. When he arrived, he saw the ladder had tipped and the decedent face down on the concrete floor. The decedent had landed on his head and was trying to rise from the floor. The coworker called for emergency response. The decedent was transported to a nearby hospital where he died several days later from complications of his injury. MIFACE Summary of a MIOSHA Inspection [Case 510](#) and MIFACE Investigation Report [18MI105](#).
- 36. A remodeler in his 60s died from complications of a head injury sustained when he slipped on ice in a driveway as he was getting out of his pickup truck. The decedent was a subcontractor for another firm (Firm 1) subcontracted by a big box store (Firm 2) to install tile in a customer's bathroom. The decedent drove to the customer's home and as he exited his truck, he slipped on the ice and struck his head. He called Firm 1 and told personnel that he was going to purchase some sand for the driveway. He drove to Firm 2 to buy the sand. The decedent's head began to hurt to such a degree that he drove himself to a local hospital. Upon examination, hospital personnel airlifted him to another hospital, where he died several days later from complications of the head injury. MIOSHA Construction Safety and Health Division investigated the fatality and deemed it non-program-related because an

employer-employee relationship could not be established.

Homicide

- 37.** The co-owner of a fencing business in his 60s died from a gunshot wound.

Machine

- 38.** A plumbing and HVAC subcontractor in his 50s died when he was crushed between the bucket and body of a skid-steer loader. The decedent was operating the loader and had filled the bucket with dirt, which caused it to tip forward, throwing the decedent from his seat out between the bucket and the cab. The impact from the loader tipping caused a battery terminal to dislodge, stalling the loader, lowering the bucket and crushing the decedent.

Motor Vehicle Crash

- 39.** An HVAC service technician in his 30's died when his cargo van struck another vehicle in an intersection. The decedent was traveling south during the day on a dry, two-lane road with a posted speed limit of 55 MPH. The decedent approached a stop sign at an intersection but failed to stop, striking the right side of a box truck traveling west on the intersecting road. The decedent was not wearing their seatbelt, and the vehicle's airbags did not deploy.
- 40.** The owner of an excavating firm in his 40's died when his pickup truck struck a semi-truck trailer. The decedent was traveling north during the day on a dry, two-lane divided highway with a posted speed limit of 70 MPH. The decedent was in the left lane of travel and came upon a semi-truck stopped on the left shoulder, with its trailer partially protruding into the left lane. The decedent's pickup truck struck the right rear corner of the trailer. The decedent was restrained, and his vehicle's airbags did deploy.
- 41.** The owner/operator of an excavating firm in his 70s died when his vehicle was rear-ended and overturned. The decedent was traveling north on a 4-lane highway with a posted speed limit of 65 mph in a pickup truck with a flatbed trailer. A second vehicle traveling in the same lane of traffic struck the trailer from behind, causing both vehicles to cross the lane of traffic and median to the left and come to rest in the southbound lanes of traffic. The decedent's vehicle overturned in the process. The decedent died on the scene. The decedent was not wearing a seatbelt, and the equipped airbags did not deploy.
- 42.** A roofing foreman in his 50s died when the company pickup truck he was driving failed to stop at a stop sign and struck the side of a box van traveling through the intersection. The incident occurred while dark and raining, and the intersection was unlit. The intersecting roads had posted speed limits of 55 mph. The airbag in the decedent's vehicle did deploy, although he was not wearing his seatbelt.

Struck By

- 43.** A drilling company technician in his 20's died when he was struck by a vehicle while working in the front yard of a residence. The decedent was a member of a four-person work

crew restoring the lawn following the replacement of water lines. The traffic control devices had been taken down because the water line replacement had concluded. The four-man crew were working adjacent to the roadway just north of a curve in the north/south road. The work truck with a flashing amber beacon was located south of their work area. The crew were restoring two lawns at a time; for each set of lawns the work truck moved with them. All workers were wearing Class 2 high visibility vests. The decedent and one of his coworkers were raking near the sidewalk and a fire hydrant. Their coworkers were working in the front lawn of the home. A car travelling southbound crossed the centerline of the roadway, entered the northbound lane and then continued to travel across the northbound lane, onto the roadway shoulder and then onto the lawn, striking the decedent and his coworker working near the fire hydrant. The decedent was declared dead at the scene. His coworker was transported to a nearby hospital with serious injuries. The driver of the vehicle indicated that the cruise control was set at 60 MPH; the speed limit in the area where the crew was working was reduced to 40 MPH and then to 30 MPH as the southbound lane entered the city. MIFACE Summary of a MIOSHA Inspection [Case 496](#).

44. An electrician in his 40's died after he was struck by a car. The decedent worked for an industrial electrical contractor and was running to cross a two-lane road to reach a gate to enter that day's worksite. As he was crossing the road, the decedent was struck by a car. The decedent was not crossing the street at a crosswalk. It was early in the morning and still dark and was raining.



45. An asphalt construction worker in his 20s died when he was run over by an asphalt truck driving in reverse. The northbound/southbound two-lane roadway was closed to through traffic while being repaved. The northbound lane had been paved and driven on by the public. Paving work was being commenced on the southbound lane. Paving activities worked south to north on the roadway. Several construction vehicles involved in the repaving were positioned in the southbound lane working northbound. A company subcontracted by the decedent's employer trucked the asphalt from the asphalt plant to the paver. The 5-axle dump truck involved in the incident was loaded with asphalt and was hauling a rear trailer full of asphalt. The driver unloaded the trailer into the paver, and drove northbound, unhooked his trailer, and then pulled ahead to the northernmost edge of the construction zone. The driver backed his truck into the southbound lane and parked the truck near the area where the flagger had closed the northbound lane. The driver waited for the flagger to signal him to take his load of asphalt to the paver. The paver was positioned near the southern most point of the construction zone. The flagger, after receiving the okay from the decedent to open the northbound lane to construction traffic, moved the cones closing the northbound roadway and indicated to the dump truck driver to transport the

An asphalt construction worker in his 20s died when he was run over by an asphalt truck driving in reverse.

asphalt to the paver using the previously paved northbound lane. The decedent told another density tech that he wanted to check the northbound roadway at the southern end, but because his vehicle was blocked by construction vehicles, he decided to walk to the south end. After receiving the okay from the flagger, the dump truck driver backed his vehicle from the southbound lane into the northbound previously paved lane and continued backing southbound until he struck the decedent. The driver/truck was located quite a distance to the north of the actual paving machine at the time of the incident. There was a truck already in the paver unloading at the time of the incident. The driver of the truck, which struck the decedent, indicated he was checking his mirrors as he backed. Water and tack trucks were operating in the southbound lane. His flashers and audible backup warning system were operational. Responding police re-creation determined he was backing at a speed of approximately 9 mph and the blind spot behind his truck was approximately 165 feet. The decedent, who was wearing a high visibility vest, was walking southbound in the northbound lane with his back to the backing dump truck. He was struck and run over by the backing dump truck approximately 325 feet from the flagger's location. The dump truck driver indicated he felt "two bumps" and then when he looked forward, he saw the decedent on the ground in front of the truck. The driver called for emergency response. Emergency responders found a hand-held temperature gun and a Bluetooth communication device near the decedent. MIFACE Summary of a MIOSHA Inspection [Case 491](#).

46. A highway construction laborer in his 30's died from complications 20 years after injuries sustained after being struck by a vehicle in a highway construction zone.

