

# **2014 Annual Report Tracking Work-Related Fatalities in Michigan**

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## ***Executive Summary***

The Division of Occupational and Environmental Medicine at Michigan State University (MSU) began tracking work-related fatalities in the State of Michigan in January 2001. This is the 14<sup>th</sup> annual Michigan Fatality Assessment and Control Evaluation (MIFACE) report on acute traumatic work-related (WR) deaths in Michigan. There were **143 work-related deaths in 2014**, an increase of 9 deaths compared to 2013 (134 work-related deaths) representing 139 employers and 138 separate incidents. A narrative summary of each work-related fatality is in Appendix I. MIFACE educational material, including on-site investigation reports, summaries of MIOSHA investigations, and hazard alerts are located on the MIFACE webpage on the Michigan State University Department of Occupational & Environmental Medicine ([MSU OEM](#)) website. Key findings for 2014:

- The number of work-related deaths (143) and the fatal injury rate (3.2 deaths/100,000 workers) were up compared to 2013 (134 work-related fatalities, 3.1/100,000 workers, respectively). The number and rate of acute traumatic fatalities peaked in the years 1997-2001, were at their lowest from 2004-2005 and during the economic depression in the years 2007-2009 but otherwise have fluctuated during this time period from 134-155 deaths per year with a rate 3.1- 3.3/100,000 workers.
- Agriculture (25, 17.5%) had both the largest *number* of work-related deaths and the highest *risk* of death (30.5 deaths/100,000 workers). Construction was second in both number and risk (23, 16.1%; 16.3 deaths/100,000 workers), and Transportation and Warehousing was third in number and risk (19, 13.3%; 14.7 deaths/100,000 workers) of a work-related death. Retail Trade, although 4<sup>th</sup> in the number of deaths (13, 9.1%) and tied with Other Services, (13, 9.1%) had one of the lowest risks of death (2.8 deaths/100,000 workers compared to Other Services 7.6 deaths/100,000 workers).
- The two most common causes of death were from motor vehicles and struck-by incidents (28 each, 19.6 %), then falls (24, 16.8%) and then homicides (19, 13.3%).
- The number of work-related suicides in 2014 decreased dramatically compared to 2013 (9 suicides in 2014 compared to 22 suicides in 2013).
- Individuals who died were most likely to be men (87.4%) and Caucasian (83.9%). The average age was 47.9 years old and ranged from 20 to 84 years of age.
- Foreign-born workers accounted for nearly 10% of all work-related deaths in Michigan in 2014. The most common cause of death among foreign-born was homicide (4 deaths), followed by falls (3 deaths) and then machines (2 deaths).
- Illegal drugs, alcohol or side effects of prescribed medication was a potential factor in approximately 24% of the deaths.
- The Management occupation had the largest number of work-related deaths (32) followed by Transportation & Material Moving (30) and then Construction & Extraction (21).
- There was a work-related fatality in 44 of Michigan's 83 (53.0%) counties. Wayne County had the highest number of work-related fatalities (29, 20.3%), followed by Genesee and Macomb Counties (8 each, 5.6%).
- Of the 143 work-related fatalities, 37 (25.9%) 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 there to work; or
- (2) OFF the employer's premises and person 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 LARA and then from NIOSH. This is a joint project of LARA/MIOSHA and MSU OEM.

The purpose of the [MIFACE](#) tracking project is three-fold:

- Identify 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 as well as that of the Bureau of Labor Statistics (BLS), which collects the official statistics of work-related deaths 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.

<b>IDENTIFY INDIVIDUALS</b>	<b>GATHER INFORMATION</b>	<b>CONTACT EMPLOYER/FARM FAMILY</b>	<b>MIFACE SITE VISIT</b>
<ul style="list-style-type: none"> <li>◇ <b>Receive Report of Death</b></li> <li>◇ <b>Determine if WR Death</b> <ul style="list-style-type: none"> <li>- Paid employee, self-employed?</li> <li>- Working at job or family business?</li> <li>- Traveling "while on-the-clock" or compensated travel?</li> <li>- Volunteer?</li> <li>- In parking lot of business?</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>Contact</b> <ul style="list-style-type: none"> <li>- MIOSHA if fatality is program-related</li> </ul> </li> <li>• <b>Gather source documents</b> <ul style="list-style-type: none"> <li>• Reports from agencies that investigated the death/provided emergency services when event occurred</li> <li>• Death certificate</li> <li>• Medical examiner report and, when appropriate</li> <li>• MIOSHA fatality investigation narrative.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>◇ <b>Send MIFACE Introduction Letter and Brochure</b></li> <li>◇ <b>Follow-up phone contact</b> <ul style="list-style-type: none"> <li>- Answer questions</li> <li>- Ask if employer and/or family will voluntarily participate                             <ul style="list-style-type: none"> <li>➤ If Yes, schedule date and time for MIFACE site visit</li> <li>➤ If No, write case summary or MIFACE Summary of MIOSHA Investigation.</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>◇ <b>Explain MIFACE program</b></li> <li>◇ <b>Complete appropriate research forms</b></li> <li>◇ <b>Conduct interviews with appropriate personnel</b> <ul style="list-style-type: none"> <li>- Learn about process, equipment involved, work activities of deceased, training, safety programs, etc.</li> </ul> </li> <li>◇ <b>Observe area and/or equipment involved</b></li> <li>◇ <b>Take pictures, ensuring identifiers are removed</b></li> </ul>

**ALL work-related deaths MUST be reported to MIOSHA within 8 hours of the death.**

**The toll-free hotline to report a work-related death is: 1-800-858-0397**

### MIFACE INVESTIGATION REPORT

#### Site Visit Report Includes:

- 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**

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### ◇ **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 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 with employer agreement, accompanied the MIOSHA compliance officer. Also, MIFACE interviewed the compliance officers about their investigation.



[Case 24.](#) Millwright fell 60 feet through an opening in a catwalk floor while disassembling and removing conveyor equipment from a grain elevator



## Results

**There were 143 acute traumatic work-related fatalities in 2014.** One hundred thirty four (93.7%) of the 143 work-related traumatic incidents occurred in 2014; a description of the nine individuals who died in 2014 due to complications from a work-related injury sustained in a previous year (as noted by the medical examiner on the death certificate) follows:

- A 72-year-old male operations training specialist for the Army National Guard died from complications of a motor vehicle crash that occurred in 1979. The decedent was driving a pickup truck to another location for an audit. He lost control and hit a snow bank causing the pickup to roll over. Due to the length of time between the incident and the death, a police report could not be obtained.
- A 70-year-old male risk manager for a hospital died from a drug overdose. The decedent was in an automobile crash in 1988 and sustained injuries requiring multiple surgeries, leading to chronic pain syndrome. The amount of pharmaceuticals ingested in an attempt to deal with chronic pain syndrome led to his death.
- A 68-year-old male hotel co-owner died from complications of an 8-foot fall sustained in 2006. The decedent was working with two co-workers tarping a stack of carpeting located outside of a hotel. One coworker was using a Sky Trak Turbo Model 60362 forklift to elevate the decedent and a second coworker, both of whom were standing in a large wooden box/crate. The box/crate was not secured to the forklift's forks or mast. While working approximately 8 feet above the ground, the two coworkers were placing plywood on the tarp so it would not blow away. The decedent's coworker walked to the side of the box where the decedent was standing, causing it to become unbalanced and fall from the forks to the ground.
- A 61-year-old male brick mason died from complications of injuries he sustained in 2007 when he was struck in the head by a falling 12-foot-long metal wall stud. The decedent had been assigned to erect a block wall along the east side of the ground floor. Directly above the location where he was working, the exterior wall of the second floor had not been completed. Bundles of wall studs had been off-loaded and stacked on the second floor. There was a 2 3/4-inch toe board on the edge of the second floor and a guardrail consisting of two steel cables attached to the building's steel columns; the rest of the second floor was open and exposed. An employee of another subcontractor was installing studs on the west side of the building. He walked to the northeast side of the second floor to retrieve a bundle of wall studs. As he removed one bundle of studs from the west side of the pile (bunk), the unstable bunk tilted and shifted, causing the studs to fall from the second floor and strike the decedent on his head.
- A 55-year-old male laborer in the automotive industry died from complications of a fall at work that occurred in 2008.
- A 60-year-old female inspector at a manufacturing facility died from complications of a fall that occurred in 2012 after she stepped down off a rack onto a two-foot step stool, lost her balance, fell onto her back and struck her head on the floor.

- A 35-year-old male cattle farmer died from complications after he fell from an off-road vehicle (ORV) while traveling on a dry, 2-lane roadway in 2012. At the time of the incident, he was traveling to a corn field to get cows out of that field. The ORV had a very low left tire (unknown if the low tire was the front or rear tire) and the decedent had been leaning to his right to compensate for the tire when he fell from the vehicle. His traveling speed was unknown. After falling he skidded and rolled down the roadway approximately 40 feet. He was not wearing a helmet at the time of the incident.
- A 42-year-old male process designer died of complications of a 2013 crash. He was driving a passenger vehicle enroute to consult with a client when his vehicle struck a parked tow truck. He was southbound on an icy, 4-lane roadway with a posted speed limit of 70 mph. He was traveling in an outside lane which looked clear, but had a thin layer of ice. The inside lane had a packed ice and snow layer. The decedent lost control of the car and it rotated counter clockwise approximately 110 degrees and then slid into the rear of the tow truck that was parked, while working to remove another vehicle that was stuck in the snow. The decedent was wearing his seatbelt. The airbag did not deploy.
- A 52-year-old male owner operator of an auto repair shop died from complications of burns sustained in an explosion which occurred in 2013. The decedent was using a worn, cut web-type strap to raise a fuel tank out of a vehicle. The strap broke and the tank fell to the ground causing fuel to be released. A propane heater that was heating the garage ignited the gasoline vapors causing an explosion.

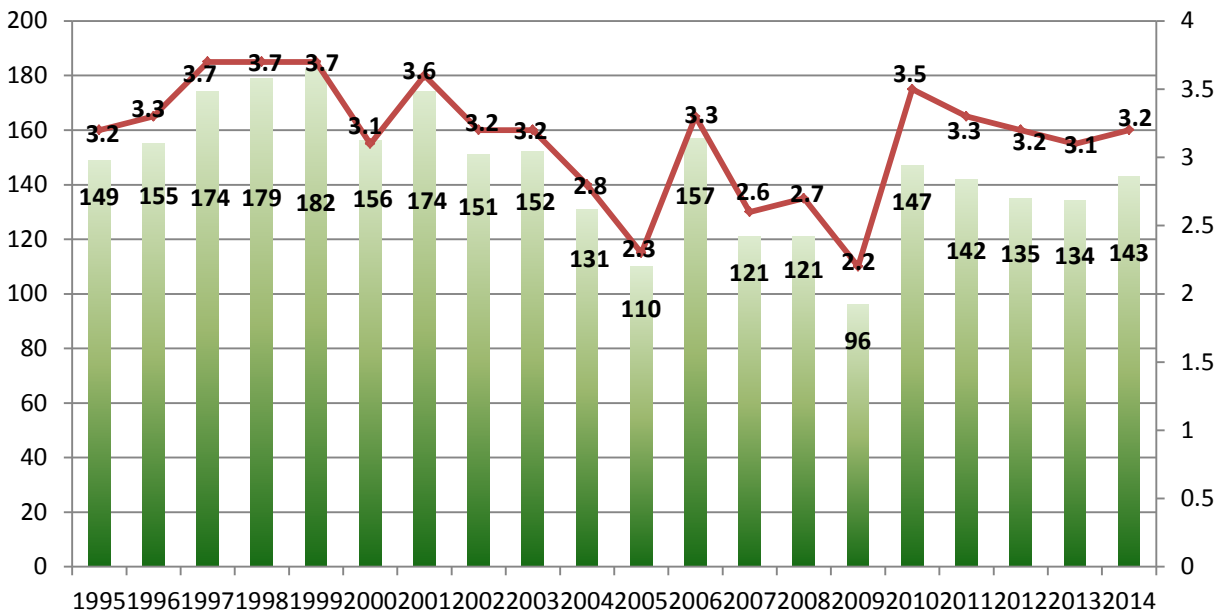
The 143 individuals who died had 139 different employers; four employers had a fatal incident where more than one person died. A real estate firm had two landlords shot in the same incident by disgruntled tenants, an agricultural company had two individuals die when the pickup they were traveling in was struck-by a train, the State of Michigan had two employees die in a motor vehicle crash, and a social service organization had two individuals die in a motor vehicle crash. One aircraft crash resulted in the death of two individuals who worked for the same employer.

The number of traumatic work-related deaths per year is shown by the **green** columns. **Figure 1.**



Incidence rates (per 100,000 workers) are shown by the **blue** line. The number of work-related deaths per year is shown by the **green** columns. Incidence rates shown from 1995-2000 were obtained from the [BLS](#) website. Rates shown for 2001-2014 were determined from MIFACE statistics.

**Figure 1. Number and Incidence Rate of Work-Related Fatalities  
In Michigan, 1995-2014**



## Demographics

**Table 1** shows the demographic characteristics of the 143 traumatic work-related fatalities in Michigan in 2014. Demographic characteristics were obtained from the individual's death certificate.

One hundred and six Caucasian males and 14 African American males died. Eighteen women, 14 Caucasian, 2 African Americans, and 2 Hispanic/Latinos died. Eighteen was the largest number of women dying from a work-related fatality since the inception of the MIFACE program in 2001.

Six individuals were of Hispanic ethnicity; two males and four females. The death certificates indicated race as Caucasian for one Hispanic male and one Hispanic female, one male and two females had their race identified as Hispanic, and one Hispanic female's race was identified as African American.



**Case 71.** Beef cattle he fell from the blade of a John Deere HLT bulldozer and was run over when the bulldozer moved forward.

## Age

The age distribution of the individuals who died from a work-related injury is shown in **Table 1, Figure 2, and Table 2.**

The ages ranged from 20 to 84. The average age was 47.9, up from 46.4 years of age in 2013. For men, the ages ranged from 20-84, and for women, the ages ranged from 25-76. The average age for men at the time of death was 47.4 years and for women the average age was 50.9 years.

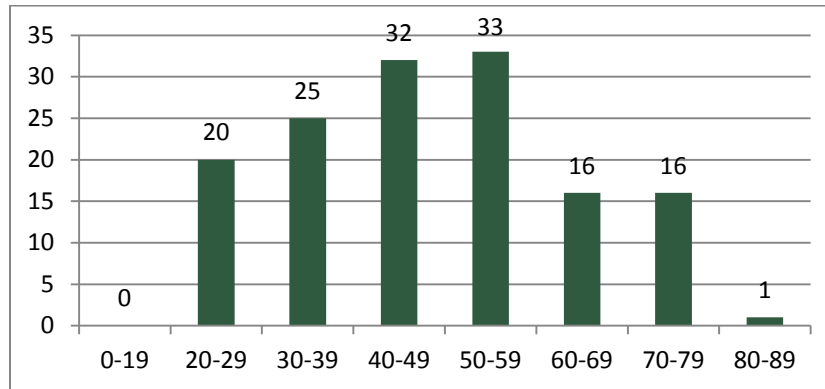
**Table 2** shows the distribution of traumatic work-related fatalities by age of the victim and industry sector.

Twenty-two individuals were 66 years of age or older when they died from an acute work-related event. Three of the 22 individuals were injured prior to 2014; the dates of injury were 1979, 1988 and 2010. The 22 deaths occurred in 11 of the 18 industry sectors. **Figure 2** shows the industry sector, the number of individuals and their age at the time of their death.

Seven (31.8%) of the 22 individuals aged 66 years or older died due to a motor vehicle crash, five (22.7%) individuals died from a fall, three (13.6%) individuals died in a struck-by incident, and two (9.1%) individuals died from a gunshot wound (homicide). The following causes of death were involved in one death each: a machine, a drug overdose, and a drowning.

<b>Table 1. Demographic Characteristics* of 143 Work-Related Fatalities, Michigan 2014</b>		
<b>Demographic Characteristics</b>	<b>Number</b>	<b>Percent</b>
<b>Gender</b>		
Male	125	87.4
Female	18	12.6
<b>Race</b>		
White	120	83.9
Black	16	11.2
Asian/Pacific Islander	1	0.7
American Indian/Alaskan Native	1	0.7
Hispanic	3	2.1
Arab	1	0.7
Vietnamese	1	0.7
<b>Age</b>		
<20	0	--
20-29	20	14.0
30-39	25	17.5
40-49	32	22.4
50-59	33	23.1
60-69	16	11.2
70-79	16	11.2
80-89	1	0.7
<b>Education</b>		
Less than High School	15	10.9
High School Graduate	60	43.5
GED	1	0.7
Specialized Training	1	0.7
Some College (1-4 years)	46	33.3
Post College (5+ years)	6	4.3
Unknown	5	--
<b>Country of Origin</b>		
United States	129	90.2
Iraq	3	2.1
Canada	2	1.4
Guatemala	2	1.4
Ghana	1	0.7
Israel	1	0.7
Mexico	1	0.7
Pakistan	1	0.7
Russia	1	0.7
Vietnam	1	0.7
Poland	1	0.7
<b>Totals</b>	<b>143</b>	
* Source: Death Certificate		

**Figure 2. Age Distribution of Work-related Fatalities, Michigan 2014**



**Table 2. Traumatic Work-Related Fatalities by Age of Victim and Industry Sector, Michigan 2014**

Industry Sector (NAICS Code)	0-19	18-65	66+	Total
	Number	Number	Number	
Agriculture, Forestry, Fishing & Hunting (11)	--	20	5	<b>25</b>
Utilities (22)	--	1	--	<b>1</b>
Construction (23)	--	21	2	<b>23</b>
Manufacturing (31-33)	--	8	--	<b>8</b>
Wholesale Trade (42)	--	6	1	<b>7</b>
Retail Trade (44-45)	--	13	--	<b>13</b>
Transportation & Warehousing (48-49)	--	17	2	<b>19</b>
Information (51)	--	--	1	<b>1</b>
Finance & Insurance (52)	--	1	--	<b>1</b>
Real Estate & Rental & Leasing (53)	--	2	1	<b>3</b>
Professional, Scientific, & Technical Services (54)	--	1	--	<b>1</b>
Administrative & Support & Waste Management & Remediation Services (56)	--	7	1	<b>8</b>
Education (61)	--	2	--	<b>2</b>
Health Care & Social Assistance (62)	--	1	3	<b>4</b>
Arts, Entertainment & Recreation (71)	--	3	--	<b>3</b>
Accommodation & Food Services (72)	--	4	1	<b>5</b>
Other Services (except Public Administration) (81)	--	9	4	<b>13</b>
Public Administration (92)	--	5	1	<b>6</b>
<b>Totals</b>	<b>0</b>	<b>121</b>	<b>22</b>	<b>143</b>

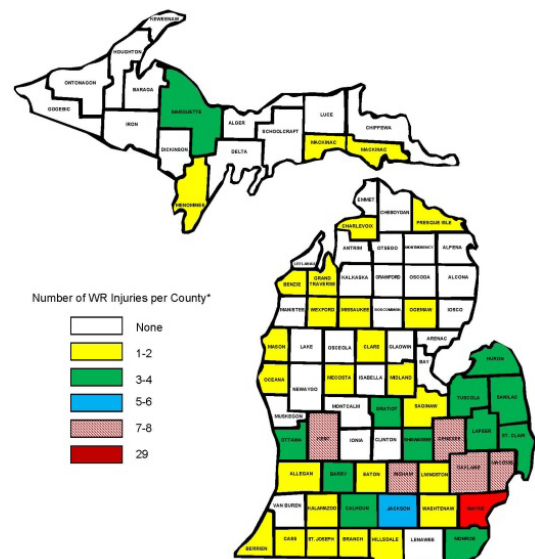
### *Geographic Distribution*

**Figure 3** and **Table 3** show the county in which the victim worked where he/she was fatally injured. The county of injury was known for all of the 143 work-related deaths.