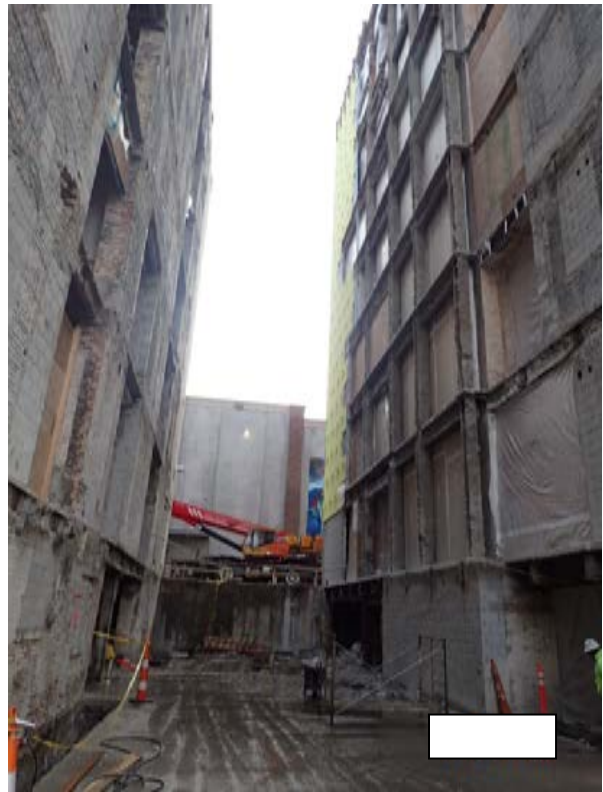
47. A journeyman electrician in his 60s died when a 40-gang meter bank and disconnect switch weighing approximately 700 pounds fell away from a wall and landed on top of him. The 40-gang meter bank and disconnect switch were installed previously and located in the basement of an apartment building. The date of installation and the company which installed the banks/switch were unknown. The firm (Firm 1) for whom the decedent worked had been subcontracted to pull new service cables from the building's housing units to the meter banks. Firm 1 found that the main switch was not located properly and had to be moved and relocated to the middle of 10 (4) stacks of meter banks. It was hypothesized that the decedent was working inside the panels, removing the connections between the panels so they could be removed one at a time a few days later. While working on this task, all 10 of the meter banks and the main switch fell from the wall and landed on the decedent. A coworker found the decedent under the meter bank/disconnect switch. The coworker was unable to lift the bank and called emergency responders. When emergency responders arrived, the bank was lifted off the decedent, who



A journeyman electrician in his 60s died when a 40-gang meter bank and disconnect switch weighing approximately 700 pounds fell away from a wall and landed on top of him.

was declared dead at the scene. After the incident, it was found that the meter banks/main disconnect switch were not properly fastened to the wall with a mounting channel. MIFACE Summary of a MIOSHA Inspection [Case 512](#).

48. A construction laborer in his 40s died when he was struck by a 2" x 10" x 16' wood scaffold plank that fell from the roof of an 8-story building. The decedent and a coworker were performing demolition activity on the lower level basement exterior wall. The plank may have previously been installed along the upper edge of the building's penthouse roof to hold down roofing material. Strong storms had passed through the area about the same time as the incident occurrence. It was thought by other contractors on-site that wind and weather may have contributed to the plank becoming dislodged and falling to the ground. Work had been completed on the penthouse approximately 5- to 6 weeks prior to the incident. There were no contractors working on the roof on the date/time of the incident. After the incident, a contractor removed a plank from the top of the penthouse roof that was located approximately 1- to 1.5- feet from the penthouse roof edge. The MIOSHA compliance officer noted one screw projecting 1"- to 1.25" out of the plank that struck the decedent. MIFACE Summary of a MIOSHA Inspection [Case 493](#).



A construction laborer in his 40s died when he was struck by a 2" x 10" x 16' wood scaffold plank that fell from the roof of an 8-story building.

49. An underground equipment locating field manager in his 40's died when he was struck by a vehicle while taking a drilling depth measurement in an active roadway. The north-south roadway had two traffic lanes with a middle (center) lane. At a nearby intersection, the southbound roadway widened to two lanes and the northbound two-lane wide roadway narrowed to one lane. The posted speed limit was 50 MPH. There had been a water tap break on the west side of the roadway. The foreman instructed two workers to place temporary traffic control signs (Work Zone Ahead and Work Zone) on each side of the roadway. Channelizing devices were placed on the east and west fog lines of the roadway in the work zone; both the northbound and southbound travel lanes were open to active traffic. A subcontractor dug an excavation on the west side of the roadway and then dug a second excavation on the east side of the roadway. A directional boring machine was set up on the west side. The plan was to bore under the roadway, west to east, pull the new water pipe through, and then make the connection. While boring took place, the location and depth of the bore was monitored. The decedent and a coworker, who worked for a company that marketed instruments for underground locating, were at the site to demonstrate their new locating equipment. The decedent and his coworker placed sensors on both sides of the road to assist with locating the boring head. Throughout the boring operation, the decedent

had walked back and forth across the open traffic lanes, assessing the depth and location of the bore head, demonstrating the new underground locating equipment. Checking the bore depth one last time, the decedent took an older piece of equipment into the northbound travel lane. He placed the equipment on the roadway and bent over facing west to read the results. A vehicle travelling in the open northbound lane at approximately 55 MPH neared the work zone. A worker ran toward the vehicle yelling and waving his hands and hard hat. The vehicle struck the decedent, propelling him in the air approximately 80 feet. He landed on the asphalt. Emergency response arrived and transported the decedent to a nearby hospital. He died several days later from the injuries. The decedent was wearing a high visibility vest at the time of the incident. MIFACE Summary of a MIOSHA Inspection [Case 511](#) and MIFACE Investigation Report [18MI072](#).

50. A volunteer construction laborer in his 80's died after he was crushed between pieces of equipment at a job site. The decedent was aiding in a task to transport a large water pump using a Cat model 322L excavator. The water pump was hooked to the bucket of the excavator via a chain. As another worker entered the excavator cab, he mistakenly triggered the controls, spinning the excavator rapidly. The water pump struck the decedent, crushing him between the pump and the tire of a large road grader.
51. A construction laborer in his 50's was struck by a cast iron plate at the end of a traveling grate spreader stoker chain being dismantled. The stoker chain system was located on the first floor. The decedent was in the basement performing fire watch duties. The cast iron plate at the end of the chain was approximately 40 inches long and 4 feet wide and weighed 52.5 pounds. A nearby beam was 17 feet 7 inches above the basement floor. The work crew had placed a double row of red danger tape across a basement stairwell located approximately 11 feet 3 inches to the south of the beam's pivot point. The crew radioed the decedent, indicating they were ready to cut the chain. The decedent radioed back the "all clear." The decedent was positioned in the stairwell when the crew on the first floor cut the stoker chain free without controlling the drop of the cut end. When the chain dropped, the beam acted as a pivot point and the chain swung toward the south (like a pendulum). The cast iron plate at the end of the chain struck the decedent. Plant personnel called for emergency response. Emergency responders transported the decedent to a nearby hospital. He was declared dead in the emergency room. MIFACE Summary of a MIOSHA Inspection [Case 495](#).
52. A construction operating engineer in his 50s died when he was struck by a vehicle entering the work zone during a night shift work operation. The work crew were setting barrier walls on the right shoulder of the roadway. The right lane of the 4-lane northbound freeway was closed by construction vehicles, signage, and orange barrels. Except for the absence of an "End Road Work" sign, the construction signage and the placement of the impact attenuator vehicle was appropriate. The posted speed limit with construction workers present was 45 mph. An SUV was traveling northbound on the freeway. The SUV did not move toward the left as indicated by signage and entered the work zone, crashing into the front of the attenuator vehicle, which was parked in the closed right lane. When the SUV crashed into the attenuator vehicle, the driver lost control and struck the decedent, who was standing next to a trailer parked on the right shoulder. Continuing its northbound trajectory, the SUV struck another construction vehicle (pickup truck) and just missed striking another worker. The SUV then rolled over and came to rest in the right lane of the

freeway. The decedent was wearing a Class II reflective vest. MIFACE Summary of a MIOSHA Investigation [Case 492](#).

Suicide

53. A residential building contractor in his 40s died by a self-inflicted hanging.

MANUFACTURING (31-33) (n=18)

Airplane

54. An owner of a logging and forestry equipment manufacturing firm in his 50s died when the Cessna 340A he was piloting crashed in a field, while he was attempting to locate the runway of a nearby airport for landing. He was traveling to a trade show to represent his company. Air traffic control (ATC) records indicate that the owner/pilot was cleared to land on the runway. The decedent then reported to ATC that he had lost his right engine and was still going to attempt to land. The decedent was then unable to visually locate the runway or the rest of the airport and inquired whether the runway lighting was malfunctioning. After noting that the decedent was going to circle and reattempt his landing and that he could still not see the airport, ATC did not hear from him again. Surface weather at the time included moderate rain with calm winds and scattered clouds and 10-mile or greater visibility.