Forty-four (53.0%) of the 83 Michigan counties had at least one work-related injury that led to the death of the worker.

**Figure 3. County of Fatal Work-Related Injury, Michigan 2014**

Collectively, the five southeast Michigan Counties of Macomb, Oakland, Washtenaw, Monroe and Wayne had 49 (34.3%) of all work-related deaths. Wayne County had the largest number of deaths (29, (20.3%)), followed by Macomb and Genesee Counties (8 each, 5.6%), and then Ingham, Kent and Oakland Counties (7 each, 4.9%).



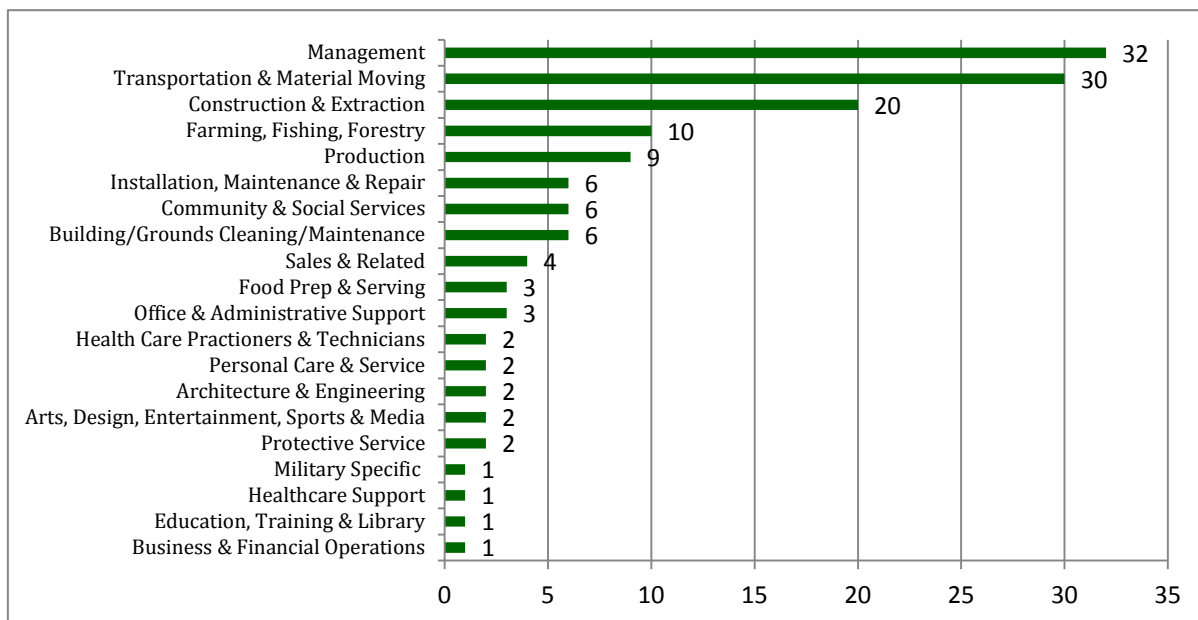
County	Number	Percent	County	Number	Percent	County	Number	Percent	County	Number	Percent
Alcona	--	--	Dickinson	--	--	Lake	--	--	Oceana	1	0.7
Alger	--	--	Eaton	1	0.7	Lapeer	4	2.8	Ogemaw	1	0.7
Allegan	2	1.4	Emmet	--	--	Leelanau	--	--	Ontonagon	--	--
Alpena	--	--	Genesee	8	5.6	Lenawee	--	--	Osceola	--	--
Antrim	--	--	Gladwin	--	--	Livingston	1	0.7	Oscoda	--	--
Arenac	--	--	Gogebic	--	--	Luce	--	--	Otsego	--	--
Baraga	--	--	Grand Traverse	1	0.7	Mackinac	1	0.7	Ottawa	3	2.1
Barry	4	2.8	Gratiot	3	2.1	Macomb	8	5.6	Presque Isle	1	0.7
Bay	--	--	Hillsdale	1	0.7	Manistee	--	--	Roscommon	--	--
Benzie	1	0.7	Houghton	--	--	Marquette	3	2.1	Saginaw	1	0.7
Berrien	2	1.4	Huron	4	2.8	Mason	1	0.7	St. Clair	3	2.1
Branch	2	1.4	Ingham	7	4.9	Mecosta	1	0.7	St. Joseph	2	1.4
Calhoun	3	2.1	Ionia	--	--	Menominee	1	0.7	Sanilac	3	2.1
Cass	2	1.4	Iosco	--	--	Midland	1	0.7	Schoolcraft	--	--
Charlevoix	1	0.7	Iron	--	--	Missaukee	1	0.7	Shiawassee	4	2.8
Cheboygan	--	--	Isabella	--	--	Monroe	3	2.1	Tuscola	3	2.1
Chippewa	--	--	Jackson	5	3.5	Montcalm	--	--	Van Buren	--	--
Clare	2	1.4	Kalamazoo	1	0.7	Montmorency	--	--	Washtenaw	2	1.4
Clinton	--	--	Kalkaska	--	--	Muskegon	--	--	Wayne	29	20.3
Crawford	--	--	Kent	7	4.9	Nawaygo	--	--	Wexford	1	0.7
Delta	--	--	Keweenaw	--	--	Oakland	7	4.9			

## Occupation

**Figure 4** shows the occupation distribution of the 143 work-related deaths utilizing 2000 Standard Occupational Classification (SOC) categories. Occupation was determined from

the reporting source data. The 2000 SOC is divided into 23 major groups, which are called “job families”. The “job families” 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.

**Figure 4. Number of Deaths by Standard Occupational Classification, Michigan  
2014**



The Management Occupations job family classification had the largest number of deaths (32, 22.4%). Management occupations were in multiple industries. Of the 32 individuals identified as conducting a work activity in this job family, 14 of the 32 (43.8%) deaths occurred in the Agriculture, Forestry, Fishing & Hunting industry sector. Seven of the 32 (21.9%) deaths were identified as top executives in the following industries: Retail Trade, Professional Scientific, and Other Services. Three individuals (9.4%) were identified as Property, Real Estate and Community Association Managers. The others were in: Advertising, Marketing, Promotions, Public Relations and Sales Managers, Operations Specialties Managers, Food Service Manager, Lodging Manager, and Miscellaneous Managers.

The 23 “job families” are further subdivided using a six-digit structure into 821 detailed occupations. Within the Transportation & Material Moving job family, multiple occupations were involved. Truck drivers had more than 50% of the work-related deaths (16 deaths, (53.3%). Air Transportation and Material Moving Workers had 4 (13.3%) deaths each. Service Station Attendants had 3 (10.0%) deaths, Water Transportation Workers had 2 (6.7%) deaths, and one (3.3%) parking lot attendant died.

Although the Construction and Extraction Occupations includes many different occupations, 17 of the 20 work-related deaths occurred to individuals who were Construction Trades Workers. Construction Trade workers included: 5 roofers, 5



construction laborers, 2 electricians, 2 carpenters, 1 brick mason/block mason, 1 pipe layer, and 1 operating engineer.

### ***Working Status of the Decedent***

One hundred thirty-nine employers were associated with the 143 individuals who died in 138 separate incidents.

The employer/employee status was known for 139 (97.2%) of the 143 work-related deaths. Eighty-five (61.2%) individuals were identified as employees; two of these individuals were temporary workers. Forty-nine (35.3%) were identified as self-employed or the owner/co-owner of the business, and 5 (3.6%) individuals were identified as volunteers at work.

The decedent was working alone in 75 (56.8%) incidents and with a coworker in 57 (43.2%) incidents. The work status was unknown in 11 incidents. For homicides, the decedent was working alone in 11 (61.1%) incidents and with a coworker in 7 (38.9%) incidents. For homicides, the work status was unknown for one incident.

The location of injury for the fatal incident was identified for 142 (99.3%) of the 143 deaths. For years 2001-2011, if the individual was injured in a motor vehicle accident or injured when struck-by a motor vehicle, the decedent's location was



[Case 77](#). Shot blast operator died when a firm-built 632-pound steel plate guard fell on him.

a street/roadway. Beginning in 2012, MIFACE further refined the location of injury as instructed in the [CDC Death Certificate Section 4 – Main Elements](#). Coding changes include: 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. Those 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 garage” was used; d) If an incident occurred while the victim was in a motor vehicle, the place of injury was coded

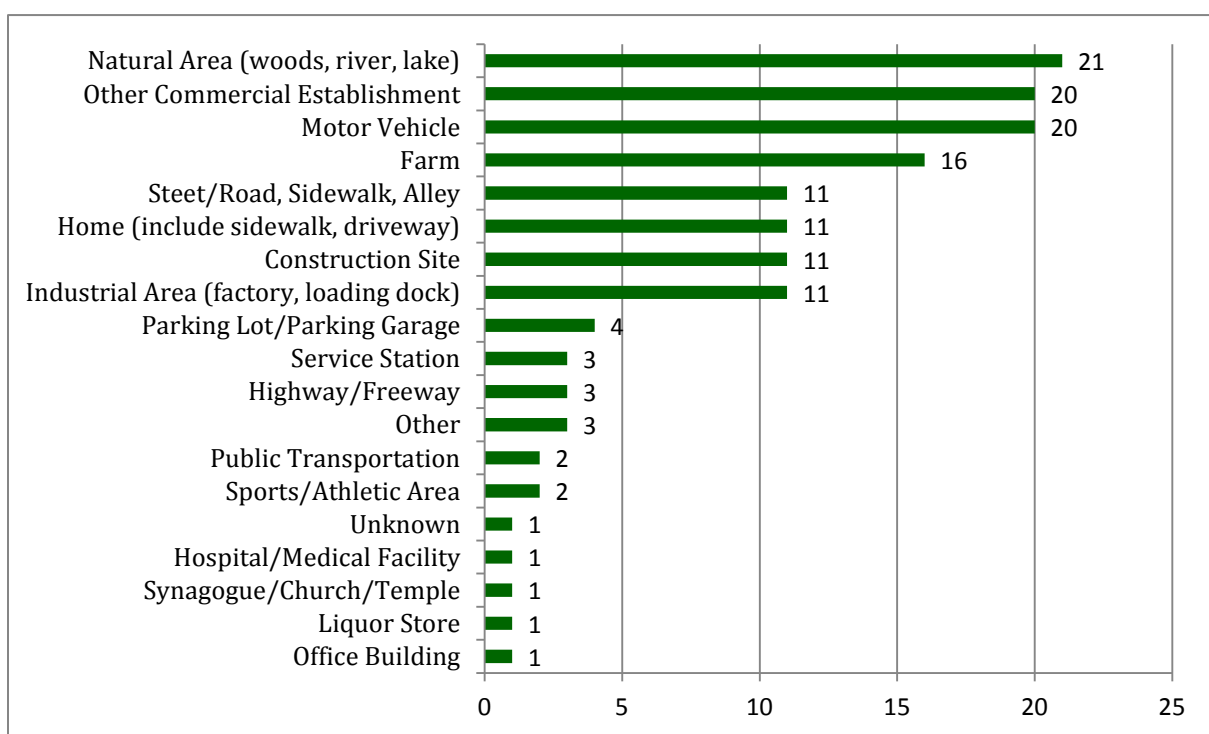


as a “motor vehicle” - for annual report years 2001-2011, MIFACE coded the location (street/road) rather than “motor vehicle”.

**Figure 5** shows the place and number of injuries for the 2014 traumatic deaths.

A natural area (woods, river, lake, field (other than farm)) was the location where the largest number of the fatal injuries occurred (21, 14.8%). Motor vehicles and commercial establishments closely followed a natural area as the location of the fatal injury (20 each, 14.1%). The deaths in “Other” include a docked ore boat, a grain mill and a shed in a remote storage area. The location of injury for one individual was unknown.

**Figure 5. Location and Number of Fatal Work-Related Injuries, Michigan 2014**



### ***Location of Death***

For 77 (54.2%) individuals, the place of death was at the scene of the traumatic incident. For 57 (40.1%) individuals, the death certificate indicated the death occurred in the hospital. Two (1.4%) individuals died in a nursing home. One (0.7%) individual was identified as dying at a residential home. The location where one individual died was unknown.

### **Illegal Drug/Alcohol/Medication Use**

Of the 130 individuals whose death was not a suicide (9 deaths) or a drug overdose (4 deaths), a toxicology screen for alcohol, illegal drugs, prescription or non-prescription medications was known to have been performed on 78 (60.0%) individuals; 40 (51.3%)

individuals had detectable levels of at least one of these substances. Twenty-four (60.0%) of the 40 individuals with detectable levels of alcohol, illegal drugs, prescription and non-prescription medications had levels that were considered on review to possibly have contributed to the fatal incident (**Table 4**). It was unknown if the presence of opiates, hydrocodone and marijuana was from the use of a prescribed medication or from illegal use.

**Table 4. Type Of Work-Related Fatal Incident and Drug Found in Toxicological Analysis Among 24 Individuals Where the Substance Detected was Considered a Possible Contributor to the Individual's Death, Michigan 2014**

<b>Incident Type</b>	<b>Alcohol (blood level %)</b>	<b>Opiates</b>	<b>Prescription</b>	<b>Marijuana &amp;/or marijuana metabolite</b>	<b>Cocaine, Heroin, metabolites</b>	<b>Unknown Prescription /Non Prescription</b>
Toxic Exposure	0.26					
Fall						Hydrocodone
Motor Vehicle	0.14 (VF*)					
Fall				√		
Motor Vehicle		√	7-Amino Clonazepam			
Fall				√		
Motor Vehicle			Fentanyl	√		Methadone
Machine				√		
Struck-by				√		
Fall				√		
Electrocution					√	
Drowning				√		
Motor Vehicle				√		
Fall				√	√	
Electrocution			Midazolam Laudanosine Fentanyl			
Struck-by			Alprazolam Diazepam			Hydrocodone
Motor Vehicle			Gabapentin Citalopram Bupropion Lamotrigine	√		
Struck-by			Trazadone Oxcarbazepine			
Fall						Oxycodone
Struck-by						Hydrocodone
Fall						Hydrocodone
Machine			Clonazepam			
Struck-by		√				Benzodiazepine
Motor Vehicle						Diphenhydramine

\* VF=Vitreous Fluid

## Work-Related Fatality Incidence Rates

**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 tend to have full-time employees. However, differences will be observed for industries which tend to have 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 5**).

Michigan data shows that in industry sectors with a large number of 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 Service. When the number of hours worked is 40 hours or more, the hours-based incidence rate is similar to the employment-based incidence rate, such as in Construction, Manufacturing, and Wholesale Trade.

### *Industry Highlights, Michigan 2014*

**Table 5** 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 5:*

**Nine** industry sectors had fewer work-related deaths and a lower employment-based incidence rate in 2014 compared to 2013:

Industry	Decrease in Number of Deaths from 2013	Number of 2014 WR Deaths	2014 Incidence Rate	Number of 2013 WR Deaths	2013 Incidence Rate
Construction	2	23	16.3	25	18.9
Manufacturing	2	8	1.4	10	1.8
Transportation & Warehousing	7	19	14.7	26	24.6
Finance & Insurance	4	1	0.6	5	3.3
Professional, Scientific & Technical Services	2	1	0.4	3	1.2
Administrative & Support & Waste Management & Remediation Services	1	8	2.7	9	3.2
Education	1	2	0.5	3	0.8
Health Care & Social Assistance	2	4	0.7	6	1.0
Arts, Entertainment & Recreation	3	3	2.1	6	12.7

**Six** industry sectors had a higher number of work-related deaths and a higher employment-based incidence rate in 2014 compared to 2013:

Industry	Increase in Number of Deaths from 2013	Number of 2014 WR Deaths	2014 Incidence Rate	Number of 2013 WR Deaths	2013 Incidence Rate
Agriculture	12	25	30.5	13	16.0
Wholesale Trade	5	7	4.2	2	1.2
Retail Trade	5	13	2.8	8	1.8
Real Estate & Rental & Leasing	1	3	5.9	2	4.0
Accommodation & Food Services	1	5	1.4	4	1.1
Other Services	8	13	7.6	5	2.9

**One** industry sector had the same number of work-related deaths but a higher employment-based incidence rate in 2014 compared to 2013.

Industry	Number 2014 & 2013 WR Deaths	Incidence Rate 2014	Incidence Rate 2013
Public Administration	6	2.9	2.5

**Two** industry sectors had work-related deaths in 2014 but did not have a death in 2013:

Industry	Number of 2014 WR Deaths	Incidence Rate 2014
Utilities	1	Unknown
Information	1	2.1

The industry sector with the highest employment-based industry rate was Agriculture (30.5 deaths/100,000 workers), followed by Construction (16.3 deaths/100,000 workers) and then Transportation and Warehousing (14.7 deaths/100,000 workers). Within Agriculture, the Forestry and Logging subsector had the highest incidence rate (316.1 deaths/100,000 workers). The industry subsector with the next highest rate was within the Transportation sector; Water Transportation had an incidence rate of 132.8 deaths/100,000 workers.



**Case 128.** Ramp agent died when he was pinned by a 2001 Tug 660 Belt Loader Wide Body conveyor against a plane.

**Table 5. Number of Traumatic Work-Related Fatalities by Industry and Rates by Number of Employees and by Hours Worked, Michigan 2014**

Industry Sector (NAICS Code)	Number	Percent	Employment-Based		Hours-Based	
			Number Employees <sup>a</sup>	Rate <sup>b</sup>	Number Hours <sup>a</sup>	Rate <sup>c</sup>
<b>Agriculture, Forestry, Fishing &amp; Hunting (11)</b>	<b>25</b>	<b>17.5</b>	<b>82,005<sup>dg</sup></b>	<b>30.5</b>	<b>**</b>	<b>**</b>
Crop Production (111) (Owner, Unpaid Worker)	6	4.2	34,538 <sup>f</sup>	17.4	**	**
Animal Production (112) (Owner, Unpaid Worker)	6	4.2	17,656 <sup>f</sup>	34.0	**	**
Crop Production (111) Hired Workers	5	3.5	35,106 <sup>f</sup>	14.2	37.6 <sup>h</sup>	7.6
Animal Production (112) Hired Workers	1	0.7	48,345 <sup>f</sup>	2.1		
Forestry & Logging (113)	5	3.5	1,701 <sup>g</sup>	293.9	**	**
Unknown	2	1.4	**		**	**
<b>Utilities (22)</b>	<b>1</b>	<b>0.7</b>	<b>19,800</b>	<b>5.1</b>	<b>**</b>	<b>**</b>
Utilities (221)	1	0.7	19,800	5.1	**	**
<b>Construction (23)</b>	<b>23</b>	<b>16.1</b>	<b>141,300</b>	<b>16.3</b>	<b>38.9</b>	<b>16.7</b>
Construction of Buildings (236)	4	2.8	31,900	12.5	37.2	13.5
Heavy & Civil Engineering Construction (237)	3	2.1	15,800	19.0	**	**
Specialty Trade Contractors (238)	16	11.2	93,600	17.1	38.8	13.8
<b>Manufacturing (31-33)</b>	<b>8</b>	<b>5.6</b>	<b>575,900</b>	<b>1.4</b>	<b>43.9</b>	<b>1.3</b>
Food (311)	1	0.7	33,000	3.0	**	**
Wood Product (321)	3	2.1	9,466 <sup>g</sup>	31.7	**	**
Plastics & Rubber Products (326)	2	1.4	38,500	5.2	**	**
Fabricated Metal Product (332)	1	0.7	79,700	1.3	42.7	1.2
Transportation Equipment (336)	3	2.1	175,900	1.7	48.5	1.4
<b>Wholesale Trade (42)</b>	<b>7</b>	<b>4.9</b>	<b>168,000</b>	<b>4.2</b>	<b>38.2</b>	<b>4.4</b>
Merchant Wholesalers, Durable Goods (423)	3	2.1	95,000	3.2	39.0	3.2
Merchant Wholesalers, Non-durable Goods (424)	3	2.1	49,000	6.1	**	**
Wholesale Electronic Markets and Agents and Brokers (425)	1	0.7	24,100	4.1	**	**
<b>Retail Trade (44-45)</b>	<b>13</b>	<b>9.1</b>	<b>460,300</b>	<b>2.8</b>	<b>29.7</b>	<b>3.8</b>
Motor Vehicle & Parts Dealers (441)	2	1.4	58,800	3.4	37.8	3.6
Furniture and Home Furnishings Stores (442)	1	0.7	12,550 <sup>g</sup>	8.0	**	**
Building Material and Garden Equipment and Supplies Dealers (444)	1	0.7	42,700	2.3	**	**
Food & Beverage Stores (445)	3	2.1	76,500	3.9	**	**
Health and Personal Care Stores (446)	1	0.7	32,000	3.1	**	**
Gasoline Stations (447)	3	2.1	25,600	11.7	**	**
General Merchandise Stores (452)	1	0.7	111,200	0.9	**	**
Miscellaneous Store Retailers (453)	1	0.7	25,900	3.9	**	**
<b>Transportation &amp; Warehousing (48-49)</b>	<b>19</b>	<b>13.3</b>	<b>129,300</b>	<b>14.7</b>	<b>**</b>	<b>**</b>
Air Transportation (481)	3	2.1	13,000	23.1	**	**
Water Transportation (483)	1	0.7	753 <sup>g</sup>	132.8	**	**
Truck Transportation (484)	12	8.4	43,300	27.7	**	**
Transit & Ground Passenger Transportation (485)	1	0.7	7,596 <sup>g</sup>	13.2	**	**
Support Activities for Transportation (488)	1	0.7	13,744 <sup>g</sup>	7.3	**	**
Warehousing & Storage (493)	1	0.7	15,300	6.5	**	**

**Table 5. Number of Traumatic Work-Related Fatalities by Industry and Rates by Number of Employees and by Hours Worked, Michigan 2014, cont.**

Industry Sector (NAICS Code)	Number	Percent	Employment-Based		Hours-Based	
			Number Employees <sup>a</sup>	Rate <sup>b</sup>	Number Hours <sup>a</sup>	Rate <sup>c</sup>
<b>Information (51)</b>	<b>1</b>	<b>0.7</b>	<b>57,000</b>	<b>1.8</b>	<b>34.2</b>	<b>2.1</b>
Other Information Services (519)	1	0.7	4,235 <sup>g</sup>	23.6	**	
<b>Finance &amp; Insurance (52)</b>	<b>1</b>	<b>0.7</b>	<b>154,000</b>	<b>0.6</b>	<b>35.8</b>	<b>0.7</b>
Credit Intermediation & Related Activities (522)	1	0.7	72,600	1.4	**	**
<b>Real Estate &amp; Rental &amp; Leasing (53)</b>	<b>3</b>	<b>2.1</b>	<b>50,800</b>	<b>5.9</b>	<b>**</b>	<b>**</b>
Real Estate (531)	3	2.1	37,000	8.1	**	**
<b>Professional, Scientific, &amp; Technical Services (54)</b>	<b>1</b>	<b>0.7</b>	<b>267,700</b>	<b>0.4</b>	<b>37.4</b>	<b>0.4</b>
Professional, Scientific, & Technical Services (541)	1	0.7	76,600	1.3	**	**
<b>Administrative &amp; Support &amp; Waste Management &amp; Remediation Services (56)</b>	<b>8</b>	<b>5.6</b>	<b>293,000</b>	<b>2.7</b>	<b>**</b>	<b>**</b>
Administrative & Support Services (561)	6	4.2	279,023 <sup>g</sup>	2.2	**	**
Waste Management & Remediation Services (562)	2	2.8	12,107 <sup>g</sup>	16.5	**	**
<b>Education (61)</b>	<b>2</b>	<b>1.4</b>	<b>383,600</b>	<b>0.5</b>	<b>**</b>	<b>**</b>
Education (611)	2	1.4	383,600	0.5	**	**
<b>Health Care &amp; Social Assistance (62)</b>	<b>4</b>	<b>2.8</b>	<b>601,200</b>	<b>0.7</b>	<b>31.7</b>	<b>0.8</b>
Hospitals (622)	2	1.4	229,100	0.9	35.9	1.0
Nursing and Residential Care Facilities (623)	1	0.7	104,700	1.0	**	**
Social Assistance (624)	1	0.7	70,800	1.4	**	**
<b>Arts, Entertainment, &amp; Recreation (71)</b>	<b>3</b>	<b>2.1</b>	<b>48,300</b>	<b>6.2</b>	<b>24.6</b>	<b>10.1</b>
Performing Arts, Spectator Sports, & Related Industries (711)	1	0.7	9,100	11.0	**	**
Amusement, Gambling & Recreation Industries (713)	2	1.4	35,200	5.7	24.2	9.4
<b>Accommodation &amp; Food Services (72)</b>	<b>5</b>	<b>3.5</b>	<b>357,000</b>	<b>1.4</b>	<b>22.9</b>	<b>2.4</b>
Accommodation (721)	1	0.7	40,600	2.5	**	**
Food Services & Drinking Places (722)	4	2.8	316,400	1.3	**	**
<b>Other Services (except Public Administration) (81)</b>	<b>13</b>	<b>9.1</b>	<b>171,000</b>	<b>7.6</b>	<b>**</b>	<b>**</b>
Repair & Maintenance (811)	6	4.2	39,000	15.4	**	**
Religious, Grantmaking, Civic, Professional & Similar Organizations (813)	6	4.2	93,400	6.4	**	**
Private Households (814)	1	0.7	10,455 <sup>g</sup>	9.6	**	**
<b>Public Administration (92)</b>	<b>6</b>	<b>4.2</b>	<b>235,000</b>	<b>2.6</b>	<b>**</b>	<b>**</b>
Justice, Public Order, & Safety Activities (922)	1	0.7	**	**	**	**
Administration of Human Resource Programs (923)	3	2.1	**	**	**	**
Administration of Economic Programs (926)	1	0.7	**	**	**	**
National Security and International Affairs (928)	1	0.7	**	**	**	**
<b>Totals</b>	<b>143</b>		<b>4,406,000<sup>e</sup></b>	<b>3.2</b>		

<sup>a</sup> Source: Michigan Department of Technology, Management and Budget, Office of Labor Market Information, Industry Employment (Establishments-CES) (IES), Michigan, Year: 2014. November 13, 2014. [www.milmi.org/cgi/dataAnalysis/](http://www.milmi.org/cgi/dataAnalysis/)

<sup>b</sup> Incidence rates calculated per 100,000 workers.

<sup>c</sup> Rate represents the number of fatal occupational injuries per 100,000 full time equivalent workers and was calculated as: (N/EH) x 200,000,000 where N= Number of fatal injuries; EH = total hours worked by employees

in the industry sector during the calendar year (number of hours x 50 weeks per year); 200,000,000 = base for 100,000 equivalent full-time workers (working 40 hours per week, 50 weeks per year)

<sup>d</sup> Source: USDA, National Agricultural Statistics Service. 2012 Census of Agriculture, AC-12-A-22, Released May 2014. Accessed March 8, 2015, Table 23, Summary by Farm Typology Measured by Gross Cash Farm Income, Primary Occupation of Small Family Farm Operators, and Non-Family Farms - Michigan: 2012 Pg 315 [http://www.agcensus.usda.gov/Publications/2012/Online\\_Resources/Typology/typology13\\_mi.pdf](http://www.agcensus.usda.gov/Publications/2012/Online_Resources/Typology/typology13_mi.pdf)

<sup>e</sup> Source: Employment status of the civilian noninstitutional population by sex, race, Hispanic or Latino ethnicity, and detailed age, 2014 annual averages – Michigan. Bureau of Labor Statistics, Local Area Unemployment Statistics <http://www.bls.gov/lau/table14full14.pdf> Accessed November 13, 2014.

<sup>f</sup> Source: USDA, National Agricultural Statistics Service. 2012 Census of Agriculture, AC-12-A-22, Released May 2014. Accessed March 8, 2015, Table 51. Selected Characteristics of Farms by North American Industry Classification System: 2012 [http://www.agcensus.usda.gov/Publications/2012/Full\\_Report/Volume\\_1,\\_Chapter\\_1\\_State\\_Level/Michigan/st26\\_1\\_051\\_052.pdf](http://www.agcensus.usda.gov/Publications/2012/Full_Report/Volume_1,_Chapter_1_State_Level/Michigan/st26_1_051_052.pdf)

<sup>g</sup> Source: Michigan Department of Technology, Management and Budget, Office of Labor Market Information, Industry Census of Employment and Wages (QCEW-ES202), Michigan. Year: 2014. April 27, 2016. [www.milmi.org/cgi/dataAnalysis/](http://www.milmi.org/cgi/dataAnalysis/)

<sup>h</sup> Source: [USDA Farm Labor Report, Released November 19, 2015 by the National Agricultural Statistics Service \(NASS\), Agricultural Statistics Board, United States Department of Agriculture \(USDA\)](#), Average Number of Workers, Lake Region. Accessed May 25, 2016.

<sup>i</sup> Rate represents the number of fatal occupational injuries per 100,000 full time equivalent workers and was calculated as:  $(N+N/EH) \times 200,000,000$  where N= Number of fatal injuries for hired workers; EH = total hours worked by employees in the industry sector during the calendar year (number of hours x 50 weeks per year); 200,000,000 = base for 100,000 equivalent full-time workers (working 40 hours per week, 50 weeks per year)

\*\* No Data provided on DTMB CES report.

**Table 6** compares the employment-based and hours-based work-related fatality incidence rates by industry in Michigan to National hours-based rates for 2014 as computed by 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.

Employment-based fatality rates were calculated using estimates of employed civilian workers (aged 16 and older) from the Current Population Survey (CPS) supplemented with counts for resident armed forces provided by the Department of Defense (DOD). **The overall employment-based fatality rate per 100,000 workers in Michigan for 2014 (3.2/100,000 workers) was lower than the United States hours-based fatality incidence rate (3.4/100,000 workers).** BLS cautions that hours-based fatal injury rates should not be directly compared to employment-based rates because of the differences in the numerators and denominators used.



**Case 11.** Bartender overcome by carbon dioxide in the building basement due to a faulty beverage carbon dioxide pump.



**Table 6. Traumatic Work-Related Fatalities by Industry Sector, Michigan Incidence Rates Compared to US Incidence Rates, 2014**

Industry Sector <sup>a</sup> (NAICS Code)	Number of Fatalities	2014 MI Employment- based Rate <sup>b</sup>	2014 MI Hours-Based Rate <sup>a</sup>	2014 US Hours-Based Rate <sup>c</sup>
Agriculture, Forestry, Fishing and Hunting (11)	25	30.5	**	25.6
Utilities (22)	1	5.1	**	1.7
Construction (23)	23	16.3	16.7	9.8
Manufacturing (31-33)	8	1.4	1.3	2.3
Wholesale Trade (42)	7	4.2	4.4	5.1
Retail Trade (44-45)	13	2.8	3.8	1.9
Transportation & Warehousing (48-49)	19	14.7	**	14.1
Information (51)	1	1.8	2.1	1.2
Financial Activities (52)	1	0.6	0.7	1.2
Real Estate and Rental and Leasing (53)	3	5.9	**	**
Professional & Business Services (54, 56)	9	1.5 <sup>d</sup>	1.6 <sup>e</sup> 2.	2.7
Educational & Health Services (61, 62)	6	0.6 <sup>d</sup>	**	0.7
Leisure & Hospitality (71, 72)	8	2.0 <sup>d</sup>	3.4 <sup>e</sup>	2.0
Other Services (except Public Administration) (81)	13	7.6	**	2.7
Public Administration (92)	6	2.6	**	1.9
<b>Total</b>	<b>143</b>	<b>3.2</b>	<b>**</b>	<b>3.4</b>

<sup>a</sup> Sources: USDA, National Agricultural Statistics Service. 2012 Census of Agriculture, AC-12-A-22, Released May 2014.

Table 23, Summary by Farm Typology Measured by Gross Cash Farm Income, Primary Occupation of Small Family Farm Operators, and Non-Family Farms - Michigan: 2012 Pg 315  
[http://www.agcensus.usda.gov/Publications/2012/Online\\_Resources/Typology/typology13\\_mi.pdf](http://www.agcensus.usda.gov/Publications/2012/Online_Resources/Typology/typology13_mi.pdf) Accessed March 8, 2015,  
 Michigan Department of Technology, Management and Budget (DTMB), Office of Labor Market Information, Industry Employment (Establishments-CES) (IES), Michigan, Year: 2012. Accessed November 25, 2014. [www.milmi.org/cgi/dataAnalysis/](http://www.milmi.org/cgi/dataAnalysis/).

<sup>b</sup> Incidence rates calculated per 100,000 full-time equivalent (FTE) workers.

<sup>c</sup> Bureau of Labor Statistics News, United States Department of Labor, USDL 10-1142, Release Date: Revised Data April 2016. Accessed May 13, 2016. <http://www.bls.gov/iif/home.htm>

<sup>d</sup> Employment-based rate calculated as (N+N)/(E+E) x 100,000 FTE workers (from Table 9): N=Number fatalities (NAICS+NAICS), E=Number Employees (NAICS+NAICS).

<sup>e</sup> Hours-based rate calculated as (N+N)/(E+E) x (IES # hours) x 50 x 200,000,000

\*\* No data reported on DTMB CES report.

Of the eight Michigan industry groupings with a calculated hours-based incidence rate, four had higher hours-based incidence rates compared to the US hours-based incidence rate for that industry group: Construction (16.7 compared to 9.8, nearly 70% higher), Retail Trade (3.8 compared to 1.9, 100% higher), Information (2.1 compared to 1.2, 75% higher), and Leisure and Hospitality (3.4 compared to 2.0, 70% higher).

## ***Agriculture***

The employment-based incidence rate for Agriculture was based on the number of operators identified in the 2012 Agricultural Census of Michigan Agriculture. Seventeen of the 25 known work-related deaths in Agriculture in 2014 were identified as the farm operator, seven were known to be laborers (6 paid, 1 unpaid), and it was unknown if one individual who worked for a dairy operation was an operator, hired farm labor or an unpaid worker (new item now tracked on the 2012 USDA Agricultural Census). 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 include agricultural workers not on the payroll who performed activities or work on a farm or ranch.

The 2012 Agricultural Census reported 83,451 individuals as hired farm workers (excluding operators identified as a hired manager). The Census divides hired farm workers into two categories based on the duration of work in a calendar year: working 150 days or more (25,710 workers) or less than 150 days (57,741 workers). MIFACE was able to determine that four of the six hired farm workers who died worked more than 150 days in a calendar year. The work-related fatality incidence rate for hired farm workers was 15.1 deaths/100,000 workers.

The number of migrant workers was not noted on the 2012 Agricultural Census, only the number of farms utilizing migrant labor. The Michigan Migrant and Seasonal Farmworker Enumeration Profiles Study (Update June 2013) estimated 49,135 migrant and seasonal farm laborers in 2014. 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.” 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 farmworkers 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).

[https://www.michigan.gov/documents/dhs/FarmworkerReport\\_430130\\_7.pdf](https://www.michigan.gov/documents/dhs/FarmworkerReport_430130_7.pdf). Thirteen thousand six hundred-twenty farm operators indicated they hired labor and 3,906 farm operators indicated they hired contract labor (Table 64, 2012 Agricultural Census, Michigan).

Eighteen of the 25 individuals who died in Agriculture were the farm owner and one individual was an unpaid worker. The work-related fatality incidence rate for these 19 individuals was 14.0 deaths/100,000 workers (utilizing agricultural operators (80,304), unpaid workers (53,797) and fallers, logging equipment operators, log graders and scalers and all other logging workers (1,701 individuals) in the denominator.

If the total number of Agricultural operators (80,304), hired farm labor (83,451), unpaid workers (53,797) identified in the 2012 Agriculture Census, migrant and seasonal farm laborers (49,135), and fallers, logging equipment operators, log graders and scalers and all



Case 6. Dairy farm worker was mauled by either a 2-year-old bull or a dairy cow.

other logging workers (1,701 individuals) are utilized in the denominator, the number of workers in Agriculture was 268,388. The increase in the number of workers in Agriculture, Fishing, Forestry and Hunting would dramatically lower the NAICS 11 Agriculture, Forestry, Hunting and Fishing work-related fatality incidence rate from 30.5/100,000 to 9.3 deaths/100,000 workers. With the use of either denominator there is a doubling of the rate of agricultural deaths from 2013 to 2014; 16.0 to 30.5 or 4.9 to 9.3 deaths/100,000 workers.

There are a number of issues associated with utilizing hired labor, unpaid workers, and migrant/seasonal laborers in the Agriculture denominator. In Michigan, only 33.6% of agricultural production operations had hired labor and/or migrant/seasonal workers. Seven hundred sixty-eight farms indicated that their hired or contract workers were migrant workers in 2012. Ninety-four farms reported on the 2012 Agricultural Census that they did not have hired farm workers but they did have migrant contract workers on their operation.

The transient nature of crop production complicates the picture of Agricultural employment. More farm operators hire workers in the summer than during the winter. A single farm may produce a number of crops utilizing hired labor to harvest. Workers may come and go (leave the state) to harvest other crops. Of the 83,451 hired farm workers, a significant number (57,741, 69.2%) work less than 150 days (approximately 5 months) and it is unknown if they are working in Michigan for 5 days or 149 days. The same is true for hired hands working 150 days or more – did they work 150 days or 359 days?



[Case 117](#). Farmer/mechanic crushed when he was trapped between a trailer and a New Holland chopper tractor while assisting in freeing a stuck Case tractor and trailer filled with chopped corn.

## Means of Work-Related Death

**Table 7** shows the means of death by industry sector. Additional information regarding each means of death follows the summary information.

The means of death was known for all of the 143 work-related deaths in Michigan in 2014. Motor vehicles and struck-by incidents were the leading causes of a work-related death (28 each, 19.6%) in Michigan in 2014.

Motor vehicles were the leading cause of death in Transportation & Warehousing (8 of 19 deaths, 42.1%), Public Administration (4 of 6 deaths, 66.7%), and Wholesale Trade (3 of 7

deaths, 42.9%). The Finance & Insurance and Professional, Scientific & Technical Services deaths (1 each) were caused by a motor vehicle crash.

Struck-by incidents were the primary cause of a work-related death in Agriculture (11 of 25, 44.0%) and Administrative & Support & Waste Management & Remediation Services (3 of 8, 37.5%). Struck-by incidents were one of the leading causes of death in Construction (5 of 23, 21.7%) and Transportation & Warehousing (3 of 19, 15.8%).