Asphyxiation

55. A laborer for a metal tank manufacturing firm in his 20s died while performing abrasive blasting on a metal tank. The decedent job performed abrasive sandblasting to remove paint and finishes from metal tanks as part of a refurbishing process. The decedent was performing this process when he was discovered unresponsive. He was wearing a hood with an air supply line but was found with the hose disconnected. Testing of the hose and hood found them to be in working order. During his autopsy, some findings were suggestive of asphyxia but were inconclusive and the cause of death was left undetermined.

A laborer for a metal tank manufacturing firm in his 20s died while performing abrasive blasting on a metal tank.

Drug Overdose

56. A shipping coordinator in his 20s died from a drug overdose.

Electrocution

57. A male machine adjuster in his 40s died when he contacted the upper frame of a pump that was energized by a damaged cord and plug. The decedent was in the process of starting/setting up a printing press that used a water-based ink supplied by three ink pumps. The three pumps had been plugged in on the press to 220V AC/30-amp, 3-prong style outlets. The outlets had visible dried ink on them and were not provided with ground fault circuit interrupter (GFCI) protection. The pumps did not have any independent grounding and were only grounded through the cord and plugs/isolated off the press. Two of the three pumps were in operation at the time of the incident. During the setup, the decedent knelt next to the pump and rested his left forearm on the upper frame of the inside tint ink pump. The pump had defects in the cord and the plug, which energized the frame, and made a ground contact through the decedent, causing him to be electrocuted. After the incident, a 3rd party electrician found that the pump involved in the incident had a bad electrical connection in the plug and no ground on the cord and plug. MIFACE Summary of a MIOSHA Inspection [Case 504](#).



A male machine adjuster in his 40s died when he contacted the upper frame of a pump that was energized by a damaged cord and plug.

58. A machine builder in his 40s was electrocuted when he contacted an energized conductor. The manufacturing cell contained three engine block honing machines (A, B and C) and a conveyor system used to transfer engine blocks between each machine. Prior to lunch, the decedent had been aligning the spindle with an engine block that was mounted in the fixture on an indexing table on Machine B. Between Machine B and Machine C there was an approximately 10-foot long roller conveyor. The conveyor had electrical wiring, Ethernet cables and a ground wire coming from Machine C that powered the conveyor. On the legs of the conveyor were brackets with bolts and nuts securing them to the conveyor legs.



A machine builder in his 40s was electrocuted when he contacted an energized conductor.

Machine C had an approximately two-inch-thick by six-inch-wide steel rail mounted to the side of the machine approximately 18 inches from the floor. The rail was spaced approximately 1.5 inches away from the machine. After lunch, the decedent returned to the work area. He had been at the work area for approximately five to ten minutes when a coworker noticed that the decedent was kneeling on the floor in the corner of Machine C and the conveyor. He had his left arm resting on top and his left chest leaning against the side of the metal rail. His right arm was moving and then stopped. The coworker called out his name but there was no response. Another coworker came by and they both went to the decedent to see what he was doing. One of his coworkers reached down and grabbed the decedent under the armpits and felt a vibration or tremor like electric current so he immediately let go and yelled for someone to turn off the machine. Once the machine was turned off his coworker grabbed the decedent's shirt and pulled him away from Machine C. The decedent did not have a pulse. The workers moved the conveyor (with all wiring attached) to provide room for emergency responders. After calling for emergency response, the employees performed CPR until EMS arrival, who took over emergency care. Subsequent investigation by the medical examiner found burn marks on his right forearm consistent with two nuts holding a bracket on the leg of the conveyor down by the floor. Burns to his left chest and left arm were consistent with him leaning against the metal rail with his chest while resting his arm on top of the metal rail. After EMS left the facility, the conveyor was put back in place. The next morning electricians repaired the ground, an Ethernet cable and a 380-volt electric power connection that was damaged when the conveyor was removed. MIFACE Summary of a MIOSHA Inspection [Case 499](#).

Fall

59. A sawmill owner in his 60s died when he slipped and fell from the cab of a front-end loader. The decedent had been using the front-end loader to fill a trailer with firewood. It appeared that the decedent was in the process of exiting the cab of the front-end loader when he slipped. He fell face-down to the ground. Another worker found the decedent, non-responsive, laying on the gravel. He called 911 and the decedent was transported to the hospital where he was pronounced dead. This worker stated to the MIOSHA compliance officer that it had rained slightly earlier in the day causing some of the surfaces to be wet. The steps leading into/out of the cab had traction cleats. The front fender and cab steps were approximately four feet from the ground surface. MIFACE Summary of a MIOSHA Inspection [Case 501](#).



A sawmill owner in his 60s died when he slipped and fell from the cab of a front-end loader.

Homicide

60. A shipping and receiving traffic manager for an aluminum stamping plant in his 50s died

from multiple gunshot wounds.

Machine

61. The owner/operator of a tool and die business in his 50s died from complications of a traumatic brain injury. Twelve years prior, the decedent had been operating a CNC machine when a piece of metal was flung from the machine and struck a window. The window flexed and hit the decedent in the head, knocking him to the floor, where he further injured his head.

Motor Vehicle Crash

62. A driver for an auto parts manufacturer in his 40s died when the semi-truck he was driving was struck by a dump truck. The decedent was traveling south during the day and in clear weather on a dry, two-lane road with a posted speed limit of 55 mph. A dump truck traveling east failed to stop at a stop sign and stuck the decedent's vehicle in its left side, leading to both vehicles leaving the roadway via the southwest corner of the intersection. It is unknown whether the decedent was wearing a restraint, and the vehicle was not equipped with an airbag.

Struck By

63. A manufacturing shift leader in his 50s died when he was struck by a piece of 2.5-inch diameter metal tubing being cut by a tube cutting machine. The upper portion of the tube cut off machine applied pressure (which was adjustable) and had a thin metal cutting wheel (which was adjustable for speed and tubing diameter). There were two rollers on the bottom. The full length of tubing was placed in the feed area by hand, and end stop was set to the proper length of tube to be cut. To initiate the cycle, the tubing was fed by hand into the end stop, the head came down and the cutting wheel contacted the tubing; the tubing spun in one direction and the cutting wheel in the other direction. Once the cut began, the end stop retracted a little to make clearance for the tube to be released from the cut. The operator, after a piece of tubing was cut, would place the cut tubing in a 20-inch tall wheeled cart that had open ends and an open top. The decedent was showing a coworker how to operate the tube cutting machine. The decedent's coworker stood in front of the machine to catch the cut material. The decedent was standing to the side of the machine and on a cart for the cut tubing. A tube did not cut all the way through, so the decedent adjusted the machine speed. The cut left a burr which caught on the cutting blade causing the tubing to fly up and strike the decedent. MIFACE Summary of a MIOSHA Inspection [Case 514](#).
64. A manufacturing laborer in his 40s died when he was struck by his own car. The decedent had begun parking on the top of a hill in an informal parking area on the employer's property during a time of restricted parking while the formal parking lot was undergoing maintenance. Though this maintenance had ended, numerous employees continued parking in this area as it was closer to the entrance than the parking lot. Following the end of the decedent's shift, a coworker noticed a running car at the bottom of this hill and upon closer inspection found the decedent laying on the ground next to the running car. It is believed the car began rolling once it was started but before the decedent had fully situated himself within the car, and he was thrown from the car and struck by it on its way down the hill.