A fall was the second leading cause of death (24, 16.8%) in Michigan in 2014 followed by homicides (19, 13.3%), and then machines (11, 7.7%), and then suicides (9, 6.3%).

Falls were the leading cause of a work-related death in Construction accounting for 9 of the 23 deaths (39.1%). Work-related homicides were the leading cause of death in Retail Trade (8 of 13, 61.5%).



[Case 41](#). Tree service owner thrown from the bucket of a cherry picker.

**Table 7. Traumatic Work-Related Fatalities by Means of Death and Industry Sector, Michigan 2014**

<b>Industry Sector (NAICS Code)</b>	<b>Aircraft (3.5%)</b>	<b>Animal (2.1%)</b>	<b>Asphyxiation (2.1%)</b>	<b>Drowning (2.1%)</b>	<b>Drug Overdose (2.8%)</b>	<b>Electrocution (3.5%)</b>	<b>Fall (16.8%)</b>	<b>Fire/Explosion (0.7%)</b>	<b>Homicide (13.3%)</b>	<b>Machine (7.7%)</b>	<b>Motor Vehicle (19.6%)</b>	<b>Struck-by (19.6%)</b>	<b>Suicide (6.3%)</b>	<b>Total</b>
<b>Agriculture, Forestry, Fishing &amp; Hunting (11)</b>	--	2	--	1	--	--	--	--	2	4	2	11	3	<b>25</b>
<b>Utilities (22)</b>	--	--	--	--	--	1	--	--	--	--	--	--	--	<b>1</b>
<b>Construction (23)</b>	--	1	--	--	--	1	9	--	--	2	3	5	2	<b>23</b>
<b>Manufacturing (31-33)</b>	1	--	--	--	--	--	1	--	--	4	--	1	1	<b>8</b>
<b>Wholesale Trade (42)</b>	--	--	--	--	--	--	2	--	1	--	3	1	--	<b>7</b>
<b>Retail Trade (44-45)</b>	--	--	--	--	--	--	2	--	8	--	1	1	1	<b>13</b>
<b>Transportation &amp; Warehousing (48-49)</b>	3	--	--	--	1	1	1	--	1	--	8	3	1	<b>19</b>
<b>Information (51)</b>	--	--	--	--	--	--	1	--	--	--	--	--	--	<b>1</b>
<b>Finance &amp; Insurance (52)</b>	--	--	--	--	--	--	--	--	--	--	1	--	--	<b>1</b>
<b>Real Estate &amp; Rental &amp; Leasing (53)</b>	--	--	--	--	--	1	--	--	2	--	--	--	--	<b>3</b>
<b>Professional, Scientific, &amp; Technical Services (54)</b>	--	--	--	--	--	--	--	--	--	--	1	--	--	<b>1</b>
<b>Administrative &amp; Support &amp; Waste Management &amp; Remediation Services (56)</b>	1	--	--	--	--	--	2	--	1	--	1	3	--	<b>8</b>
<b>Education (61)</b>	--	--	--	--	--	--	--	--	1	--	1	--	--	<b>2</b>
<b>Health Care &amp; Social Assistance (62)</b>	--	--	1	--	1	--	--	--	2	--	--	--	--	<b>4</b>
<b>Arts, Entertainment, &amp; Recreation (71)</b>	--	--	--	1	--	--	--	--	--	--	--	2	--	<b>3</b>
<b>Accommodation &amp; Food Services (72)</b>	--	--	--	--	1	1	2	--	--	--	1	--	--	<b>5</b>
<b>Other Services (ex. Public Administration) (81)</b>	--	--	2	--	1	--	4	1	1	1	2	1	--	<b>13</b>
<b>Public Administration (92)</b>	--	--	--	1	--	--	--	--	--	--	4	--	1	<b>6</b>
<b>Totals</b>	<b>5</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>24</b>	<b>1</b>	<b>19</b>	<b>11</b>	<b>28</b>	<b>28</b>	<b>9</b>	<b>143</b>



## Means of Death by Cause

### *Aircraft*

Five individuals died as a result of a plane crash. Two individuals died in one crash; the pilot was the owner of the single engine aircraft and was transporting the owner of a business. Two incidents occurred with a twin engine aircraft. One incident occurred when the lightweight aircraft experienced an in-flight breakup. The single and twin engine aircraft crashes occurred during the landing attempt.

### *Animal*

Three individuals died from injuries caused by an animal. One individual, a dairy farm laborer, died when she was mauled either by a bull or dairy cow. One horse trainer died when a horse he was training broke free. The third individual was the owner of a demolition firm who died from complications of a bee sting.

### *Asphyxiation*

Three individuals died as a result of asphyxiation. One individual choked to death on a piece of food. Two individuals died from oxygen deprivation; one while repairing a car in a pit in a building, which had a strong odor of gasoline, and the other while in a basement where a faulty beverage carbon dioxide pump was located.

### *Drowning*

Three individuals died from drowning. Two individuals died in the Great Lakes (Superior and Huron); one individual was a male ship hand who fell overboard and one individual was a hunting club employee whose overweight boat filled with water. A farmer died when his zero turn lawnmower overturned into a drainage ditch and he was pinned underneath the mower.

### *Drug Overdose*

Four individuals, all males, died due to a drug overdose. Two were in their 20s, one in his 40s, and one in his 70s; a restaurant cook/dishwasher, a hospital risk manager, a furniture mover and a volunteer for a voter registration organization. Drugs included fentanyl, heroin, cocaine and prescription drugs.



[Case 12](#). Farmer drowned when his zero-turn Bad Boy lawnmower overturned into a drainage ditch and pinned him underwater.

## ***Electrocution***

Five individuals died as a result of coming into contact with electrical current. Three incidents involved overhead power lines: an overhead lineman contacted an energized 13,280-volt electrical line with his hand while in an aerial bucket; a roll-off truck driver was raising the dump box when the dump bed/box contacted an energized 7,600-volt overhead line, and a landlord contacted a downed power line of unknown voltage in the backyard of his rental property. In a fourth incident, a handyman was connecting a power line from an electrical pole to a home when he contacted a wire of unknown voltage-it is unknown if this line was an overhead line. One individual was servicing an energized frozen custard machine when he contacted an unknown energized part of the equipment.

## ***Fall***

Falls accounted for 24 of the work-related fatalities. The height of the fall was known for 20 (83.3%) of the 24 incidents. The heights ranged from ground level to 60 feet. There were 8 (40.0%) fatal falls of 10-feet or less (3 falls were ground level falls), 7 (35.0%) individuals fell 11-20 feet, 3 (15.0%) individuals fell 21-40 feet, and 2 (10.0%) individuals fell 41-60 feet.

The reason for the fall was identified in 18 (75.0%) of the 24 incidents. The individual slipped/tripped/lost balance in 12 (66.7%) incidents and the structure gave way in 4 (22.2%) incidents. In one incident, the individual was struck-by a piece of metal causing his fall from a scaffold. One individual was in the bucket of a cherry picker when the boom knuckle caught on a tree, and when the boom freed, it swayed back and forth, throwing the decedent from the bucket.

The location of the fall was identified for 22 (91.7%) of the 24 fall-related deaths; from a ladder in 7 (31.8%) incidents, from a roof/roof edge in 6 (27.3%) incidents, while standing on the ground in 3 (13.6%) incidents, and from a vehicle/machine/equipment in 3 (13.6%) incidents. One individual fell from piled/stacked materials, one individual fell from a walkway/catwalk and one individual fell from access steps to a railcar.

The condition of the working surface was known in 15 (62.5%) of the 24 cases. The working surface was dry in 8 (53.3%) incidents and frost/ice/snow-covered in 7 (46.7%) incidents. In one incident where the work surface was dry, another factor was contributory: the knuckle of the boom lift became caught on a tree.



[Case 46](#). A male HVAC repairman in his 50s died when he fell an estimated 10-12 feet from a ladder.

The worksites of the fatal falls were known for all 24 falls. Seven (29.2%) falls occurred at a residential construction site. Three (12.5%) falls occurred at a commercial construction site, and two (8.3%) falls each occurred in a manufacturing facility, store, and parking lot. One (4.2%) fall each occurred in the following locations: auto dealer services department, hotel, restaurant, barn roof, public library, repair shop, grain mill, and a tree.

### ***Fire/Explosion***

An owner of an auto repair shop heated by a propane heater, died from burns sustained from an explosion when a worn web-type strap he was using to raise a fuel tank from a vehicle broke, causing the tank to fall to the ground, spilling gasoline.

### ***Homicide***

MIFACE identified 19 work-related homicides. Twelve (63.2%) men were victims of a homicide and 7 (36.8%) victims were women.

Eleven (57.9%) work-related homicide victims were Caucasian (6 men, 54.5% and 5 women, 45.5%). Seven (36.8%) individuals were African American (5 men, 71.4% and 2 women, 28.6%). One male individual was identified on his death certificate as Arab.

Fifteen of the 19 (78.9%) homicides occurred among individuals born in the United States. The country of origin for four homicides was Iraq (2 homicides), Ghana and Guatemala.

Work-related homicides occurred primarily in Wayne County (11 of 19, 57.9%). Macomb County and Ingham County each had 2 (10.5%) homicides. The following Counties each had 1 (5.3%) homicide: Calhoun, Genesee, Kent and Oakland. The decedent was working alone in 11 (61.1%) homicides and with coworkers in 7 (38.9%) homicides. One incident involved two individuals. For one homicide, it is unknown if coworkers were present when the homicide occurred.

The average age of a homicide victim was 41.9 years. Ages ranged from 20 years of age to 72 years of age.

Monday and Thursday were the days most homicides occurred (4 each, 23.5%), followed by Tuesday and Friday (3 each, 17.6%) and then Sunday, Wednesday and Saturday (1 each, 5.9%). Thursday had one homicide and the day of two homicides is unknown.

The time of the incident was known/estimated for 16 (84.2%) of the 19 homicide cases. When the time of incident could be determined/estimated, four homicides occurred between 8 a.m. and 11:59 a.m., 3 each occurred between 4 p.m. and 7:59 p.m. and 8 p.m. and midnight and 2 each between midnight and 3:59 a.m., 4 a.m. and 7:59 a.m. and noon and 3:59 p.m.



A gun was the cause of death in 14 (77.8%) incidents. Two individuals were struck-by another person, one individual was hit by a vehicle eluding police, and one individual was stabbed. The cause of one individual's homicide was unknown.

### ***Machine***

There were 11 non-vehicular machine-related fatalities.

Four (36.4%) individuals were crushed by the machine. In Agriculture, one individual was crushed by a combine head. In Manufacturing, injection mold machines were involved in 2 cases, and a steel machine guard was involved in one case.

Three (27.3%) individuals were run over by the machine; (tractor and bulldozer in Agriculture, one individual was run over by a road grader in Construction).

Two (18.2%) individuals were entangled; one had his clothing become entangled in a food conveyor's gear drive (Manufacturing) and one individual's clothing wrapped around the lathe's bar stock (Other Services).



[Case 72](#). County road commission foreman in his 40s died when he was run over by a Cat Model 140M2 road grader.

One individual in Agriculture fell from an ORV while driving to a field and one individual in Construction died when the crane cab was dislodged by the crane's counterweights.

### ***Motor Vehicle***

There were 28 motor vehicle related fatalities in 25 collisions. Three crashes had multiple fatalities; in one crash, two passengers were killed and in two collisions, both the driver and the passenger died.

Crash data for one motor vehicle crashed could not be obtained; the incident occurred in 1979. Although crash data could not be obtained, we were able to identify that the decedent was the driver.

In total, there were 21 drivers, 5 passengers and two pedestrians killed by a motor vehicle in 2014.

For each of the motor-vehicle related deaths, MIFACE reviewed the responding police/sheriff department crash and/or written report(s) to gather and summarize the data.

## Motor Vehicle Crash Terminology

A “**unit**” is identified as a motor vehicle, bicycle, pedestrian or train involved in the crash and individually reported; therefore, a car-animal crash or a car-tree crash is categorized as a single-unit crash.

The **crash type** is based on the intended direction of travel, regardless of points of impact or the direction the vehicles ultimately face after the crash.

- ◆ **Single motor vehicle:** cases in which a motor vehicle was (a) the only traffic unit and (b) the only motor vehicle involved collided with a bicyclist, pedestrian, animal, railroad train or any other non-motorized unit.
- ◆ **Head On:** direction of travel of both vehicles must be toward each other.
- ◆ **Angle:** direction of travel is basically perpendicular for both drivers and there is a side impact of approximately 90 degrees.
- ◆ **Rear End-Left Turn:** intention of one driver was to make a left turn and driver struck by a following vehicle not necessarily in the same lane.
- ◆ **Sideswipe - Same:** vehicles traveling in same direction and made side contact.
- ◆ **Other:** crash does not fit in one of the categories.

### *Highlights of Motor Vehicle Incidents*

#### **Driver/Passenger/Pedestrian**

- ◆ Drivers: 21 (75.0%) individuals
- ◆ Passengers: 5 (17.9%) individuals
- ◆ Pedestrians: 2 (7.1%) individuals

#### **Number of Units (24 incidents)**

- ◆ 1 unit: 7 (29.2%) incidents
- ◆ 2 units: 13 (54.2%) incidents
- ◆ 3 units: 3 (12.5%) incidents
- ◆ 4 units: 1 (4.2%) incident

#### **Crash Type (24 incidents)**

- ◆ Single motor vehicle: 7 (29.2%) incidents
- ◆ Head On: 4 (16.7%) incidents
- ◆ Angle: 5 (20.8%) incidents (1 driver and her passenger)
- ◆ Rear End-Left Turn: 1 (4.2%) incident (1 driver and his passenger)
- ◆ Sideswipe-Same: 1 (4.2%) incident
- ◆ Other: 4 (16.7%) incidents
- ◆ Train: 2 (8.3%) incidents (1 driver and his passenger)

#### **Number of Roadway Lanes (24 incidents)**

- ◆ 2 lanes: 14 (58.3%) incidents
- ◆ 3 lanes: 5 (20.8%) incidents
- ◆ 4 lanes: 2 (8.3%) incidents
- ◆ 5 lanes: 1 (4.2%) incident
- ◆ 6 lanes: 1 (4.2%) incident
- ◆ Road on personal property: 1 (4.2%) incident

#### **Amount of Light (24 incidents)**

- ◆ Daylight: 17 (70.8%) incidents
- ◆ Dawn/Dusk: 1 (4.2%) incident
- ◆ Dark – Lighted: 1 (4.2%) incident
- ◆ Dark – Unlit: 5 (20.8%) incidents

#### **Speed Limit (24 incidents)**

- ◆ 25 mph: 2 (8.3%) incidents
- ◆ 30 mph: 1 (4.2%) incident
- ◆ 45 mph: 1 (4.2%) incident
- ◆ 55 mph: 11 (45.8%) incidents
- ◆ 60 mph: 2 (8.3%) incidents
- ◆ 70 mph: 6 (25.0%) incidents
- ◆ Private Property Roadway: 1 (4.2%) incident

**Weather (24 incidents)**

- ◆ Clear: 12 (50.0%) incidents
- ◆ Cloudy: 8 (33.3%) incidents
- ◆ Rain: 1 (4.2%) incident
- ◆ Snow/Blowing Snow: 2 (8.3%) incidents
- ◆ Severe Wind: 1 (4.2%) incident

**Surface Conditions (24 incidents)**

- ◆ Dry: 17 (70.8%) incidents
- ◆ Wet: 3 (12.5%) incidents
- ◆ Icy: 3 (12.5%) incidents
- ◆ Snowy: 1 (4.2%) incident

**Type of Trafficway (24 incidents)**

- ◆ Not physically divided (2-way traffic): 14 (58.3%) incidents
- ◆ Divided highway, median strip, without traffic barrier: 2 (8.3%) incidents
- ◆ Divided highway, median strip, with traffic barrier: 7 (29.2%) incidents
- ◆ Private Roadway: 1 (4.2%) incident

**Type of Vehicle (25 incidents)**

- ◆ Passenger car: 5 (25.0%) incidents
- ◆ Truck/Bus: 11 (44.0%) incidents
- ◆ Pickup Truck: 5 (25.0%) incidents
- ◆ Van: 1 (4.0%) incident
- ◆ Small truck (<10,000#): 1 (4.0%) incident
- ◆ Cut-V Army vehicle: 1 (4.0%) incident
- ◆ Parade Float: 1 (4.0%) incident

**Hazardous Action, Driver is Decedent (15 of 21 known)**

- ◆ None: 3 (20.0%) incidents
- ◆ Speed Too Fast: 3 (20.0%) incidents
- ◆ Failed to Yield: 2 (13.3%) incidents
- ◆ Drove left of center: 1 (6.7%) incident
- ◆ Improper lane use: 1 (6.7%) incident
- ◆ Unable To Stop: 2 (13.3%) incidents
- ◆ Other: 3 (20.0%) incidents

**Hazardous Action of Driver, Passenger is Decedent (4 of 5 known)**

- ◆ None: 4 (100.0%) incidents

**Hazardous Action of Driver, Pedestrian is Decedent (2 incidents)**

- ◆ Failed to Yield: 1 (50.0%) incident
- ◆ Other: 1 (50.0%) incident

**Seat Belt Use** was known for 15 individuals. Restraint use was not available for 2 individuals (specialty vehicle), not applicable for 2 pedestrians, and restraint available, but use unknown for 9 incidents

- ◆ Seat Belt Used: 9 (60.0%) incidents
- ◆ Seat Belt Not Used: 6 (40.0%) incidents

**Roadway Area Where Fatal Incident Occurred (24 incidents)**

- ◆ Freeway: 9 (37.5%) incidents
  - ◇ All other freeway areas: 9 (100.0%) incidents
- ◆ Non-Freeway Intersection: 5 (20.8%) incidents
  - ◇ Within Intersection: 3 (60.0%) incidents
  - ◇ Driveway (w/in 150 ft. of nearest intersection): 1 (20.0%) incident
  - ◇ Intersection-Other: 1 (20.0%) incident
- ◆ Other Non-Freeway Areas: 10 (41.7%) incidents
  - ◇ Straight Roadway: 6 (60.0%) incidents
  - ◇ Curved Roadway: 1 (10.0%) incidents
  - ◇ Railroad grade crossing: 3 (30.0%) incidents

### Most Harmful Event (24 incidents)

- ◆ Non-collision: 4 (16.7%) incidents
  - ◇ Overturn: 1 (25.0%) incident
  - ◇ Loss of Control: 1 (25.0%) incident
  - ◇ Fire/Explosion: 1 (25.0%) incident
  - ◇ Ran Off Roadway-Left: 1 (25.0%) incident
- ◆ Collision with non-fixed object: 15 (62.5%) incidents
  - ◇ Pedestrians: 2 (13.3%) incidents
  - ◇ Motor vehicle in transport: 8 (53.3%) incidents
  - ◇ Parked motor vehicle: 2 (13.3%) incidents
  - ◇ Engineer (railroad/train): 3 (20.0%) incidents
- ◆ Collision with Fixed object: 5 (20.8%) incidents
  - ◇ Tree: 2 (40.0%) incidents
  - ◇ Building: 1 (20.0%) incident
  - ◇ Bridge/pier/abutment: 1 (20.0%) incident
  - ◇ Other Fixed Object: 1 (20.0%) incident

### Motor Vehicle Crash Terminology

**Sequence of Events** records step-by-step regarding what happened during the crash. Up to four Sequence of Events may be recorded.