65. A heat treat operator in his 60s died from complications of a cut/scratch sustained when he dropped either a carbon plate or a part onto his ankle. The decedent did not report the cut/scratch to his employer although he did show it to a fellow coworker. The cut/scratch became infected a few days later causing him to seek treatment at an Urgent Care. The Urgent Care referred the decedent to the hospital based on the symptoms of the infection. The decedent told hospital personnel that he dropped a carbon plate on his ankle. The infection turned septic and the decedent died due to complications from the infection/septic shock approximately two months later. The reason the decedent was handling a carbon plate was unknown; per the employer, the decedent should not have needed to use the carbon plates due to the number of parts in the furnace that day. MIFACE Summary of a MIOSHA Inspection [Case 509](#).

66. A manufacturing laborer in her 60s died when she was struck by a 262-inch-long cast iron pipe that fell approximately 15 feet from ceiling height. A pressurized (55-65 psi) overhead 6-inch diameter, 262-inch-long cast iron water pipe, elevated 15 feet near the ceiling level fell and struck her head. Approximately two months before the incident, a powered industrial truck had struck the pipe, dislodging the hanger brackets from the I-beam ceiling, causing the pipe to sag and rest on some equipment racks. The MIOSHA investigation found that the racks were stored three high in this area leaving minimal clearance distance between the racks and the overhead piping and electrical systems. The lids for the racks popped open randomly due to their latch design when the powered industrial truck operators moved the racks. The employer had documented the overhead pipe damage from the opening rack lids. Additionally, the firm had documented incidents of the powered industrial trucks striking the overhead pipes. The firm made repairs to the water line, raising the pipe back into position and re-attaching the clamps. Approximately two months after the repair, the decedent was returning from break and was walking through the area in the aisle way to return to her work location. The water pipe broke and fell approximately 15 feet, striking the decedent's head. MIFACE Summary of a MIOSHA Inspection [Case 515](#).



A manufacturing laborer in her 60s died when she was struck by a 262-inch-long cast iron pipe that fell approximately 15 feet from ceiling height.

67. A laborer for a plating firm in her 30s died after she was struck by a car. The decedent had just been hired and had been instructed to undergo a drug test. The decedent was walking on the sidewalk after leaving a medical center for the required pre-placement drug test when a passing car left the roadway onto the sidewalk, struck the decedent, and continued across the sidewalk, striking a tree, wooden stairs, and a guardrail.

Suicide

- 68. The owner of a steel machining firm in his 70s died from a self-inflicted gunshot wound.
- 69. A quality control inspector for a machine tool manufacturing firm in his 50s died from a self-inflicted hanging.
- 70. The owner of a custom metal product fabrication firm in his 50s died from a self-inflicted hanging.

Toxic Exposure

- 71. A production worker in his 30s died from a work-related asthma attack. The manufacturing facility utilized Ecocool 715 coolant in their CNC machinery, which created a haze in the working environment. Multiple workers at the facility reported having asthma that was exacerbated by the haze. The decedent had an asthma attack at the end of his workday which did not abate into the evening, leading to his hospitalization and death due to consequences of the attack.

WHOLESALE TRADE (NAICS 42) (n=4)

Drug Overdose

- 72. A cattle handler for a livestock commission in his 30s died from a drug overdose.

Motor Vehicle Crash

- 73. A truck driver for a produce wholesaler in his 30s died when his box truck struck the rear of a semi-truck stopped on the side of the road. The decedent was traveling west on a dry, three-lane divided highway with a posted speed limit of 70 mph. It was dark out, but the highway was lit. The decedent came upon a semi-truck with double trailers that had experienced malfunctions and pulled off the roadway. However, the rear of the second trailer was still protruding into the lane. The decedent's box truck struck the rear of the protruding trailer, causing it to begin spinning to the right and become perpendicular to the direction of traffic. It was then struck by a third vehicle. The decedent was wearing his seatbelt, though his vehicle was not equipped with airbags.

Suicide

- 74. The co-owner of an off-road vehicle wholesale supplier in his 30s died from a self-inflicted hanging.
- 75. The owner of a coin-operated game wholesaler in his 50s died by a self-inflicted gunshot.

RETAIL TRADE (NAICS 44-45) (n=13)

Fall

- 76.** A butcher at a grocery store in his 40s died from complications of a fall at work several years prior. The decedent was attempting to lift a box of meat off a pallet on top of the meat freezer case, which he was accessing via a ladder. The decedent lost his balance and fell from the ladder approximately 6 feet to the concrete floor below.
- 77.** A cashier at a pharmacy in his 70s died after he fell from standing height and struck the back of his head on the floor.

Homicide

- 78.** An employee of a tire retailer in his 30s died from multiple gunshot wounds sustained during an argument with a former employee of the same establishment.
- 79.** An electronics salesperson in his 30s died from multiple gunshot wounds.
- 80.** A gas station cashier in her 40s died from multiple gunshot wounds.
- 81.** A retail worker in her 20s died from multiple gunshot wounds.
- 82.** A retail store stock clerk in his 20s died from a stab wound.

Motor Vehicle Crash

- 83.** A driver for a used car dealership in his 60s died from complications of becoming a quadriplegic after a motor vehicle collision in 2014. The decedent was transporting a passenger vehicle that his employer had just purchased at auction back to the dealership. He was traveling east on a three-lane highway with a posted speed limit of 70 mph in the right-most lane. He attempted to change lanes to the left but struck the rear passenger-side panel of a pickup truck already in the lane. Both vehicles traveled off the road to the left, striking the median barrier and coming to a rest on the median shoulder. The decedent was not wearing the equipped seatbelt, although his airbags did deploy. The decedent had a blood alcohol level at the time of the crash of 0.141%.
- 84.** An employee of a gas station chain in his 20s was killed while delivering payroll to assorted branches when his vehicle struck another vehicle in an intersection. The decedent was traveling west during the day on a dry, two-lane road with an unposted speed limit of 55 MPH. The decedent failed to stop at a stop sign and was struck by a northbound pickup truck (for whom there was no traffic control). It is unknown whether the decedent was wearing a restraint, though the vehicle's airbags did deploy.

Struck By

- 85.** A retail worker in her 40s was killed when she was struck by a vehicle in the parking lot while walking into the store to begin her shift.

Suicide

- 86. A mechanic at a motorsport dealership in his 40s died by self-inflicted carbon monoxide poisoning.
- 87. A clerk at a grocery store in his 20s died from a self-inflicted gunshot wound.
- 88. A co-owner of a car dealership in his 50s died from a self-inflicted gunshot wound.

TRANSPORTATION & WAREHOUSING (NAICS 48-49) (n=19)

Airplane

- 89. A pilot for a charter air service in his 30s died when his plane crashed for unknown reasons. The pilot was the sole occupant of a Beechcraft 200 twin-engine turbo prop plane that took off from one airport to pick up passengers at a second airport. The plane had begun its initial descent into the destination airport, and the last radar return indicated the plane was at an altitude of 2,200 ft approximately 8 miles out from the runway. After the plane failed to arrive, the wreckage was found in a wooded area. Markings on trees in the wreckage area indicated the plane descended at a 45-degree angle to the ground. The wreckage revealed no evidence of mechanical malfunctions or anomalies.

Drug Overdose

- 90. A tow truck operator in his 20s died from a drug overdose.
- 91. A truck driver in her 50s was found dead of a drug overdose in her truck.
- 92. A truck driver in his 30s died from a drug overdose.

Fall

- 93. A truck driver in his 60s died from complications of a fall off a truck or trailer in 1989.
- 94. A front-end loader operator in his 60s fell while stepping into or from the loader cab and/or ascending or descending the loader's fixed ladder. The decedent's employer was contracted to shuttle corn between an outside storage facility and the main facility. The decedent was a member of a four-person crew; two semi-truck drivers, the decedent who operated the front-end loader, and another crew member preparing the next area of corn to be loaded/transported. The loader had an enclosed cab and a fixed ladder that allowed climbing into or from cab. The decedent used the front-end loader (three buckets full) to alternately fill the truck trailers. The truck drivers transported and dumped the load at the main storage facility and then returned to the outside storage facility for another load. A returning truck driver found the decedent lying on his back on the ground, severely injured and unconscious. The loader was running, in neutral with the emergency brake applied. The truck driver yelled for the coworker nearby, who ran over and attempted to stop the bleeding. The two workers continued to yell for help and one of the outside storage facility employees ran out and called 911. The decedent was transported by ambulance to a nearby

hospital where he passed away 12 days later due to complications from the injuries. MIFACE Summary of a MIOSHA Inspection [Case 519](#).