The event that was considered **most harmful** to the human being is identified by the responding police officer. The event that is most harmful is categorized within headings identified as:

- ◆ Non-Collision
- ◆ Collision with Non-Fixed Objects
- ◆ Collision with Fixed Objects

### Struck-by

Twenty-eight individuals were fatally injured when struck-by an object. Ten (35.7%) incidents involved a motor vehicle; four involved semi-trucks (semi-trailer shifted pinning decedent against another trailer, a semi fell from a jack during tire changing, decedent run over in staging/parking lot, and decedent run over by pup trailer of gravel train in an agricultural field), two incidents involved pickup trucks (decedent struck-by pickup truck in work zone, decedent struck-by pickup truck hitch which broke away from the truck while pulling out a stuck tractor), 2 incidents involved a car (car entered work zone striking decedent and backing car entering food distribution area struck worker), one incident involved an individual working on a dump truck and the raised dump box fell onto him, and one incident involved a motorcycle crash during a competition. Seven (25.0%) incidents involved a tree and/or a tree branch striking the decedent. Two (7.1%) struck-by incidents were initiated by horses - in one incident, bolting horses ripped off a block and tackle off its track and the unit struck the decedent; and in one incident, spooked horses attached to a wagon ran and struck the legs of a free-standing grain bin



[Case 123](#). Production control laborer struck-by the manifold of a prototype aluminum fuel distribution system that exploded.



which fell striking the decedent as he chased the horses. One (3.6%) individual each died as a result of being struck-by a: trench wall cave-in, a 12-foot-long metal wall stud, a garage wall collapse, a spring-loaded tool, steel rods being moved by an overhead crane, a combine head, a pressurized prototype aluminum fuel distribution system, a tire/rim when the tire exploded and an airplane tug's conveyor.

### ***Suicide***

Nine individuals died from a fatal self-inflicted injury at work. Five individuals died from asphyxiation due to a self-inflicted hanging. Guns were involved in 4 of the deaths.

By industry sector, Agriculture had the largest number of suicides (3), followed by Construction (2). All of the decedents were male with an age range of 22 years of age to 59 years of age; the average age of the decedent was 37 years old.

### **MIOSHA Fatality Investigations**

The 143 individuals who died as a result of a work-related injury in 2014 worked for 139 employers. In 2014, MIOSHA personnel conducted a work-related fatality program-related compliance investigation at 37 (26.6%) of the 139 employers. A fatality is recorded as a MIOSHA "Program-Related" fatality if the deceased party was employed in an occupation included in MIOSHA jurisdiction as defined in Public Act 154 of 1974, as amended, and the fatality appears to be related to one or more of the following conditions:

1. The incident was found to have resulted from violations of MIOSHA safety and health standards or the "general duty" clause.
2. The incident was considered to be the result of a failure to follow a good safety and health practice that would be the subject of a safety and health recommendation.
3. 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 indicates that there is 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.



[Case 125](#). Tire service technician was asphyxiated when the semi-truck cab he was working under came down on his chest.

**Table 8** shows the number of work-related fatalities in Michigan in 2014 by industry sector and the number of MIOSHA work-related fatality compliance inspections for each industry sector.

<b>Table 8. Work-Related Fatalities and Number of MIOSHA Work-Related Fatality Compliance Inspections, Michigan 2014</b>		
<b>Industry</b>	<b>Number of Work-Related Fatalities</b>	<b>Number of Work-Related MIOSHA Compliance Inspections (%)</b>
Agriculture, Forestry, Fishing & Hunting (11)	25	4 (16.0%)
Utilities (22)	1	1 (100%)
Construction (23)	23	9 (39.1%)
Manufacturing (31-33)	8	5 (62.5%)
Wholesale Trade (42)	7	1 (14.3%)
Retail Trade (44-45)	13	2 (15.4%)
Transportation & Warehousing (48-49)	19	5 (26.3%)
Information	1	0
Finance & Insurance (52)	1	0
Real Estate & Rental & Leasing (53)	3	0
Professional, Scientific, & Technical Services (54)	1	0
Administrative & Support & Waste Management & Remediation Services (56)	8	3 (37.5%)
Education (61)	2	0
Health Care & Social Assistance (62)	4	1 (25.0%)
Arts, Entertainment, & Recreation (71)	3	1 (33.3%)
Accommodation & Food Services (72)	5	1 (20.0%)
Other Services (ex. Public Administration) (81)	13	3 (23.1%)
Public Administration (92)	6	0
<b>Total</b>	<b>143</b>	<b>37</b>

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. Nine of the 37 (24.3%) employers having a MIOSHA work-related fatality compliance inspection in 2014 were identified as having a MIOSHA work-related compliance inspection prior to 2014.

Of the 9 companies which had a work-related fatality in 2014 and were previously inspected by MIOSHA, 4 were in Construction, 3 were in Manufacturing, 1 was in Utilities and 1 was in Transportation & Warehousing. MIOSHA issued a violation citation to the firm at the conclusion of the fatality investigation in 28 of its 37 (75.7%) investigations. Citation penalties assessed at the conclusion of the compliance inspection (not the penalties decided after appeal) ranged from a low of \$500 to a high of \$220,000.

## **MIFACE Contact with Companies**

MIFACE sent letters to 50 companies/families that had a work-related fatality in 2014. We could not contact six companies/families because we were unable to find a phone number and/or a valid address. Phone call follow-ups were made if no response was received to the letter. Thirty-eight (76.0%) declined and 12 (24.0%) accepted the invitation to participate. MIFACE did not contact 81 employers due to the nature of the fatality (for example, work-related suicide, incident happened years ago, motor vehicle crash). A copy of four of the twelve 2014 MIFACE investigation reports (in addition to all MIFACE educational outreach materials) are on the MSU OEM [web site](#). Click on the [Traumatic Fatalities](#) link to view the reports and other educational materials.

## **Health and Safety Initiatives**

### ***Hispanic Initiative***

The US Department of Labor, Bureau of Labor Statistics (BLS) has analyzed the Census of Fatal Occupational Injury (CFOI) data and reported a higher fatal work injury rate for Hispanic workers than for other racial/ethnic groups. As a result, Federal OSHA is currently collecting additional information during all investigations that includes the primary language and country of origin of the victim. OSHA has also developed several Hispanic safety and health outreach materials that include a compliance assistance web page and information about workplace rights.

In partnership with Federal OSHA, NIOSH has added Hispanic worker fatalities to the list of the current targets for the Federal in-house FACE program. Information gathered will be made available to the OSHA Hispanic Worker Task Force. The Michigan FACE program supports the concept and rationale of this initiative. As a result, we have utilized a draft Immigrant Workers/Limited English Speakers Workers investigation guide during on-site investigations to gather information when it is appropriate.

There were six deaths of workers of Hispanic/Latino ethnicity in Michigan in 2014. The BLS Table 14, [Michigan Employment Status of the Civilian Non-institutional Population by Sex, Race, Hispanic or Latino ethnicity, and Detailed Age, 2014 annual averages - Michigan](#) was utilized to calculate work-related fatality rates for Michigan Hispanic/Latino, Caucasian and African-American workers 16 years of age and older. In 2014, the Hispanic/Latino fatality rate in Michigan was 3.0 per 100,000 Hispanic/Latino individuals; for males the fatality rate was 1.7/100,000 males and for Hispanic females, the rate was 4.7/100,000. For Caucasians, the rate was 3.3/100,000 (males (5.4/100,000) and females (0.88/100,000)) and for African-Americans, the rate was 3.2/100,000 (males (6.4/100,000) and females (0.7/100,000)).

Five of six Hispanic/Latino individuals were in their 40s and one individual was in his 60s. The country of origin for three Hispanic/Latino individuals was the United States, two individuals were born in Guatemala and one was born in Mexico. Two individuals worked in Agriculture, one worked in Construction, one worked in Manufacturing, one worked in Health Care, and one worked in Accommodation and Food Service.

## 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 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. 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 9** shows a review of the past 14 years of the sensitivity of the Injury at Work box. Data identified that on average nearly 25% (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.

<b>Table 9. Sensitivity of Death Certificate Injury at Work Box Predicting Fatal Injury at Work, Michigan 2014</b>		
Year (# Deaths)	DC Coded as at work (%)	DC Coded as not 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%)

\*All death certificates were not obtained/reviewed each year

In 2014, the injury at work box was misidentified most frequently in the designation of an injury at work in the Agricultural industry (15 of the 25 deaths) followed by Construction (9 of 23 deaths). Work-related deaths involving motor vehicle incidents (15 deaths) and struck-by incidents (10 deaths) were the causes of death most misidentified as No in the injury at work box.



## Number of 2014 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 143 work-related deaths in 2014 per the BLS website viewed on May 25, 2016. MIFACE identified the same number of deaths as the published CFOI number of deaths.

## Case Narratives

Based on the information collected during MIFACE on-site investigations and/or from source documents, a brief narrative summary organized alphabetically by means of death of each of the 143 acute traumatic work-related deaths in 2014 is included in Appendix I.

**Table 10** gives the narrative case number and cause of death by NAICS code found 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.

In Table 10, the Cause of Death is hyperlinked to its corresponding heading in the Appendix. 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.



[Case 115](#). Logging firm owner struck-by a rotten section of a poplar tree he had felled with a Husqvarna 395XP chain saw.

**Table 10. Traumatic Work-Related Fatality Narratives by Means of Death and Industry Sector, Michigan 2014**

<b>Industry Sector (NAICS Code)</b>	<b>Aircraft (3.5%)</b>	<b>Animal (2.1%)</b>	<b>Asphyxiation (2.1%)</b>	<b>Drowning (2.1%)</b>	<b>Drug Overdose (2.8%)</b>	<b>Electrocution (3.5%)</b>	<b>Fall (16.8%)</b>	<b>Fire/Explosion (0.7%)</b>	<b>Homicide (13.3%)</b>	<b>Machine (7.7%)</b>	<b>Motor Vehicle (19.6%)</b>	<b>Struck-by (19.6%)</b>	<b>Suicide (6.3%)</b>
Agriculture, Forestry, Fishing & Hunting (11)	--	6-7	--	12	--	--	--	--	49-50	68-71	79-80	107-117	135-137
Utilities (22)	--	--	--	--	--	19	--	--	--	--	--	--	--
Construction (23)	--	8	--	--	--	20	24-32	--	--	72-73	81-83	118-122	138-139
Manufacturing (31-33)	1	--	--	--	--	--	33	--	--	74-77	--	123	140
Wholesale Trade (42)	--	--	--	--	--	--	34-35	--	51	--	84-86	124	--
Retail Trade (44-45)	--	--	--	--	--	--	36-37	--	52-59	--	87	125	141
Transportation & Warehousing (48-49)	2-4	--	--	--	15	21	38	--	60	--	88-95	126-128	142
Information (51)	--	--	--	--	--	--	39	--	--	--	--	--	--
Finance & Insurance (52)	--	--	--	--	--	--	--	--	--	--	96	--	--
Real Estate & Rental & Leasing (53)	--	--	--	--	--	22	--	--	61-62	--	--	--	--
Professional, Scientific, & Technical Services (54)	--	--	--	--	--	--	--	--	--	--	97	--	--
Administrative & Support & Waste Management & Remediation Services (56)	5	--	--	--	--	--	40-41	--	63	--	98	129-131	--
Education (61)	--	--	--	--	--	--	--	--	64	--	99	--	--
Health Care & Social Assistance (62)	--	--	9	--	16	--	--	--	65-66	--	--	--	--
Arts, Entertainment, & Recreation (71)	--	--	--	13	--	--	--	--	--	--	--	132-133	--
Accommodation & Food Services (72)	--	--	--	--	17	23	42-43	--	--	--	100	--	--
Other Services (ex. Public Administration) (81)	--	--	10-11	--	18	--	44-47	48	67	78	101-102	134	--
Public Administration (92)	--	--	--	14	--	--	--	--	--	--	103-106	--	143

## Discussion

Michigan was one of twenty-eight states which had a higher number of work-related fatal injuries in 2014 compared to 2013. There were 143 traumatic work-related fatalities in Michigan in 2014, an increase of nine fatalities compared to 2013. The 2014 work-related fatality rate in Michigan was 3.2/100,000. The major sources for identifying a work-related death were death certificates, the 24-hour MIOSHA hotline, internet notifications, and the Michigan State Police vehicular crash data reporting system. We coordinated our surveillance with the Census of Fatal Occupational Injuries (CFOI). CFOI is the surveillance system funded in most states by the United States Department of Labor Bureau of Labor Statistics (BLS). CFOI reported 143 deaths in 2014. Since MIFACE began surveillance of all traumatic work-related fatalities the number and rate of work-related acute traumatic fatalities are generally down from 174 (3.6/100,000) in 2001 to 143 (3.2/100,000) in 2014. However, the lowest number of deaths and rates occurred in 2005 (110, 2.3/100,000) and 2009 (96, 2.2/100,000) (Figure 1).

In 2014, the number of work-related deaths averaged 2.75 fatalities per week although the deaths were not evenly distributed throughout the year. The month of the fatal incident was known in all of the 143 work-related fatalities. Of the known month of incident, June was the most common month (18 fatal incidents) followed by September (15 fatal incidents) and then March and July (14 fatal incidents).

Agriculture (25, 17.5%) had both the largest number of work-related deaths and the highest risk of death (30.5 deaths/100,000 workers). Construction was second in both number and risk (23, 16.1%; 16.3 deaths/100,000 workers), and Transportation and Warehousing was third in number and risk (19, 13.3%; 14.7 deaths/100,000 workers) of a work-related death. Retail Trade, although 4th in the number of deaths (13, 9.1%) and tied with Other Services, (13, 9.1%) had one of the lowest risks of death (2.8 deaths/100,000 workers compared to Other Services 7.6 deaths/100,000 workers).

Among the non-suicide/non-overdose deaths, a toxicology screen for alcohol, illegal drugs, prescription, or non-prescription medications was known to have been performed on 78 (60.0%) individuals; 40 (51.3%) individuals had detectable levels of at least one of these substances. Twenty-four (60.0%) of the 40 individuals with detectable levels of alcohol, illegal drugs, prescription and non-prescription medications had levels that were considered on review to possibly have contributed to the fatal incident.

MIOSHA staff investigated 37 of the 143 (25.9%) deaths. The National Transportation Safety Board investigated five deaths (4 incidents) and the U.S. Coast Guard investigated one death. The remaining 100 (69.9%) work-related deaths were not investigated by any regulatory agency other than the police.

Nine industry sectors had a decrease in the number of work-related deaths and incidence rate. The three industry sectors with the largest reduction in the number of work-related deaths were Transportation & Warehousing (-7 deaths), Finance & Insurance (-4 deaths) and Arts, Entertainment & Recreation (-3 deaths). Six industry sectors had an increase in the both number of work-related deaths and incidence rate. The four industry sectors with the largest increase in

the number of deaths compared to 2013 were Agriculture (+12 deaths), Other Services (+8 deaths), and Wholesale Trade and Retail Trade (+5 deaths each), Public Administration had the same number of deaths (6) but had a higher incidence rate in 2014 compared to 2013 (2.9 deaths/100,000 workers compared to 2.5 deaths/100,000 workers). Two industry sectors had a work-related death in 2014 but did not have a work-related fatality in 2013: Utilities and Information.

As stated previously, Agriculture had the largest number of work-related deaths (25 deaths, 17.5%) and the highest incidence rate of 30.0/100,000 workers. The incidence rate was based on the number of *operators* as identified in the 2012 USDA Agricultural Census. The Agricultural Census does not gather data regarding the Forestry & Logging subsector.

The [USDA Farm Labor Report, Released November 19, 2015 by the National Agricultural Statistics Service \(NASS\), Agricultural Statistics Board, United States Department of Agriculture \(USDA\)](#) indicates that the number of hours hired labor worked per week in 2014 was 37.6. The data includes field crops, other crops including nursery or greenhouse crops and livestock or poultry. The data excludes logging, fishing, forestry and hunting and agricultural service workers, contract labor and custom labor (such as hay baling, combining, corn picking, spraying, fertilizing, etc.). In 2014, 6 hired laborers working in field crops, other crops or livestock/poultry were identified. Utilizing USDA Farm Labor Report's 37.6 hours per week, the hours-based fatality incidence rate was 12.2 fatal injuries/100,000 full-time equivalent workers.

The increase in the number of deaths in Agriculture was due to an increase of 5 deaths in Animal Production, 3 deaths in Crop Production and 2 deaths in Forestry and Logging; the number of deaths which could not be assigned an industry sector remained constant (2 deaths). Dairy Production comprised 4 of the 7 deaths in Animal Production and doubled the number of deaths compared to 2013. The average age of those who died working in Agriculture was younger in 2014 than in previous years. The average age of the farmer who died was 46.8, with an age range of 24-84. **Table 11** shows the average age at the time of death for the past 14 years for those employed in Agriculture. In 10 of the 14 years, the average age of the individual was in their 50s or 60s.

Year	Age (in years)	Year	Age (in years)
2001	47.4	2008	67.9
2002	48.0	2009	51.5
2003	58.1	2010	53.0
2004	59.7	2011	56.6
2005	54.9	2012	52.2
2006	49.9	2013	56.6
2007	54.2	2014	46.8

Nationally, in 2014, workers age 55 and older incurred 35.1% of all fatal work-related injuries. Michigan had a similar fatal work-related injury percentage; 33.6% of the fatal injuries were incurred by this age group. Two industry sectors comprised the majority of 55+ year old fatal injuries: Construction had 9 individuals and Agriculture had 8 individuals.

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))”.

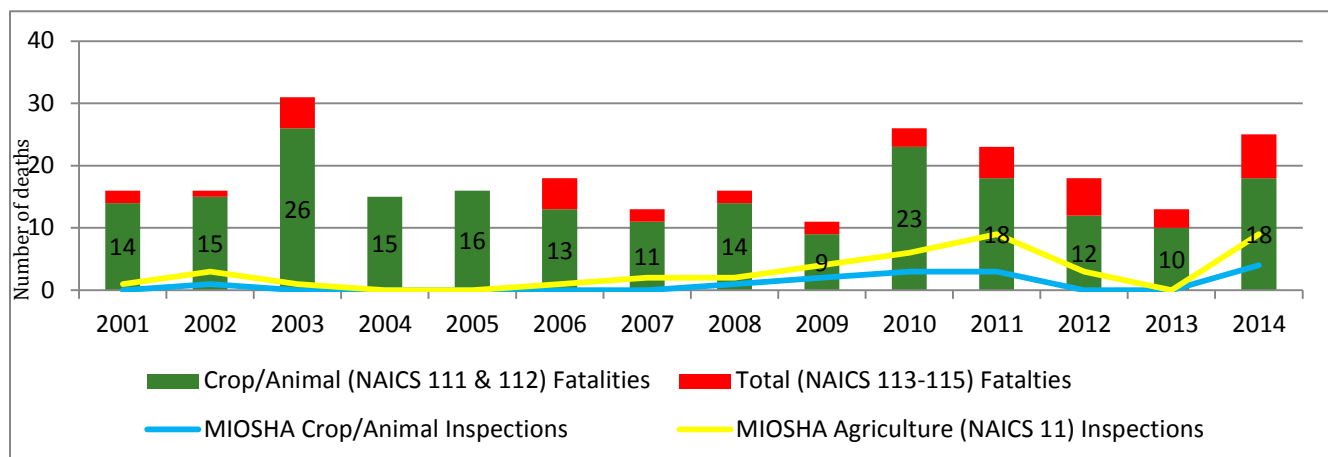
The federal Appropriations Act exempts small farming operations from federally-funded activities. 100% State funds must be used by MIOSHA for interventions at farming operations when a farm operation:

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

Note: Immediate family members of farm employers are not counted when determining the number of employees.