95. A pallet repairer in his 50s died from complications of a fall to a cement floor. The decedent was working in an area where pallets were sorted and repaired. The workspace contained loose boards held together by banding on pallets; these were used for repair of damaged pallets. Nearby was a table for placement of pallets during repair and a roller conveyor on the floor for stacking and manually moving finished/repaired pallets. The banding on the pallets of loose board was cut one-to-two times per week to allow retrieval of the boards. It appeared that the decedent was walking back to the pallet repair station. It is unknown if he was carrying any material. It appeared he tripped on some of the banding that was on the floor, falling and striking his elbow. On the day of the incident (Day 1) he reported the fall and was asked by his employer if he wanted to seek medical treatment. The decedent declined. Some time passed, and the decedent asked and received permission to go home. Later that evening, his spouse took him to a local hospital, where it was found that he had a fractured elbow. In the early morning of Day 3 he died in the hospital. It was later determined that he had sustained internal injuries when he fell. MIFACE Summary of a MIOSHA Inspection [Case 503](#).



A pallet repairer in his 50s died from complications of a fall to a cement floor.

Homicide

96. A driver for a mobile ride-hailing application in his 20s was shot while picking up a fare.
97. An operations manager of a trucking business in his 60s died from a gunshot wound.

Machine

98. A trucking business owner/operator in his 40s was killed when he was crushed by the crawler tractor he was operating. The decedent was using a Caterpillar D3G crawler tractor to transport materials at his business and continued to work after his employees left for the evening. Upon arriving the next morning, employees found the victim deceased on the ground next to the tractor with one leg severed and the other broken.

Motor Vehicle Crash

99. A truck driver in his 50s was killed in a motor vehicle collision. The decedent was heading

north in the dark on a dry road with clear weather. The two-lane road had a posted speed limit of 25. The decedent was taking an exit ramp when he struck a barrier, travelled across the exit lane and hit multiple barriers on the other side. It is unknown whether he was wearing a seatbelt, and the airbags did not deploy.

- 100.** A male truck driver in his 40s died when the semi-truck he was driving struck another semi, causing him to be ejected from the semi cab and then struck by an oncoming SUV. The decedent was traveling eastbound in the right lane of a three-lane roadway with a posted speed limit of 70 mph. The roadway was wet, and it was lightly snowing at the time of the crash. A semi-truck (Truck #1) experienced a flat tire and was parked or moving slowly on the roadway shoulder. The decedent's vehicle had left the roadway onto the shoulder and was attempting to return to the lane of travel when the right front corner (passenger side) of the decedent cab struck the left rear corner of Truck #1's trailer. The decedent's cab and trailer struck Truck #1's trailer a second time and then struck Truck #1's drive tires. The decedent's semi cab sustained severe damage and the decedent was ejected from his vehicle and killed when an eastbound vehicle, attempting to avoid the crash debris, ran over him. It is unknown if the decedent was wearing his seatbelt/shoulder harness. He tested positive for illegal substances.
- 101.** A driver in his 80s who transported Amish passengers died when his pickup truck was struck by another vehicle. The decedent was transporting a passenger southbound on a two-lane state highway with a posted speed limit of 55 mph. A second vehicle failed to stop at a stop sign for a westbound intersecting street and struck the driver's side of the decedent's vehicle, causing it to leave the roadway, strike a utility pole, and become engulfed in flames. The decedent and his passenger were trapped in the vehicle and were declared dead on scene. All airbags in the decedent's vehicle deployed; it is unknown whether he was wearing a seat belt.
- 102.** A self-employed transport driver in his 50s died when his van struck another vehicle in the roadway. The decedent was traveling east on an unlit, dry, six-lane divided highway with a posted speed limit of 70 MPH. A passenger vehicle ahead of the decedent swerved to avoid another vehicle, lost control, struck the guard rail, and came to rest in the middle lane. The decedent's vehicle, traveling in the middle lane, struck the disabled vehicle head-on. The decedent was wearing his seatbelt, and the vehicle's airbags did deploy.
- 103.** A driver for a construction material trucking firm in his 50s died when his semi-tractor struck another vehicle head-on. The decedent was driving north on a dry, two-lane road with a posted speed limit of 55 mph. Another vehicle was traveling south on the wrong side of the road (i.e., in the northbound lane). The decedent was unable to avoid striking the oncoming vehicle. The decedent was not wearing his seatbelt, and his vehicle was not equipped with airbags.

Struck By

- 104.** A manager of a vehicle towing company in his 40s died when he was pinned against a tow truck lift fork and run over by a bus tire. He was servicing the bus when it was struck by a vehicle attempting to exit an expressway. A school bus, while traveling eastbound on a 3-lane expressway, had the driver's side outside dual tire blow out. The bus driver exited the freeway onto an exit ramp to another expressway. The driver stopped, parked the bus in the median approximately 75 yards up the exit ramp, and set the emergency brake, which is only active on the rear wheels. The decedent responded to the call and set up his truck



A manager of a vehicle towing company in his 40s died when he was pinned against a tow truck lift fork and run over by a bus tire.

approximately 8-10 feet in front of the school bus with all the tow truck's emergency lights flashing. The decedent exited the truck to assess the situation and instructed the bus driver and the teacher's aide that were on the bus to get in the tow truck. The decedent moved between the back of the truck and the front of the school bus and was lying on the ground, looking under the bus trying to decide what equipment he would need to hook the bus to move it. A SUV was traveling eastbound in the far-left lane on the same 3-lane expressway. The driver made an abrupt turn to the right at the exit, swerving across two lanes and over to the exit ramp. The vehicle went into the median and into the gravel on the side of the road, striking the back of the bus at a high rate of speed. The SUV went under the rear of the bus, raising the back tires off the ground which disabled the emergency brake on the bus. The SUV pushed the bus approximately 8-10 feet forwards striking the back of the wrecker. As the bus was pushed forward, it pinned the decedent against the lift fork of the wrecker and the ground. The front right bus tire ran over the decedent and the front right spring shackle bolts struck him in the back. Emergency responders were called, and he was pronounced dead at the scene. MIFACE Summary of a MIOSHA Inspection [Case 490](#) and MIFACE Investigation Report [18MI037](#).

- 105.** A tow truck driver in his 40s died when he was struck by a vehicle as he was securing a pickup truck on his flatbed tow truck. The pickup truck had been traveling on an expressway when it had a flat tire. The pickup truck driver exited the expressway and drove to a gas station near the exit ramp to fill the tire. The air compressor was not working, so the driver left the station and was driving in the right lane of the roadway to another nearby station when the tire bead came off the rear passenger wheel. The driver stopped the pickup truck in the right travel lane of the roadway near the roadway intersection with the entrance/exit ramps of the expressway; there was a turn lane for the entrance ramp to the expressway on the passenger side of the truck and stop lights at the intersection. The intersection was lit by overhead lights. It was raining. One of the occupants of the pickup

truck called for a tow truck. The decedent arrived and parked his tow truck behind the disabled pickup truck. The tow truck's overhead yellow lights were on along with all the running lights and 4 LED lights that lit up the back of the wrecker. The decedent worked approximately 30+ minutes attempting to release and drop the pickup truck's spare tire. Unable to release the tire, the decedent offered to tow the vehicle. The decedent moved the tow truck to the front of the disabled pickup, loaded the pickup onto the flat bed of the tow truck, and partially raised the bed. After securing the front of the



Picture of cable lowered but tire not released from safety retaining system while pickup truck on tow truck flatbed.

vehicle, he proceeded to the rear and was in the process of placing the hooks to secure the pickup to the bed when a vehicle, whose driver was under the influence of alcohol, struck the decedent, one of the pickup truck passengers, and the rear of the tow truck. The decedent was pinned between the rear of the flatbed and the front of the vehicle that struck him. The decedent struck the windshield on the driver's side and the pickup truck's hitch struck the windshield on the passenger side. Emergency response was called, and the decedent was declared dead at the scene and the passenger was transported to the hospital. The decedent was wearing a pair of brown overall style pants and jacket with a pair of boots. He was not wearing the company-issued high visibility vest or clothing. MIFACE Summary of a MIOSHA Inspection [Case 502](#) and MIFACE Investigation Report [18MI002](#).