The majority of 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. **Figure 6** shows the total number of Agricultural fatalities with the Crop/Animal fatalities and the number of MIOSHA Agricultural work-related compliance inspections for all Agricultural fatalities and for Crop/Animal work-related fatalities. From 2001 to 2014, MIOSHA has conducted 28 Agricultural (NAICS 11) work-related fatality inspections; 18 of the inspections were in Crop Production and Animal Production. Twelve MIOSHA fatality inspections occurred in the Forestry & Logging subsector.

**Figure 6. Number of Agriculture Work-related Fatalities and MIOSHA Inspections, Michigan 2001-2014**



Family farm owners are reluctant to utilize MIOSHA Consultation, Education and Training Division services to initiate “formalized” safety and health practices on their farms. In response, MIOSHA CET has initiated an Agricultural Educational Outreach program. The goal of the consultative and educational outreach to the crop, animal and logging subsectors is to reduce the rate of injuries, illnesses and fatalities by 15% over 5 years. This educational outreach will be beneficial to address the gap in knowledge about MIOSHA in general, including pertinent Agricultural health and safety regulations, and best safety practices for these small agricultural businesses.

With the exception of 2003, motor vehicles have been the leading cause of a work-related death in Michigan. **Table 12** shows the cause of death by year for all of the known work-related deaths in Michigan between the years of 2001-2014. The number of motor vehicle-related deaths remained fairly stable during the 14 years of data collection, as did the number of work-related fatal falls and struck-by incidents (with the exception of the past two years). Machine-related deaths have trended downward since 2001.

**Table 13** shows the number of motor vehicle-related work-related deaths by industry sector which occurred between the years of 2001-2014. A closer examination of the industries in which a motor vehicle-related work-related death occurred yields interesting information. Not unsurprisingly, motor vehicle-related deaths are prominent in the Transportation industry. What is surprising is the percentage of the deaths caused by motor vehicles in other industry sectors. Both Information and Finance and Insurance had at least half of the deaths caused by a motor vehicle. Professional/Scientific and Technical Services, Public Administration and Education also had a significant percentage of the work-related deaths caused by a motor vehicle. While safety initiatives addressing other issues, such as violence prevention are important, employers in these industry sectors should create and maintain safe driving policies and offer driver safety training including defensive driving as part of their safety program and training.



[Case 109](#). Farmer struck-by a tree he was felling on the north side of a farm field.

**Table 12. Cause of Death by Year, Michigan 2001-2014**

<b>Year (# deaths)</b>	<b>Electrocution</b>	<b>Fall</b>	<b>Machine</b>	<b>Other/unknown</b>	<b>Motor Vehicle</b>	<b>Homicide</b>	<b>Drowning</b>	<b>Suicide</b>	<b>Toxic Exposure</b>	<b>Struck-by</b>	<b>Fire/Explosion</b>	<b>Heat/Cold</b>	<b>Animal</b>	<b>Aircraft</b>	<b>Asphyxiation</b>	<b>Drug Overdose</b>	<b>Infectious Disease</b>
2001 (174)	4	26	32	4	39	24	2	12	4	13	6	2	1	1	3	1	
2002 (151)	8	21	20		31	22	2	11	4	18	4	2	2	5	1		
2003 (152)	10	19	36		31	15	1	5	3	16	4	1	2	2	4	3	
2004 (131)	7	16	26		29	22		4	4	13	3		1	4	1	1	
2005 (110)	4	20	18		24	16	1	2	2	10	4			6		3	
2006 (157)	10	24	14		35	11	2	8	6	31	4		2	8	1	1	
2007 (121)	4	17	16	2	28	21		6	4	17	1	1	2			2	
2008 (121)	5	26	12		30	14	1	9	2	15	3		1		1	2	
2009 (96)	5	14	7		20	11		12		17			2	2	1	4	
2010 (147)	7	24	16	2	28	26	2	11	6	15	3	1		4		2	
2011 (142)	7	21	20	2	25	15	1	16	4	13	3	2	2	7	2	1	1
2012 (135)	3	18	14	5	36	28	3	12		14						2	
2013 (134)	2	19	10	3	27	16		22	1	24	3	1		2	1	3	
2014 (143)	5	24	11		28	19	3	9		28	1		3	5	3	4	
<b>TOTALS</b>	81	289	252	18	411	260	18	139	40	244	40	10	18	46	18	29	1



<b>Table 13. Number and Percent of Motor Vehicle-Related Work-Related Deaths by Industry Sector, Michigan 2001-2014</b>		
Industry (total # deaths)	# Motor Vehicle-related deaths	% of total # of deaths
Agriculture (258)	21	8.1
Mining (16)	3	18.8
Utilities (17)	5	29.4
Construction (388)	54	13.9
Manufacturing (198)	17	8.6
Wholesale Trade (56)	21	37.5
Retail Trade (139)	22	15.8
Transportation/Warehousing (235)	102	43.4
Information (28)	16	57.1
Finance/Insurance (12)	6	50.0
Real Estate/Rental/Leasing (22)	2	9.1
Professional/Scientific/Technical Services (32)	14	43.8
Administrative/Support/Waste Management/Remediation (117)	27	23.1
Education (33)	11	33.3
Health Care/Social Assistance (68)	20	29.4
Arts/Entertainment/Recreation (53)	9	17.0
Accommodation/Food Service (63)	3	4.8
Other Services (99)	23	23.2
Public Administration (92)	35	38.0

Both nationally and in Michigan, falls continue to be the leading cause of death particularly in Construction. The national Campaign to Prevent Falls in Construction is a joint effort by government-labor-management to address the top cause of construction industry fatalities. **Table 14** shows the number of fatal falls in Construction by year and the percentage of construction work-related deaths the fatal falls represented.

<b>Table 14. Number of Construction Deaths and Number and Percent of Fatal Falls by Year, Michigan 2001-2014</b>					
<b>Year</b>	<b>Number of Construction Deaths</b>	<b>Number of Fatal Falls (%)</b>	<b>Year</b>	<b>Number of Construction Deaths</b>	<b>Number of Fatal Falls (%)</b>
2001	37	15 (40.5%)	2008	28	11 (39.3%)
2002	37	12 (32.4%)	2009	19	5 (26.3%)
2003	35	9 (25.7%)	2010	22	7 (31.8%)
2004	32	12 (37.5%)	2011	26	11 (42.3%)
2005	24	14 (58.3%)	2012	20	4 (20.0%)
2006	42	13 (31.0%)	2013	25	10 (40.0%)
2007	18	7 (38.9%)	2014	23	9 (39.1%)

Between 2001 and 2014, the number of fatal falls in Construction ranged from a low of 4 falls in 2012 to a high of 15 falls in 2001. The percentage of fatalities in construction secondary to a fall ranged from 20.0% in 2012 to 58.3% in 2005. Five (55.6%) of the 9 fatal falls in Construction occurred during roofing activities.

More 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.

Michigan had an increase (16%) in the number of work-related homicides. The number of work-related homicides in Michigan increased by 3 deaths (19 in 2014 compared to 16 in 2013 compared to 28 in 2012). Nationally, similar to national data, death by a gunshot was the most frequent manner of death in the 19 homicides.

Nationally, the hours-based fatal work injury rate (per 100,000 FTE workers) for individuals aged 65 and over was 10.7. Although not directly comparable, Michigan's employment-based fatality rate for individuals aged 65 and over was 9.3/100,000 in 2014. The number of employed individuals 65 years of age and older was the second smallest employed population and only 15.3% of Michigan's civilian non-institutional population, yet this age group had the highest fatality rate of all age groups (See **Table 15**).

<b>Table 15. Fatality Rate by Age Group and Employment Number and Percent of Civilian Non-institutional Population, Michigan 2014</b>				
Age Range (in years)	Employment		Number of Deaths	Fatality Rate
	Number (in thousands)	% of Civilian non- institutional Population		
16-19	164	31.9	0	**
20-24	451	66.2	11	2.4
25-34	862	73.6	21	2.4
35-44	957	77.3	32	3.3
45-54	989	73.7	31	3.1
55-64	748	54.9	26	3.5
65 and older	236	15.3	22	9.3

In Michigan, from 2010-2014, the number of individuals 65+ years of age who are employed rose from 164,000 in 2010 to 236,000 in 2015, an increase of nearly 31%. The workforce age 65 and older continues to grow; individuals don't retire, part-time workers enter the workforce due to economic or other reasons. Older workers have unique health and safety challenges. The challenges are diverse, from resistance to change, medical issues, strength issues, etc. 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.

BLS uses the number of hours worked in an industry and profession to calculate an hours-based fatality incidence rate. The 2014 annual national hours-based fatality rate was 3.4/100,000 FTE. MIFACE could not calculate an hours-based rate for Michigan for 2014 due to insufficient data from the Michigan Office of Labor Market Information but Michigan's employment-based rate was lower per total workforce (3.2/100,000).

The number and rate of acute traumatic fatalities peaked in the years 1997-2001, were at their lowest from 2004-2005 and during the economic depression in the years 2007-2009 but otherwise during this period have fluctuated from 134-155 deaths per year with a rate 3.1-3.3/100,000 workers. **Table 16** shows the deaths per year by industry sector for the six industry sectors with the largest number of deaths per year. There is some suggestion of a decrease in the number of deaths in construction and manufacturing from peaks in 2001 but no suggestion in the other sectors.

**Table 16. Number of Deaths per Year by Industry Sector for the Six Industry Sectors With the Largest Number of Deaths per Year, Michigan 2001-2014**

	Agriculture	Construction	Manufacturing	Transportation	Retail Trade	Administrative Support/Waste Mgt
2001	16	37	27	20	6	11
2002	17	37	20	7	13	10
2003	31	35	10	18	11	3
2004	15	32	19	17	4	5
2005	16	24	14	14	9	6
2006	18	42	19	19	9	12
2007	13	18	14	11	10	10
2008	16	28	14	11	8	5
2009	11	19	11	6	9	13
2010	26	22	6	20	16	7
2011	24	26	15	14	10	7
2012	18	20	11	19	12	11
2013	13	25	10	26	8	9
2014	25	23	8	19	13	8

### ***Importance of Using Multiple Data Sources***

MIFACE uses many data sources to ascertain if a fatal injury occurs “on the job”. Accurate reporting of work-related deaths in Michigan depends upon the completeness of the data. Reliance on just the information in the Injury at Work box on the individual’s death certificate would have missed 53 (37.3%) of the work-related deaths in 2014.

### ***Prevention Material Dissemination***

On the MSU OEM website ([www.msu.oem.edu/](http://www.msu.oem.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.

In 2014, eight Investigation Reports, 15 MIFACE Summaries of MIOSHA Investigations, one Hazard Alert, and a MIFACE 2014 Data Fact sheet were posted on the MSU OEM website and distributed to stakeholders. MIFACE Summaries of MIOSHA Investigations include 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 is updated periodically when new information is received. The most current 2014 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.

In 2014, eighteen MIFACE presentations were given to trade groups ranging from construction workers to safety and health professionals to Agri-Science teachers to Michigan government workers. A special effort in conjunction with the Michigan Farm Bureau to provide educational safety sessions to farmers was ongoing. In 2014, 13 agricultural health and safety presentations were given; more than 800 individuals attended the training sessions.

MIFACE Investigation reports were highlighted in the National Safety Council, Safety and Health Magazine in the July and October 2014 issues; in July's issue, FACE Value: Case Report #[10MI069](#) – Farm Laborer electrocuted in potato field and in October's issue, FACE Value: Case Report #[09MI085](#) – Truck Driver Struck, Killed.

## Summary

Traumatic occupational fatalities are an important public health issue in Michigan as they are throughout the United States. There was an increase in the number of deaths in 2014 by nine deaths. Traumatic occupational deaths are not random events. Information about the settings and circumstances in which work-related deaths occur is necessary to prevent their occurrence in the future. Acute traumatic fatalities have fluctuated from year to year, but do not show a clear downward trend. Further efforts are needed to have a meaningful reduction of the occurrence of these tragedies.

Understanding the root cause(s) of these tragic events and then sharing that information with stakeholders - from individuals to groups, is what makes these efforts worthwhile. If what we learn from any of these deaths can help prevent another death, 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.

Each of the 143 deaths in this report could have been prevented, whether through installation of engineering changes, development and implementation of health and safety plans, work practice changes and identifying and assisting individuals in seeking and receiving mental health counseling so they can better cope with both work and personal stressors. Efforts to prevent future work-related deaths will also be useful to prevent the much larger number of work-related injuries (~243,000) that are estimated to occur each year in Michigan.

The descriptions of the acute traumatic work-related deaths in Appendix I highlight these tragedies and the need to take action to prevent them. Further efforts to investigate the circumstances leading to these deaths and disseminate information from what we learn are necessary to educate and where applicable, recommend change in regulations to prevent similar deaths from occurring in the future.

## **Acknowledgement**

We are extremely appreciative of the support of the Michigan Department of Licensing and Regulatory Affairs MIOSHA 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 provide constructive comments on each MIFACE Report and Hazard Alert, who assist us by providing thoughts on developing MIFACE policies and educational outreach activities, and their promotion of the MIFACE program to their employees/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***



## **AIRCRAFT (5)**

**Case 1.** A male business owner in his 50s was piloting his twin-engine airplane when the plane missed the runway approach and crashed. There was dense fog at the time of the incident so the decedent was utilizing an instrument landing system. The plane hit trees and then the ground. The plane was destroyed as a result of the crash. The plane was found using its emergency locator signal.

**Case 2.** A male commercial freight service pilot in his 30s died when the Cessna 310R he was piloting crashed into trees and the ground approximately 1,500 feet west of a runway during an instrument landing system approach. Night instrument meteorological conditions prevailed at the time of the incident. The airplane was destroyed by the impact forces and post-impact fire.

**Case 3.** A male pilot and owner of an aviation firm in his 40s died when the Evolution Trikes Revo weight-shift-control aircraft he was piloting crashed following an in-flight breakup. The National Transportation Safety Board (NTSB) report indicated that witnesses stated they "heard an engine revving up" followed by "a loud bang". One witness saw a wing descending from the clouds.

**Cases 4 & 5.** A male aviation business owner in his 60s and a male recycling business owner in his 40s, both pilots, died when the Nanchang single-engine plane most likely being piloted by the recycling business owner, crashed during a forced landing. A witness reported hearing the engine sputter and saw the propeller slow as the plane began descending toward an open field with the landing gear extended. The plane struck the ground nose down at an angle of approximately 45 degrees. When the plane struck the ground, the decedent in the forward position was not wearing his harness. The rear passenger had his seatbelt harness on but the metal bracket appeared to have snapped off on impact allowing his head to hit the instrument panel in the forward position. The FAA inspector noted that the rear seat occupant had his hands on the throttle and may have been in control of the plane at the time of the emergency landing.

## **ANIMAL (3)**

**Case 6.** A Hispanic female dairy farm worker in her 40s was mauled by either a 2-year-old bull or a dairy cow. The farm worker was herding approximately 50-60 dairy cows from a free stall area (where the cows eat and stay when not being milked) into a holding pen before they enter the parlor for milking. The bull had been raised by the owner's family on the farm and freely roamed with the dairy cows. The event was unwitnessed. The owners of the farm and a family member were in the front of the barn; one of the owners was tending to a sick cow and the other owner and family member were in the break area when they heard the cows bellowing. The three of them stepped out into the feed aisle and saw the bull in the feed aisle walking toward them. The bull was herded without incident to another stall. One of the owners found the decedent lying face down and unresponsive under a stanchion; with the upper body found in one stall and lower body in another stall. The owner rolled her over and began CPR while emergency response was summoned. She was declared dead at the scene. MIFACE Investigation Report: [14MI014](#).

**Case 7.** A male horse trainer in his 30s was training his draft horses when one of the horses broke free. The decedent pursued the horse. The decedent and horse continued into a field and then into a wooded area. The decedent was found dead in the wooded area. It appeared to responders that he had been dragged and that he had struck a tree.

**Case 8.** A male demolition firm owner in his 40s died of complications of a bee sting. The decedent was demolishing mobile homes when he was stung by a bee. He collapsed before the ambulance arrived. Approximately one and a half months earlier, the decedent was stung multiple times by bees, had an allergic reaction, and was taken to the hospital. The hospital gave him a prescription for an epi-pen, but due to his lack of insurance, he did not fill the prescription. On the day of the incident, the decedent was stung by a bee on his ear and sustained a fatal allergic reaction.

### **ASPHYXIATION (3)**

**Case 9.** A male vocational rehabilitation firm laborer in his 70s died when he choked on a piece of food.

**Case 10.** A male auto mechanic in his 60s died from oxygen deprivation while in a 7-foot-deep pit in a pole barn fixing a gas leak on a car. The pole barn was approximately 30 feet wide by 60 feet long by 16 feet tall. There were two overhead doors; the decedent left one of the doors open and the other door closed. The floor pit was approximately 4 feet wide, 15-18 feet long and 7 feet deep. The pit was closer to the south end of the barn, the same end of the barn with the closed overhead door. There were stairs to the bottom of the pit. The decedent had driven the vehicle over the pit and was working beneath the car lying on his back. Responding police found liquid puddled in about 60% of the floor of the pit, and there was an extremely strong smell of gasoline coming from the pit. The officer had to leave the area after approximately five minutes due to becoming light-headed. Family members arrived at the decedent's home and when they could not find him, they went to the pole barn. One of the family members pushed the car away from the pit. They opened the overhead door for ventilation and attempted to lift the decedent out of the pit, but were not able to do so. They called for emergency response. When emergency response arrived, the decedent was found on the steps leading out of the pit. He was declared dead at the scene.

**Case 11.** A female bartender in her 40s died when she was overcome by carbon dioxide in the building basement due to a faulty beverage carbon dioxide pump. A 300-pound liquid carbon dioxide storage tank was located outside of the building on the main level. The carbon dioxide was distributed via lines to the basement where the beverages (such as syrups, soda and tonic) boxes were connected to carbon dioxide pumps to provide beverage carbonation. Bartenders were required to remove the empty beverage boxes and replace them with full boxes. The decedent had provided bartending activities for the evening of the incident. After all patrons went home, she counted the money and then punched out. For reasons unknown, she went down to the basement, perhaps because she heard a "hissing" sound or a warning signal indicating the carbon dioxide pump on the tonic was damaged. Approximately 4 hours after she had punched out, patrons arrived at the building. Seeing the decedent's car, one of the patrons began searching the building for her. The basement door was open (usually closed) and the lights were on. This

patron heard a hissing noise in the basement, so he went downstairs. He found the decedent unconscious near the pop dispenser which was also the location of the hissing noise. He closed the carbon dioxide valve and could hear the decedent breathing. He became lightheaded, and went back upstairs. Emergency response was summoned. Emergency responders entered the basement and found the decedent in cardiac arrest and while providing aid, they also became lightheaded. Emergency response personnel removed the decedent from the basement and transported her to the hospital. Contributing factors in her death were a blood alcohol level of 0.26% and hypothermia secondary to exposure to cold temperatures. (Her body temperature was 91.5°F when she arrived at the hospital). MIFACE Summary of MIOSHA Investigation: [Case 367](#).

### **DROWNING (3)**

**Case 12.** A male farmer in his 70s died when his zero-turn Bad Boy lawnmower overturned into a drainage ditch and pinned him underwater. The decedent had been mowing both a path to the field behind his home and the banks of the ditch. The ditch was approximately 10 feet deep with approximately one-foot of water in the base of the ditch. When the decedent was found, the mower deck was facing skyward and the pathway cut. Responding police noted that the decedent appeared to have been going in reverse and went down over a culvert and down into the ditch. When the mower was lifted from the water, the key was found in the ignition, in the “on” position and the throttle set at “full”. The mower was not equipped with a roll over protection structure.