106. A postal service mail carrier in her 50s died when she was struck by her mail delivery truck. The decedent was delivering a package to a private residence. The residence was not along the decedent's regular route, as she was covering for an injured coworker. The residence had a driveway at an incline. The decedent parked her vehicle in the driveway but did not set the emergency brake. After she exited the vehicle, it began rolling down the driveway and struck the decedent, pinning her against a metal handrail along the residence's entrance walkway. The resident of the home heard her crying for help, went outside, and then ran to get a neighbor's help, calling for emergency services along the way. After the neighbor failed to open the door, the resident ran back to the truck and tried to back it up; however, the rear wheels were elevated due to the truck being tilted down the walkway stairs. When he exited the truck, he saw the decedent had died. The decedent had put the vehicle in park; this vehicle was known to have linkage problems and was known to slip out of gear. The normal carrier for this route routinely parked along the side of the road instead of on the inclined driveway. Federal OSHA Inspection: [1303659.015](#)

Suicide

107. The owner of a local freight logistics firm in his 60s died by a self-inflicted gunshot.

INFORMATION (NAICS 51) (n=1)

Suicide

108. The owner of a video production company in his 20s died from a self-inflicted hanging.

REAL ESTATE & RENTAL & LEASING (NAICS 53) (n=4)

Fall

109. An owner of residential rental properties in his 80s died after falling down a flight of approximately 15 stairs at one of his homes.

Homicide

110. The owner and lessor of a residential property in her 50s died from a gunshot wound.
111. The manager of a residential property in his 40s died from a gunshot wound.
112. A co-owner of an estate appraisal firm in his 50s died from multiple gunshot wounds.

ADMINISTRATIVE & SUPPORT & WASTE MANAGEMENT & REMEDIATION SERVICES (NAICS 56) (n=14)

Drowning

113. The owner/operator of a landscaping firm in his 50s drowned after the skid-steer loader he was operating fell through the ice on a lake.

Electrocution

114. An owner-operator of a grounds-keeping business in his 60s was electrocuted when his equipment contacted overhead power lines. The decedent had been hired by a church to power wash the exterior of the building and was doing so from an aerial bucket. Individuals nearby were alerted by a flash arising from the area and called for help. When first responders arrived, the bucket itself was not in contact with the power lines, and subsequent inspection of the individual and the contents of the bucket suggested that it was the power washing equipment that contacted the energized lines.
115. A truck driver for a landscaping firm in his 50s was electrocuted when he touched an energized conductor while standing next to his truck. The decedent had just delivered a load of mulch and was driving away from the delivery point with the dump truck bed fully elevated. The elevated bed contacted an overhead service line that had (2) 110 V AC lines/220 V AC total electrical voltage. The decedent attempted to free his truck by lowering the bed to approximately 30 degrees and driving backward approximately 10 feet. This action caused the pole securing the service line to fall onto a nearby fence and the pole's 4,800 V AC primary electrical line to break and fall onto the truck bed. Both the service line and the primary electrical line were still energized; the lines arced and smoked when they

contacted the metal parts of the truck. The decedent removed the metal head of a sledgehammer and, while standing on the passenger side of the truck, used the sledgehammer's wooden handle to manually push the service line off the cab of the truck. He successfully moved the line towards the hood but not off the truck. He dropped the wooden handle and walked to the driver's side of the truck where he contacted the energized conductor (either the truck or an energized line). He was declared dead at the scene; he had electrical burns on his right arm and left hand and the glove on his left hand. MIFACE Summary of a MIOSHA Inspection [Case 487](#).

Fall

- 116.** An owner of a tree trimming/removal service in his 60s died when he was thrown from the bucket of a bucket truck when the 12-inch diameter cottonwood tree branch he was cutting struck the bucket. The decedent was elevated approximately 30 feet. He was not wearing fall protection. A line had been attached to the branch the decedent was cutting and a small tractor operated by a coworker (Coworker 1). The decedent instructed Coworker 1 to back slowly away as he cut the branch so that when the branch was cut through it would not strike a nearby building. As the decedent made the cut on the branch, the tension was suddenly released, and the branch snapped back and struck the bucket. The decedent was propelled out of the bucket. He fell 30 feet and struck an air conditioner. He landed between another air conditioner and a retaining wall. Coworker 2 witnessed the incident and ran over to the decedent, who spoke a few words. The building owner called EMS. Coworker 2 began rescue breathing; Coworker 2 could not perform CPR due to the position of the decedent. EMS arrived and attempted CPR. He was transported to the hospital where he was pronounced deceased. MIFACE Summary of a MIOSHA Inspection [Case 500](#).

Homicide

- 117.** A locksmith in his 30s died from multiple gunshot wounds.

Motor Vehicle Crash

- 118.** A delivery driver for a private mail services firm in his 40s died when his cargo van lost control, crossed into oncoming traffic and hit another vehicle. The decedent was driving southeast during the day on a two-lane non-divided roadway with a posted speed limit of 55 mph. There was blowing snow, and the roadway was snow-covered. The decedent's vehicle lost control, veered to the left into the oncoming lane of traffic and struck a pickup truck head-on. The decedent's use of restraints was unknown, although the front airbags did deploy. Excessive speed was believed to be a factor in the loss of control.
- 119.** A water damage remediation technician in his 20s died when his panel van struck two other vehicles while trying to pass one of them. The decedent was driving east during the day on a dry, two-lane road with a posted speed limit of 55 MPH in daylight. The decedent attempted to pass a vehicle in the same lane by entering the left-hand turn lane but struck the side of a semi-truck it had been attempting to pass and then left the roadway to the south. The decedent was wearing his seatbelt, and the van's airbags did deploy.

Struck By

- 120.** A contractor in his 50s was removing trees from a private property. The decedent was using a gas-powered chainsaw when a tree that had been cut became suspended in the air by another tree. The decedent and his coworker attached a chain to the suspended tree and planned to use a tractor to pull the tree to the ground. The deceased was driving the tractor forward when he saw the tree falling in his direction. He attempted to avoid the tree and jumped off the tractor but was struck and pinned by branches of the tree. He was taken to a hospital but died from his injuries.
- 121.** A landscape laborer in his 30s died when a 20-inch diameter and approximately 20-foot long willow tree branch snapped off the trunk and fell to the ground, pinning the decedent against the controls of a machine he was operating. The decedent and a coworker were working in a yard, moving piles of leaves/mulch to the east side of the property. On the day of the incident, the wind was gusting up to approximately 50 mph. His coworker had left the area to move a truck trailer and heard the tree crackle. When he returned to the area, he walked toward the back of the property and saw the branch laying on top of the decedent, who was still on the machine. The coworker called for emergency response. He was declared dead at the scene. The county's Department of Public Works lifted the tree branch from the decedent. MIFACE Summary of a MIOSHA Investigation [Case 485](#).
- 122.** A male loader operator at a waste transfer station in his 30s was struck by a front-end loader operating in reverse while he was walking to pick up a loose trash bag. The decedent was assisting the loader operator with maintaining the transfer area. The transfer department was an open front structure approximately 100 feet by 200 feet with a large paved work area approximately 300 feet by 300 feet in front of the structure where trucks dump solid waste trash. The trucks backed into the area to dump. A front-end loader is used throughout the process to keep the solid waste/trash in a pile under the transfer station's structure until it is loaded for transfer to a landfill. The decedent was wearing a hard hat and high visibility vest. The loader operator had noticed the loose trash bag, but, before retrieving it, he needed to push trash that had just been delivered into the pile. The decedent, who also noticed the trash bag, walked to pick it up. After pushing the trash into the pile, the loader operator placed the loader in reverse and backed it to the bag's location, so he could retrieve it. The loader operator did not see the decedent and rode over him. The loader stopped when the operator saw the trash bag and then noted the decedent on the ground in front of the loader. The loader had inoperable running lights, brake lights and reverse lights as well as an inoperable back up alarm and camera. MIFACE Summary of a MIOSHA Inspection [Case 516](#).
- 123.** A refuse collector in his 20s died when he was struck and pinned against a garbage truck by a pickup truck. The decedent was the driver of the garbage truck. He and his coworker were collecting trash on a rural roadway. The garbage truck made a routine stop mostly positioned in the eastbound lane requiring other vehicles to drive around the truck. The garbage truck had operable lights, 4-way hazards, but was not equipped with a flashing beacon. The decedent was not wearing his fluorescent yellow vest with a reflective strip, just his regular street clothes and a colored and reflectorized face scarf/mask. As a pickup truck hauling a pop-up camper travelling eastbound began approaching the truck, the decedent had begun walking to the driver side of the garbage truck from the rear to empty a trash bin. He was positioned in the roadway near the loading sill at the corner of the

driver's rear section of the garbage truck with his empty trash bin when he was crushed between the front of the pickup truck and rear corner driver's side of the garbage truck. The pickup truck driver told responding police that the sun was in his eyes and he could not see the garbage truck until it was too late. MIFACE Summary of a MIOSHA Inspection [Case 507](#).

124. An owner/operator of a repossession business in his 40s died when he was struck by a vehicle while securing a tow truck onto a second, flatbed tow truck. The decedent and his partner had just repossessed a vehicle using their tow truck, when their truck developed a flat tire. The decedent pulled his vehicle and the towed vehicle over to the side of the two-lane road, with their vehicles protruding partially into the southbound lane. Another tow truck operated by their firm came to take away the repossessed vehicle, while a flatbed tow truck operated by another company arrived to tow the decedent's truck. The decedent was standing in the roadway helping to secure his tow truck onto the flatbed when a vehicle traveling in the southbound lane struck the rear corner of the flatbed, traveled along the length of the flatbed, and hit the decedent. The decedent was transported to a hospital, where he died.
125. A groundskeeper in his 70s died after being struck by a falling tree. The decedent was aiding a property owner with the removal of downed trees from a wooded area of the property and the processing of the trees for firewood. The property owner was using a bulldozer to tow a downed tree back to his house where he and the decedent were to begin cutting and splitting the tree. The decedent was following on foot and spotting the towed tree. The towed tree hit a second, dead tree and knocked it over onto the decedent. The property owner ran to the house to retrieve a saw to cut the dead tree off the decedent and called his grandson to come to the property to help. By the time his grandson arrived, and emergency services had been called and arrived, the decedent had died from his injuries.
126. A male self-employed tree trimmer in his 50s died when a large section of a tree he was cutting fell to the ground and then "shot back up" pinning him against the tree. The tree section then fell back to the ground. The decedent was pinned against the tree while in a climbing harness approximately five to six feet above the ground. Another individual who witnessed the incident lowered the decedent to the ground and called for emergency response.

EDUCATIONAL SERVICES (NAICS 61) (n=3)

Fall

127. A school bus driver in his 50s slipped and fell on ice/snow while walking through a blacktop paved parking lot on his way to his car after completing his morning bus run. The parking lot had been routinely cleared of snow prior to the incident, but there had been both warm and cold weather previously, causing ice and snow buildup over the course of the winter months. The parking lot was cleared of snow every morning or as needed by a contracted snow removal service. Sand was available at the entrance/exit doors to sand the entrance areas. The decedent was transported to a local hospital and was recuperating at home when he died from complications of the injury. MIFACE Summary of a MIOSHA Inspection [Case 484](#).

Motor Vehicle Crash

- 128.** A middle school teacher in his 30s died when his car left the roadway at the end of an exit ramp. The decedent was exiting a dry highway during the day in clear weather with a posted 70 mph speed limit. He failed to stop at a stop sign at the end of the exit ramp. His vehicle continued off the road, through an embankment and came to rest in a field. The decedent was wearing his seat belt and his airbag did deploy.

Struck By

- 129.** A crossing guard in her 50s was struck by a vehicle while in the crosswalk to stop oncoming traffic. The decedent was a special education teacher, assigned morning crossing guard duties. The decedent was wearing a high visibility vest and had a hand-held stop sign with flashing lights. As she walked out into the crosswalk to stop motorists traveling east/west, she was struck by an oncoming minivan traveling east. The decedent struck the hood and front windshield of the minivan. It is unknown if the decedent had received crossing guard certification from local law enforcement. Emergency response was called, and she was transferred to a local hospital where she died approximately one week later. MIFACE Summary of a MIOSHA Inspection [Case 483](#) and MIFACE Investigation Report [18MI027](#).

HEALTH CARE & SOCIAL ASSISTANCE (NAICS 62) (n=2)

Homicide

- 130.** An assisted-living home for the elderly security guard in his 50s died from multiple gunshot wounds.

Struck By

- 131.** A certified occupational therapy assistant in her 40s was killed when she was struck by a vehicle. The decedent was walking across the road inside a crosswalk from the hospital to its parking lot. She was hit by a pickup truck that turned right onto the road being crossed by the decedent. The vehicle (traveling north prior to its turn eastbound) and the decedent (traveling south) both had a green light. The incident occurred during a clear day with dry road conditions.

ARTS, ENTERTAINMENT, & RECREATION (NAICS 71) (n=5)

Drug Overdose

- 132.** A member of a sailboat racing crew in his 40s died from a drug overdose.

Homicide

- 133.** A rapper in his 20s died from a gunshot wound.

Motor Vehicle Crash

- 134.** A race car driver in his 80s died after his car struck a guardrail. The decedent was the driver of custom jet car outfitted with a jet engine. The decedent was performing an exhibition at a racetrack and was the only car on the track. He was traveling south along a straightaway on the track and upon entering the track turn to the east, he was unable to complete the turn and continued traveling south off the track and into a guardrail. The car traveled along the guardrail and into a tire barrier and became engulfed in flames. The driver died on the scene. The car was equipped with a five-point harness and disc brakes on all four wheels but was not equipped with an airbag.

Struck By

- 135.** A male park ranger in his 60s died when his JD Gator XUV 625i was struck broadside by a snowmobile while grooming a ski trail. The decedent was operating a JD Gator XUV 625i pulling a 6-foot wide by 6-foot long snow drag. Trail A was a ski trail and ran north to south. The decedent was travelling southbound on the 8-foot wide Trail A grooming the trail. A stop sign was posted on both the north and south sides of Trail A. Trail B, a designated snowmobile trail, ran east to west. Snowmobile driver #1 was traveling eastbound on Trail B. At the site of the incident, there was limited view from Trail A to oncoming snowmobile traffic on Trail B. Trail B was approximately one mile of straight snowmobile pathway in both the east and west directions. Trail B had yield signs posted on both the east and west sides of the trail approximately 50 yards from the intersection of Trail A and Trail B. Both trails had wooded areas on each side. The decedent's vehicle was in the intersection of the two trails when the Driver #1 broadsided the decedent's vehicle. Both vehicles became engulfed in flames. A second snowmobiler driver (Driver #2) was several hundred yards behind Driver #1 and did not see the collision. When Driver #2 arrived at the scene, the vehicles were on fire. Driver #2 was able to extract Driver #1 from the wreckage but was unable to extract the decedent. The decedent died in the wreckage on fire before first responders were able to remove him. MIFACE Summary of a MIOSHA Inspection [Case 482](#).

Suicide

- 136.** A casino maintenance worker in his 50s died from a self-inflicted hanging.

ACCOMMODATION & FOOD SERVICES (NAICS 72) (n=7)

Drug Overdose

- 137.** A restaurant cook in his 30s died from a drug overdose.
- 138.** A male full-service restaurant worker in his teens died from a multiple drug intoxication.