**Case 13.** A male hunting club fire chief in his 40s drowned when the small flat-bottom boat he was piloting partially capsized. The 15-foot aluminum flat bottom boat equipped with a 20-HP outboard motor boat had been modified by removing a section of flotation material from under the middle seat to allow for more storage of materials. The boat’s beam width was 4.9 feet and the depth was 1.5 feet. The inside of the boat had been painted; the capacity plate had been over-painted. In a zippered mesh bag were Type II personal flotation devices (PFDs). The decedent and two employees boarded the boat and traveled to several campsites to winterize them. The decedent and his coworkers loaded the boat with the campsite gear (tents, cots and sleeping bags) and then started the trip home, traveling north. When they entered open water, the wind had picked up and waves began to go over the bow and sides of the boat. When this occurred, the decedent slowed the boat causing the bow to nose dive. He reversed the boat but this action did not correct the nose dive. The bow stayed underwater and water came over the stern. The boat completely filled with water, but did not sink. At this point, the decedent told his coworkers to get the life jackets on. His coworkers were able to swim to shore (approximately 100 yards), but the decedent was overcome in the water. During reconstruction of the incident, it was determined that the boat had been overloaded and it exceeded its weight capacity of 829 pounds. At a minimum, with the camp gear, the three individuals and the motor, the boat was carrying approximately 1,190 pounds. A rescue boat found the decedent face down in the water with his life jacket on. MIFACE Summary of MIOSHA Investigation: [Case 369](#).

**Case 14.** A male ship hand in his 50s drowned when he fell overboard from a freighter.

## DRUG OVERDOSE (4)

**Case 15.** A male furniture mover in his 40s died from a cocaine and fentanyl overdose.

**Case 16.** A male hospital risk manager in his 70s died from a drug overdose. The decedent was in an automobile crash in 1988 and sustained injuries requiring multiple surgeries, leading to chronic pain syndrome. The amount of pharmaceuticals ingested in an attempt to deal with the chronic pain syndrome led to his death.

**Case 17.** A male restaurant cook/dishwasher in his 20s died from an overdose of heroin.

**Case 18.** A male voter registration volunteer in his 20s died from a drug overdose.

## ELECTROCUTION (5)

**Case 19.** A male overhead lineman in his 50s died when he contacted an energized 13,280-volt overhead line. The decedent arrived at the incident scene where a power outage had been reported. He positioned the truck's mounted aerial lift between the top support guide wire and the secondary electric wires below. He found that the fuse for the pole top transformer had blown, so he re-fused it. The fuse blew out again. The decedent called the service center for an upgraded transformer and for assistance. While waiting for the transformer and assistance to arrive, he unhooked the



Case 19. Overhead lineman contacted an energized 13,280-volt overhead line.

wires, de-energized and disconnected the transformer. He then began to prep the area to upgrade the transformer. He installed one end of a 30- to 40-foot roll of #2 ground wire through the wire harness on the pole cross member and attached it to the pole ground. The remainder of the roll was inside the bucket. The spark arrester had been removed. With a tool (either a knife to scrape or mark wires or a wrench) in his left hand, the decedent reached up and grabbed the energized line with his right hand. When he reached up and grabbed the wire, he was electrocuted. The decedent was wearing safety glasses, hard hat, leather gloves (not insulating gloves or sleeves), flame resistant pants, tennis shoes, and a tee shirt (his flame resistant shirt was in the truck). He was not wearing a fall protection harness. A re-enactment of the incident found that the secondary lines were “skinned” and ready for the new transformer. The decedent may have thought that the phase was a neutral because of the way it was hooked up: a) there was no ground wire in the housing and no wiretap; b) when a line is a neutral, there is only one 4 ¼ - inch dead end disk – the line had only one 4 ¼-inch dead end disk; and c) the phase at this pole was not fused and was not tapped. A coworker who took up a bucket to a similar position indicated he could see the next two poles and he could see from there that the wire was tapped to

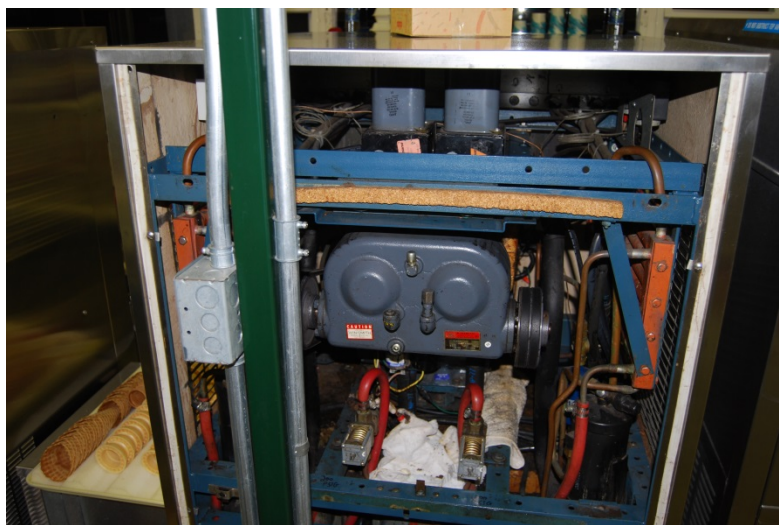
a live primary wire. A neighborhood resident called 911. Coworkers arrived and maneuvered the decedent's aerial bucket down and with assistance from emergency responders, lifted him from the bucket. The decedent died two days later from the injuries sustained at the time of the incident. MIFACE Summary of MIOSHA Investigation: [Case 349](#).

**Case 20.** A male handyman in his 50s was working for a homeowner to connect a power line from an electrical pole to the home when he contacted a live wire.

**Case 21.** A male roll off truck driver in his 50s was electrocuted when the dump box contacted an energized 7,600-volt overhead power line. The decedent's employer was contracted to change out the scrap dumpsters for a customer. The decedent was in the process of switching out a 40-yard scrap dumpster box when the incident occurred. There was a sign on the pole warning of high voltage. At the incident location, the decedent had been instructed to pull ahead of the scrap conveyor/scrap dump box approximately 200 yards to unload an empty container. In disregard of these instructions, the decedent positioned his truck next to the scrap conveyor system, which placed the truck under the energized power lines. The decedent stood outside the truck operating the controls to raise the dump bed. As the 45-foot trailer lift boom elevated, the dump bed/box contacted the energized power line. The truck became a path to ground, electrocuting the decedent. The incident was discovered by customer personnel performing a facility walk-around of the outside property. MIFACE Summary of MIOSHA Investigation: [Case 360](#).

**Case 22.** A male landlord in his 60s died when he contacted a downed power line in the backyard of his rental property. The tenant contacted him about the downed power line. The electrical provider had previously placed yellow caution tape around the backyard of the property. The decedent parked his vehicle in the driveway next door to the property. He jumped the fence into the incident backyard. A witness to the incident indicated the decedent saw the black downed power line in the grass with char marks around it. The decedent picked up the wire and he became a path to ground with the current exiting his foot. In an attempt to provide assistance, the witness jumped the fence and then called for emergency response.

**Case 23.** A male frozen custard store co-owner in his 50s was electrocuted while servicing an energized frozen custard machine. There were three frozen custard machines; he was servicing the middle machine. All three frozen custard machines used a twist lock 240-volt plug and cord power system and were connected to an energized outlet. The back panel of the middle machine had been removed. Four towels/rags had been placed inside the incident machine at various locations. Live electrical spade-type connectors and a terminal screw were adjacent to the towels in



Case 23. Frozen custard store co-owner electrocuted while servicing an energized frozen custard machine.



addition to an unguarded dual belt and pulley system powering the internal compressor. The decedent was working alone and the incident was unwitnessed. He was discovered unresponsive lying on his back behind the three frozen custard machines by a customer who immediately called 911 and began CPR. Responding emergency response personnel arrived and assumed care. The co-owner was declared dead at the scene. The County Medical Examiner autopsy report determined electrocution was the cause of death based on microscopic skin changes consistent with electrocution on the front of his left hand at the of his thumb.

## **FALL (24)**

**Case 24.** A male millwright in his 50s died when he fell 60 feet through an opening in a catwalk floor while disassembling and removing conveyor equipment from a grain elevator. The work crew arrived and had dismantled the grain leg in 10-foot sections. The grain leg removal created a 60-inch by 28-inch inch hole that was not covered or protected with guardrails. The decedent's coworkers went to lunch, but the decedent, who was not wearing fall protection, kept working on the conveyor system dismantling. A coworker who had returned from lunch observed him fall through the opening to the concrete pavement below. Emergency response was called and the decedent was declared dead at the scene. MIFACE Summary of MIOSHA Investigation: [Case 348](#).

**Case 25.** A male roofer in his 50s died when he fell 17-20 feet when walking down a purlin to obtain a piece of roof sheeting during the construction of a pole barn. It was the decedent's first day on the job. The decedent and his three coworkers had been assigned to install 4-foot by 8-foot pieces of ½-inch insulation and then cover the insulation with roof steel. The work crew had installed approximately 7 pieces of insulation and 4 sheets of steel. At the time of the incident, two coworkers were walking down the screwed-down roof steel to get the next sheet of steel from the ground person. The ground person had walked down the purlins and was in a rough terrain forklift truck with an attached scaffold platform, getting ready to hand up the next sheet of steel. The decedent was walking



Case 25. Roofer fell 17-20 feet when walking down a purlin to obtain a piece of roof sheeting during the construction of a pole barn.

down the purlins to assist the placement of the next sheet of steel when he stepped onto the foam insulation. He fell through the insulation onto the concrete floor. MIFACE Summary of MIOSHA Investigation: [Case 366](#).

**Case 26.** A male general construction contractor in his 50s died when he fell 14 feet to a concrete garage floor. He was helping a homeowner tarp off partially sheeted trusses when the lateral 2x4 he was standing on broke into two pieces near a knot in the wood.

**Case 27.** A male roofer in his 40s died when he fell from a roof.

**Case 28.** A male roofer in his 20s died after falling approximately 20 feet during a residential roof's re-roof with shingle tear-off. The decedent was one member of a nine-member roofing crew. Before beginning work, the crew waited for some frost to evaporate. Workers 1, 2 and 3 were first on the roof, shoveling snow from the northeast corner of the roof and nailing 2x4 cleats above the eave. They moved to the northwest corner of the roof, removing snow and nailing 2x4 cleats above the eave. A path of 2x4 cleats was created leading to the dumpster on the driveway. The decedent and workers 4-7 followed onto the roof and began tearing off the existing shingles. The northeast corner of the roof had been stripped and the workers had begun prepping it with water and ice protection and drip edge. The decedent and Workers 3 and 4 went to the south side of the roof, an 8/12 pitch that did not have any 2x4 cleats installed. Worker 4, seeing that the south roof was icy and that there were no cleats, returned to the northwest corner of the roof. Worker 3, also concerned about the lack of 2x4 cleats, stood by a roof plumbing vent while waiting for some 2x4s. The decedent stripped some of the shingles from the south roof and used a shingle shovel to push a pile of shingles down the roof. As he walked down the roof, he began to slip and had nothing to grab on to (2x4 cleats or gutters) to stop his 20-foot fall to the frozen ground below. Emergency response was called and he was transported to a local hospital where he died approximately 2 weeks later. No one on the roof was utilizing fall protection. MIFACE Summary of MIOSHA Investigation: [Case 347](#).



Case 28. Roofer fell approximately 20 feet during a residential roof's re-roof with shingle tear-off.

**Case 29.** A male volunteer roofer in his 60s fell approximately 25 feet through an unsupported end of a piece of corrugated metal roofing to the sawdust-covered concrete floor below. The decedent was working with two other individuals on top of a metal roof of a cattle barn. The crew was working to replace a ridge vent at the roof peak. The top of the corrugated metal at the ridge was unsupported from its original support board due to the ridge vent replacement. The two crewmembers working with the decedent had their backs turned to him when they heard a noise and the decedent yelling. Turning around, they saw the decedent's hand trying to hold onto the roof. The coworkers attempted to assist the decedent but they were unable to reach



Case 29. Volunteer roofer fell approximately 25 feet through an unsupported end of a piece of corrugated metal roofing to the sawdust-covered concrete floor below.



him in time and he fell to the concrete floor, which was covered with approximately two inches of sawdust. The property owner and the coworkers called for emergency response. He was transported to a local hospital where he was declared dead.

**Case 30.** A male roofer in his 60s died when he fell from a second story roof.

**Case 31.** A male electrician/company owner in his 70s died from a fall from a ladder while replacing a service drop mast at a single story residential home. The firm was contracted to replace the meter enclosure (box) and service drop mast which had been damaged by an electric strike. The 200-amp electrical meter enclosure and service drop mast had been installed to the building using anchors in the mortar with the mast run through the roof eave. The electrical service drop was insulated at the end and the decedent had attached a “come-a-long” between it and the top of the service drop mast. The MIOSHA compliance officer interviewed the employee who completed the task after the incident. Based on his description of the scene on his arrival, it is believed that the decedent was on an 8-foot extension ladder using the “come-a-long” to draw the service drop lines to the top of the service drop mast when the anchors used to secure the service drop mast pulled from the wall tearing through the roof eave. The mast fell to the ground and caused the decedent to fall from the ladder. The home owner, at some point after the incident, exited her home and found the decedent on the ground. She called 911 for assistance. Emergency responders transported him to a local hospital where he died one week after the incident. MIFACE Summary of MIOSHA Investigation: [Case 354](#).

**Case 32.** A male temporary worker in his 30s died when he fell approximately 25 feet from a ladder while helping to install a chimney liner (exhaust sleeve) at a private residence. The decedent placed the 32-foot extension ladder against the chimney, ascended the ladder, and checked the 25-foot tall brick chimney for brick condition and soundness. The coworker indicated during the MIOSHA compliance officer interview that he helped the decedent set the ladder and that the chimney brick, crown and the two crocks coming out of the chimney looked sound. The decedent ascended the ladder halfway up and bounced the ladder against the brick face and there was no indication of loose bricks. After determining the chimney had a sound brick face, the decedent’s coworker went to the basement to receive the chimney liner as it was inserted. The coworker shined the light of a flashlight up the chimney and heard the decedent state he could see the light and a rope would not be needed to pull the liner through. The coworker removed the light and was putting the flashlight down when he heard a crash. He investigated the noise and found the decedent on the ground with approximately two tiers of brick and part of the chimney crown nearby. The ladder was still standing against the chimney. He called for emergency response. The decedent was transported to a local hospital



Case 32. Temporary worker fell approximately 25 feet from a ladder while helping to install a chimney liner (exhaust sleeve) at a private residence.

where he died two weeks later due to complications of the injuries sustained at the time of the fall. MIFACE Summary of MIOSHA Investigation: [Case 361](#).

**Case 33.** A male automotive industry laborer in his 50s died in 2014 from complications of a fall at work that occurred in 2008.

**Case 34.** A female inspector at a manufacturing facility in her 60s fell in 2012 while stepping down off a rack onto a two-foot step stool. She lost her balance and fell onto her back and struck her head on the floor. She died from complications of her head injury in 2014.

**Case 35.** A male construction laborer in his 50s died due to falling 15-18 feet from a scaffold. The decedent and his business partner collected, hauled and sold scrap metal. The decedent was told about a demolition job where he and his business partner could take the scrap metal after they removed it. After they worked for a few days tearing out old HVAC ductwork, they decided that help was needed so they brought in other workers. The decedent ascended the scaffold and began to strip the insulation from a 3-foot wide by 1.5 -foot tall (length unknown) piece of ductwork located just under the roof trusses. After the insulation was removed, he used a sledge hammer to break the straps holding the duct work in place. A 20-foot long piece of duct work broke loose and fell, striking him and knocking him off of the scaffold. He landed on the floor and struck his head.

**Case 36.** A male party store owner in his 50s died when he fell approximately six feet from a ladder to a concrete floor. The decedent was working at a store owned by another individual at the time of the fall.

**Case 37.** A male laborer/floor social service organization technician in his 40s died when he fell from a backing supply truck. The driver of the incident truck had returned from picking up donations. He positioned the truck and he and a coworker unloaded some of the donated articles. The remainder of the articles had to be unloaded into a stationary trailer. Due to the position of other vehicles between the truck and the trailer, the driver straightened up the truck while the decedent guided him while riding on the back bumper of the truck using the hold bar to maintain his balance. The back bumper was snow covered. The truck driver could see the decedent's head and arm. The decedent motioned the driver to back up the truck. The driver backed up the truck and the decedent motioned the driver to stop. The driver stopped the truck and put it in park and turned off the ignition. After exiting the truck, the driver noticed that the decedent had fallen off of the truck. Emergency response was called and the decedent was transported to a nearby hospital where he was declared dead. The medical examiner report indicated that the decedent fell from the truck and sustained a head injury. MIFACE Summary of MIOSHA Investigation: [Case 372](#).



Case 37. Laborer/floor social service he fell from a backing supply truck.

**Case 38.** A loader operator in his 30s died when he fell into a railroad car hopper and was engulfed by 70,000 pounds of yellow soybeans during loading. The switch operator in the yard positioned a string of railroad cars into the load out area. The incident railroad car had three compartments with four hinged lids that opened toward the load out room. The load out room was positioned above and to the west of the railroad cars. To access the rail cars from the load out room, two 4-5 foot long steps approximately 18 feet above the ground were winched down to just above the rail car. The unwitnessed incident occurred during the loading of the next to last railcar. To access the top of the railroad cars, the decedent opened the load out room door and then stepped onto the top step. He did not attach the fall arrest lanyard that was hooked to the outside wall of the load out room to his fall harness. The weather was windy with a sub-zero wind chill. It is most likely that the decedent slipped or tripped, either while descending the steps or walking along the top of the rail car. He fell into a 13-foot-long by 2-foot-wide hatch opening of the railroad car. Coworkers noted that a weigh hopper had not been emptied and investigated. One worker called for emergency response as they were looking for him. Knowing which compartment was last filled, they walked around the car and then began unloading the compartment from the bottom of the car. They found the decedent and pulled him from the compartment. CPR and defibrillation were given but he could not be revived and was declared dead at the scene. MIFACE Investigation Report: [14MI002](#).

**Case 39.** A female librarian in her 70s tripped and fell as she was exiting the library. The concrete was cracked due to the severe weather. The decedent's employer had warned the employees about the cracked concrete. Due to weather issues, the employer was unable to fix the damaged concrete. A coworker found her on the ground and called 911. She died two weeks later in the hospital from complications of the facial injuries sustained at the time of the fall.

**Case 40.** A male custodial supervisor in his 30s fell on ice in a parking lot while taking trash out to a dumpster. He died several months later from complications of his cervical spinal cord injury.

**Case 41.** A male tree service owner in his 60s died when he was thrown from the bucket of a cherry picker. The decedent and a family member arrived at the site to cut down trees so the land could be prepped with a bulldozer for a new home. The decedent operated the aerial lift and the family member helped to drive vehicles to jobsites and to place brush into the limb chipper. The decedent was using a chain saw to cut two marked trees while elevated approximately 45-50 feet in the air. The truck was positioned on one side of some primary electrical lines. The articulated boomed elevated bucket was positioned on the other side of the electrical lines to cut the marked trees. It appears the knuckle of the boom caught on a tree near his truck. Apparently, he did not know the knuckle was stuck and he continued to apply pressure to try to move the bucket. When the knuckle slipped off the tree, the boom swayed back and forth, causing the decedent to be thrown out of the bucket. There were scar marks approximately 45 feet high on the tree he was trimming, possibly from the bucket itself. In the metal box on the platform, the responding police department found a safety belt. In the cab of the vehicle, the police found a hard hat. His family member contacted a nearby business who called for emergency response. He was declared dead at the scene. MIFACE Summary of MIOSHA Investigation: [Case 358](#).