Explosion/Fire

- 139.** A camp worker in his 40s died from a propane gas explosion in a camp cabin. Four portable propane heaters were used to raise the temperature inside a cabin to 1400 F-1600 F to exterminate bed bugs. Each 20-gallon propane tank was equipped with a DynoGlo 15000 BTU single lamp heater. There was a shutoff valve on the lamp but it "kicked on" only when

the propane tank was knocked over. The decedent turned on each propane tank and filled the heaters with propane. The heaters were then lit by an open flame or a lighter. A box fan with a 3-speed adjustment was placed in one corner of the cabin for circulation. The extermination process was scheduled to take eight hours. After four hours, the decedent went into the cabin and smelled a propane leak; at least one of the flames had been extinguished. Based on the damage to the tanks after the explosion, it appeared he removed the four propane tanks from the cabin prior to the explosion occurring. The ignition source causing the explosion is unknown. After the incident, it was discovered the automatic gas safety switch was bypassed which allowed a constant flow of the propane gas to the main burner when the flame extinguished. The decedent died several weeks later from his injuries. MIFACE Summary of a MIOSHA Inspection [Case 520](#).

Fall

- 140.** A restaurant manager in his 50s died from complications from spinal injuries from a slipping and falling 20 years ago while working in a restaurant.

Homicide

- 141.** The owner of a pizza restaurant in his 30s died from a stab wound.
- 142.** A club owner in his 60s died from blunt force injuries sustained during a burglary.

Toxic Exposure

- 143.** A waiter in his 20s died from complications of an asthma attack at work. The decedent had a severe fish allergy that was frequently triggered from being near cooking fish. The decedent, his employer, and the regular cook had arranged that the decedent would not handle any dishes involving fish or that were cooked on the same surface as fish. Despite this, the decedent had had multiple asthma attacks at work. The night of the incident, the regular cook was not working, and the individual filling in was not aware of the normal arrangement and gave the decedent a dish to deliver to a table that did not contain fish but had been cooked on the same surface. The decedent began having an asthma attack, which was not remedied by his use of a rescue inhaler. The employer instructed the decedent's coworkers to transport him to the hospital, where he died from the asthma attack. An emergency epinephrine delivery device was not available at the restaurant, and nobody present at the time of the incident called for emergency services.

OTHER SERVICES (EXCEPT PUBLIC ADMINISTRATION) (NAICS 81) (n=12)

Asphyxiation

- 144.** A volunteer maintenance worker for a church in his 60s died as a result of becoming trapped in a drain manhole. The decedent had been a builder and contractor for most of his life and volunteered to perform repair and maintenance projects around his church. The decedent was cleaning out the sewer drains in the church parking lot. Another individual at the church went to look for the decedent after not having seen him for a while. The decedent was discovered head-down in the drain, with his feet barely visible at the top of

the drain. His chin was pressed into his chest due to his position and he asphyxiated before he could be rescued.

Explosion/Fire

- 145.** An automotive mechanic in his 60s died from severe burns after his clothes caught fire while using an acetylene torch.

Fall

- 146.** A pastor in his 50s died after falling from a roof. The decedent was helping to install a new roof on a church when he fell for an unknown reason.
- 147.** A mechanic in his 80s died after falling into a mechanic's pit. The decedent was attempting to show some equipment for sale to potential buyers. He was walking along the wall of the garage in the dark, attempting to locate the light switch, when he tripped over equipment on the floor and fell into a mechanic's pit approximately 4 feet deep. The decedent was taken to a hospital but died from his injuries.
- 148.** An instructor for a volunteer emergency preparedness organization in her 70s died from the complications of a fall. The decedent was aiding in a training session at a military base when she stated that she needed to retrieve some items from her car. She was later found on the floor in the mess hall; she had struck her head on the floor and did not remember her fall or what caused it. She was admitted to the hospital and died from her head injuries.

Homicide

- 149.** A canvasser for a community political organization in his 20s died from a gunshot wound.
- 150.** The owner of an automobile repair shop in his 50s died from a gunshot wound.
- 151.** A barber in his 20s was shot by a coworker.

Motor Vehicle Crash

- 152.** An employee of a truck washing firm in his 40s died when the van he was driving struck the rear of a semi-tractor trailer. The decedent and one co-worker/passenger were traveling west in daylight on a dry five-lane roadway with a posted speed limit of 55 MPH. A semi-tractor with one trailer ahead of the decedent's vehicle began slowing to stop for an upcoming red light. The decedent attempted to swerve to avoid hitting the trailer but was unsuccessful, hitting it nearly straight-on. The decedent and his coworker were both wearing their seatbelts, and their airbags both deployed. The coworker survived the incident.

Struck By

- 153.** An auto mechanic in his 30s died when the car he was working underneath fell off the jack onto his head.
- 154.** A powered industrial truck mechanic in his 20s died when a powered industrial truck (PIT 1) raised by the forks of another powered industrial truck (PIT 2) fell on him. The decedent was making the final connections on the installation of the PIT1 engine. It appeared that he used the forks of another powered industrial truck (PIT 2) to raise PIT 1 so he could work underneath the machine. He did not use the firm-provided jack stands, lift, or wood blocks to raise the powered industrial truck. After raising the PIT 1, he did not use any means to prevent movement, such as wheel chocks while working under the machine. One of his coworkers received a call from the decedent's wife asking him if the decedent was still at the shop working. The coworker called another family member who lived nearby. This family member went to the shop and saw the decedent laying face up with the PIT 1, which had all four tires on the ground, laying on his chest. The family member used PIT 2 to lift PIT 1 off the decedent. The family member tried to revive the decedent but was unsuccessful. The family member called home and another family member called for 911. The decedent's coworker arrived back at the shop and noted that PIT 1's emergency brake was not set. MIFACE Summary of a MIOSHA Inspection [Case 517](#).

Suicide

- 155.** A supervisor in an automotive transmission repair shop in his 30s died by a self-inflicted hanging.

PUBLIC ADMINISTRATION (92) (n=4)

Drowning

- 156.** A firefighter in his 40s drowned in a bathtub at the fire station after losing consciousness for an unknown reason. The decedent was ending a 24-hour shift during which he had responded to multiple fires and medical incidents. He was discovered unresponsive submerged in a tub of water in the officer's bathroom at the fire station. He was transported to a hospital where he later died of complications associated with drowning. An autopsy revealed no evidence of heart attack or other acute cardiovascular event.

Homicide

- 157.** A police officer in his 20s died from a gunshot wound.

Motor Vehicle Crash

- 158.** A police officer in his 20s died in a collision during a training exercise. The decedent's police car was traveling westbound on a wet, two-lane roadway with a posted speed limit of 35 mph. It is unknown how fast the decedent was traveling (the crash report indicated that his speed was too fast) or if his sirens/lights were activated. The decedent did not stop at a red light and was struck on the passenger side by a vehicle traveling southbound. After impact,

the decedent lost control of his vehicle and struck a bridge support. The decedent was not wearing a seat belt/shoulder harness.

Struck By

- 159.** A police officer in his 30s was struck by a motor vehicle. The decedent arrived to assist in crowd control operations after being contacted by dispatch following request by officers (Officer 1 and Officer 2) who were already at the scene. The original two officers had attempted to disperse the crowd and remove them from the street when the crowd became confrontational and resistant. They made a request for additional officers. Approximately five to six patrol cars arrived. The officers parked their cars with the flashing patrol lights on. Their squad cars were positioned to partially block all lanes of traffic on the road. One of the officers who had arrived following the request for assistance lost his personal phone at the scene. Numerous officers on scene attempted to help this officer locate his phone. The officer's phone was located. All officers began to prepare to leave the scene. The decedent was in the first eastbound lane behind Officer 1's vehicle and walking towards the sidewalk. A vehicle travelling westbound drove between patrol cars without slowing its rate of speed and into the eastbound lane where the decedent was walking. The oncoming vehicle struck the decedent and ran over him with the front passenger tire. Following a brief chase by Officer 1, Officer 1 returned to the scene and Officers 1 and 2 loaded the decedent into their patrol vehicle and transported him to a nearby hospital. He died several days later from complications of the injuries sustained at the time of the incident. MIFACE Summary of a MIOSHA Inspection [Case 506](#).