**Case 42.** A male hotel co-owner in his 60s died from complications in 2014 of an 8-foot fall sustained in 2006. The decedent was working with two co-workers tarping a stack of carpeting located outside of a hotel. One coworker was using a Sky Trak Turbo Model 60362 forklift to elevate the decedent and the second coworker, both of whom were standing in a large wooden box/crate. The box/crate was not secured to the forklift's forks or mast. While working approximately 8 feet above the ground, the two coworkers were placing plywood on the tarp so it would not blow away. The decedent's coworker walked to the side of the box where the decedent was standing, causing it to become unbalanced and fall from the forks to the ground.

**Case 43.** A 41-year-old male senior center dishwasher in his 40s died as a result of medical complications due to a fractured ankle sustained after a fall in the senior center's icy and snow-covered parking lot.

**Case 44.** A male speedometer repair shop owner in his 70s died of complications from the surgery to repair the broken leg he sustained as a result of his fall at the repair shop.



Case 42. Hotel co-owner died from complications in 2014 of an 8-foot fall sustained in 2006.

**Case 45.** A male self-employed individual in his 70s worked in the service repair industry. He died when he fell 12-15 feet from a ladder to a garage floor. The decedent was contracted to work on an overhead garage door when, according to emergency responders, the ladder slipped out from under him. He was found lying face down across the ladder on the service garage floor.

**Case 46.** A male HVAC repairman in his 50s died when he fell an estimated 10-12 feet from a ladder. The decedent was dispatched to a facility to service a walk-in cooler. He placed a new Werner, 28-foot fiberglass extension ladder against the building so he could look at the roof-mounted condenser unit associated with the walk-in cooler. The roof height was approximately 14 feet. The ladder safety feet were adequately positioned with the safety feet prongs buried in the snow and ice. The ladder was properly extended above the roof. The ladder had a rubber bungee tie-down strap looped around the 5th rung from top of ladder but the strap was not secured to the building or piping at the top edge of roof. It is unknown if he was climbing up or descending from the ladder when the fall occurred. The condenser unit associated with the cooler was approximately six feet away from the edge of the roof. There were no footprints in the snow on the roof. The ladder did not move from its original position when he had his unwitnessed fall. Investigation found that the third and fourth ladder rungs were dented. Weather conditions at the time of the incident were described as blowing snow. The cause of the fall was unknown. He was found deceased at the base of the ladder by a customer. The decedent had received ladder training from his employer approximately two months prior to the incident. MIFACE Summary of MIOSHA Investigation: [Case 343](#).

**Case 47.** A male construction laborer in his 40s fell approximately 20 feet from a two-story roof while clearing snow. Decedent and a coworker had been hired by the homeowner to clear snow

and ice off the gutters and roof. The decedent was on the roof of the second story when his coworker heard him yell and then heard him land on the ground. Based on the decedent's location, the decedent may have struck a lower awning, bounced off and then landed on the ground. He died several weeks later from complications of injuries sustained at the time of the fall.

## **FIRE/EXPLOSION (1)**

**Case 48.** A male auto repair shop owner in his 50s died from burns sustained in an explosion. The decedent was using a worn, cut web-type strap to raise a fuel tank out of a vehicle. The strap broke and the tank fell to the ground causing fuel to be released. A propane heater that was heating the garage ignited the gasoline vapors causing an explosion.

## **HOMICIDE (19)**

**Case 49.** A Hispanic female florist/nursery laborer in her 40s was abducted from her workplace and killed. She was found at a different location.

**Case 50.** A male bee keeper in his 40s died from multiple gunshot wounds.

**Case 51.** A female tobacco sales manager in her 20s died in a motor vehicle crash caused by a suspect fleeing the police. The suspect did not stop at a red light and struck the decedent's vehicle on the driver's side.

**Case 52.** A male tire store manager in his 30s died from a gunshot wound.

**Case 53.** A grocery store laborer in his 20s died due to gunshot wounds sustained in a carjacking.

**Case 54.** A male party store owner in his 50s died due to a gunshot wound sustained during a robbery

**Case 55.** A male pharmacist in his 30s died due to multiple gunshot wounds during an altercation with a customer.

**Case 56.** A male gas station clerk in his 60s died from a gunshot wound.

**Case 57.** A female gas station clerk in her 20s died from multiple injuries from a sharp object.

**Case 58.** A male gas station clerk in his 20s died from multiple gunshot wounds.

**Case 59.** A male retail store owner in his 50s died from a gunshot wound.

**Case 60.** A male truck driver in his 30s died from multiple gunshot wounds.



**Cases 61 & 62.** Two landlords, a female in her 30s and a male in his 70s, died from multiple gunshot wounds when attempting to evict tenants from a newly purchased home.

**Case 63.** A male security guard in his 20s died from a gunshot wound.

**Case 64.** A female gymnastics facility administrative assistant in her 50s died from multiple gunshot wounds during an assault.

**Case 65.** A Hispanic female hospital worker in her 40s died from multiple gunshot wounds during a domestic altercation in the parking lot of her workplace.

**Case 66.** A female group home direct care worker in her 70s died from complications of being struck on her face by a resident of the home. The decedent and another employee entered the room after knocking on the door and announcing themselves. The resident became angry when she entered his room and he slapped her on the face. Her coworker heard the sound of the slap. The injured worker fell down onto the bed. She immediately got up and left the room. She recorded the incident but did not report the incident to management. When she next reported to work, one of her teeth fell out and she was sent to local clinic, which referred her to a dentist. The clinic indicated that she did not complain of a headache or pain. The clinic authorized her immediate return to work. The decedent was not scheduled to return to work for four days after her visit to the clinic. She went home after the clinic visit. Early the next morning, a family member found her unconscious and took her to the hospital where she died the following day. Her cause of death as stated on the death certificate was blunt traumatic head injury. The decedent had received entry-level care giver training-providing residential services in community settings and had successfully completed all employer-required training. MIFACE Summary of MIOSHA Investigation: [Case 345](#).

**Case 67.** A male soccer referee in his 40s died from an assault by a soccer player during a game he was refereeing.

## **MACHINE (11)**

**Case 68.** A male farmer in his 80s died while cutting grass, when he was trapped under a cutting blade of a mower attached to an old tractor. The decedent was in a ditch when he turned the tractor to his right. The front left tire of the tractor went up and over a culvert, causing the tractor to tip up and the decedent to fall off the seat backwards, landing on the ground in back of the blade. The tractor then rolled back, trapping him partially under the blade mechanism.



**Case 69.** A male farm worker in his 30s died when the unsupported Case International 1680 combine head lowered onto his side during repair activities in a bean field. The decedent was working alone in the field harvesting soybeans. It was hypothesized that the sensing mechanism which permitted the hydraulically operated head to float over the ground became “stuck” in a raised position. The decedent exited the combine and left the combine running. He did not take the combine head out of “automatic” control. He went under the raised combine head with a crescent wrench without providing secondary support (header safety stop) to prevent the head from lowering when repairs were completed. Although the event was unwitnessed, two hypotheses were developed: 1) He may have been attempting to make an adjustment directly to the combine head to lower it from the raised position or 2) he was striking the floating sensing “rod” which was stuck in the raised position to free the head. When the combine head released from its raised position, it fell onto the decedent, pinning him on his side against the dirt. When the decedent could not be contacted by cell phone, his coworkers went to look for him. A coworker found him, raised the combine head, and backed the combine approximately 15 feet away from him. Since no hydraulic fluid was observed on the ground, the cause of the combine head lowering was not due to a ruptured hydraulic line. He was declared dead at the scene.



Case 69. Farm worker died when the unsupported Case International 1680 combine head lowered onto his side during repair activities in a bean field.

**Case 70.** A male cattle farmer in his 30s fell from an ORV while traveling on a dry, 2-lane roadway with an un-posted speed limit of 55 mph in 2012. At the time of the incident, he was traveling to a corn field to get cows out of that field. The ORV had a very low left tire (unknown if the low tire was the front or rear tire) and the decedent had been leaning to his right to compensate for the tire when he fell from the vehicle. His traveling speed was unknown. After falling he skidded and rolled down the roadway approximately 40 feet. He was not wearing a helmet at the time of the incident. He died from complication of the 2012 injury in 2014.

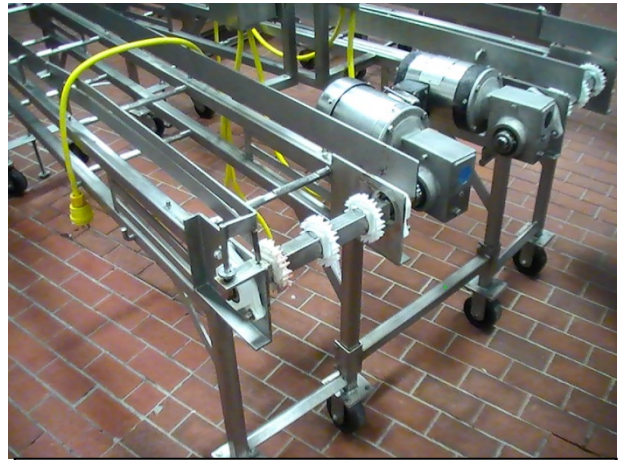
**Case 71.** A male beef cattle farmer in his 40s died when he fell from the blade of a John Deere HLT bulldozer and was run over when the bulldozer moved forward. The decedent, two family members and two contractors were working together to replace damaged weather curtains on a cattle barn. The 30-foot wide by 450-foot long cattle barn had a metal roof and open framing (no permanent walls). Running the entire length of the east side of the building was a short (approximately 2-foot high) cement retaining wall. Utilizing the bulldozer to work from, the decedent and his work crew were installing replacement curtains. The tarp-like curtains were approximately 50- to- 60-feet in length and had an aluminum pole at the base so they could easily be rolled up or down based on the weather. The curtains were installed by nailing them to the barn’s header with 2x4s. The decedent positioned the bulldozer parallel to the barn. He left the operator’s seat with the engine running and the parking brake disengaged. He stood on the 8-foot

wide, 36-inch tall blade to hold up and nail the new curtains in place. One of his family members and one contracted employee were inside the barn holding up the curtain to be nailed. The other contracted employee was standing on the bulldozer's fender near the operating controls. It was unknown if the bulldozer slipped into gear or was bumped causing it to lurch forward. The decedent lost his balance and fell between the blade and track. He was run over before the dozer could be stopped. Emergency response was called and he was declared dead at the scene. MIFACE Summary of MIOSHA Investigation: [Case 355](#).

**Case 72.** A male county road commission foreman in his 40s died when he was run over by a Cat Model 140M2 road grader. The 4-person crew was in the process of prepping a gravel road for asphalt application. The road had been closed to traffic. The grader operator was working in the southbound lane cutting from the edge to the centerline maintaining a 2%-3% grade. The decedent was checking and marking the grade south of the road grader, maintaining at least a 100-foot distance ahead of the grader. The grader operator could see the blade easily from inside the cab but had to lean left or right to see well ahead. The configuration of the machine and the operator's position permitted the operator to see 30-to 40-feet in front of the machine. The operator could not see objects less than 10 feet in front of the machine unless the object was taller than 6 feet. While keeping the decedent in view, the operator checked his mirrors and monitored the slope meters. The operator's last visual of the decedent was when the decedent was approximately 150 feet in front of the machine, measuring and marking the road. The decedent was wearing a 360-degree high visibility vest. Approximately 4-5 seconds after noting the decedent's location, the grader operator felt the left front tire of the grader raise up and travel over something. The operator then saw the decedent lying on the road between the tire and the blade of the grader. His can of spray paint and his measuring tool were found near him. Emergency response was called. While awaiting arrival, the decedent's coworkers performed CPR. Emergency responders took over the care. He was declared dead at the scene. The operator noted that the decedent usually approached the machine from the left side, not from the front. MIFACE Summary of MIOSHA Investigation: [Case 365](#).

**Case 73.** A male crane operator in his 30s died when the crane cab became dislodged by the crane's counterweights when the crane tipped forward and over during a lift. The site owner had a 13-foot diameter dirty gas main collapse through the roof and onto the support steel below. The site owner hired Firm 1 to coordinate the controlled selective demolition of a damaged building and remove the damaged gas main. The site owner rented the cranes used during demolition. The decedent was the crane operator of a Manitowoc 16000 Series III crane with a lifting capacity as configured of 140,000 pounds with a four-part line. The crane was not configured to use the rated capacity limiter (RCL) – the operator could unknowingly overload the crane without warning (the indicator lights would not flash). The damaged gas main had to be removed in multiple major lifts. Firm 1 employed an engineering firm to design the first lift to remove a section of the gas main. This lift was uneventful. Firm 1 estimated the ductwork weights and developed the lifting procedure for lifts two and three. On lift two, the rigging was not protected by softeners and cut into the steel ductwork. The ductwork weight was estimated within 10,000 pounds. Lift two was successful. It should be noted that the ductwork in lift one and two were relatively debris free. The fatal incident occurred during lift three. For lift three, Firm 1 estimated the ductwork to weigh between 26,000-40,000 pounds. The third duct was known to contain debris but the actual weight of the debris was unknown. With lift three

attached to the Manitowoc 16000 Firm 1's crew was working from a man basket hung from another crane, attempted to cut free the third duct from its supports. Two way radios were used for communication between the signalman, decedent, and crew working from the man basket. When the crew in the man basket was finished cutting, the signal man directed the decedent to begin the lift. During the attempt to dislodge the duct, the decedent was directed by the signalman to quickly place a load on the crane's load line and then release the load (bouncing the load). After more than five hours, the duct was finally dislodged. The decedent lifted the load, rotated the crane approximately 90-degrees clockwise and began to lower the load. The signalman directed the decedent to stop lowering the load (the load was approximately 60 feet above the ground) so a landing spot could be determined. After determination of the landing spot was made, the signalman directed the decedent to boom the luffing jib down. As the luffing jib was being boomed down the crane began to tip forward, it then tipped backwards, settled back on its tracks, and then tipped forward again. The counterweights, which were not fastened per assembly manual instructions, broke free and struck the crane cab, tearing it from the frame of the crane.



Case 74. Factory maintenance worker in his 40s died when he was entangled in the plastic drive gear of a 6 ½-foot long by 17-inch wide by 32-inch high food conveyor.

**Case 74.** A Hispanic male factory maintenance worker in his 40s died when he was entangled in the plastic drive gear of a 6 ½-foot long by 17-inch wide by 32-inch high food conveyor. The conveyor was powered by a ½-HP, 480-volt motor located at the end of the unit. The conveyor had a 240-volt drop cord with a twist plug to power the conveyor unit. The conveyor's disconnect box was located in the middle of the unit on the back side, requiring employees to reach over the unit to stop or shut it off. The disconnect box had a lockable red e-stop push button and a black start button. The conveyor was on casters and could be rolled into place for use with various pieces of equipment and operations. The drive shaft of the motor had three plastic gears which were driven by the motor and shaft. The conveyor was plugged in and was running when the decedent became entangled. It is unknown how the decedent became entangled or the activity the decedent was performing at the time of entanglement. His coworker, who was working in another area of the room, had removed and cleaned the plastic conveyor belt and the conveyor equipment. The decedent had been assigned to clean the floor of the room. The floor was wet and covered with sanitizer/soap solution. He was observed by his coworker with his gloved right hand/arm caught in the plastic drive gear. The decedent had been pulled up tight against the shaft. His coworker ran for help and emergency response was summoned. The decedent was working overtime and the cleaning activity was not his regular job. MIFACE Summary of MIOSHA Investigation: [Case 351](#).

**Case 75.** A male horizontal plastic injection mold machine (HPIMM) operator/material handler in his 20s was crushed when he was inside the HPIMM adjusting a cardboard chute through the rear sliding door without lockout. The HPIMM produced two parts that required subsequent

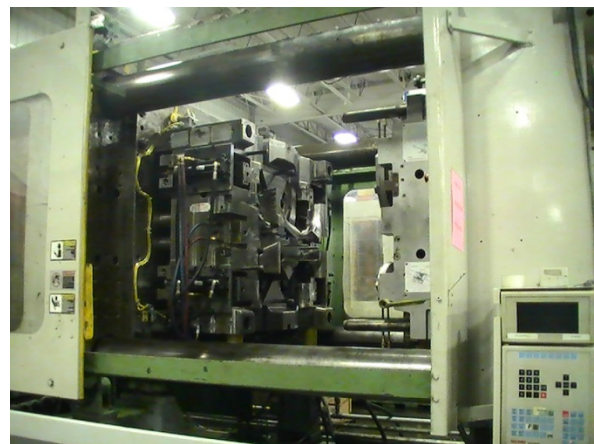


assembly. The decedent had operated the HPIMM earlier in his shift and was also acting as a material handler filling hoppers and assembling the two parts with a fixture to insert a pin that held the two pieces together. The HPIMM had a single rear interlock switch to control the hydraulics. The interlock switch had been defeated by the placement of a shop towel to hold the switch down, simulating the effect of the door in the closed position. The HPIMM operator/supervisor asked the decedent to tie up the catch tray, a cardboard piece that collected falling parts or waste, at the rear of the machine. It is unknown if the decedent bypassed the interlock or if the interlock was already in a bypass condition. The decedent leaned into the machine through the open door to tie up the catch tray. The operator/supervisor at the front of the plastic injection mold machine closed the front door. The press, which was set in semi-automatic, cycled with the decedent between the mold halves. The operator heard a noise, walked around the machine and saw the decedent. Emergency response was called and the decedent was declared dead at the scene. MIFACE Summary of MIOSHA Investigation: [Case 359](#).



Case 75. Horizontal plastic injection mold machine (HPIMM) operator/material handler crushed when he was inside the HPIMM adjusting a cardboard chute through the rear sliding door without lockout.

**Case 76.** A male process technician in his 30s who was cleaning a Van Dorn 1500 horizontal injection mold machine was crushed when another operator started the machine. The decedent was directed by his team leader to start up the 1993-vintage Van Dorn 1500 ton horizontal injection mold machine (HIMM). The HIMM was equipped with mechanical, electric and pneumatic interlocks on the front and rear gates, but there was no guard below the gates on either the front or the rear side of the press. The press base and platform were located on the floor. The platform stood approximately 16-inches high and was approximately the size of the machine's mold area. The height from the floor to the top of the front gate rail was approximately 50-inches and the gate opened about 74-inches. From the bottom of the front gate rail to the platform was 27-inches. The unguarded area under the operator's door was approximately 27-inches high x 74-inches long. The distance from the edge of the mold to the operator's gate was about 12-inches. The controller was located within 21-inches of the operator's gate window. The area below the rear gate had an approximate opening of 24-inches x 62-inches and the mold was located about 30-inches from the gate. The decedent pressed the F2 key on the controller placing the HIMM in automatic cycle, pausing both the machine and the pick & place conveyor that picked the molded parts and placed



Case 76. Process technician cleaning a Van Dorn 1500 horizontal injection mold machine was crushed when another operator started the machine.

them on a nearby conveyor. Pressing F2 also left the mold area open. The decedent entered the mold area through one of the unguarded openings and stood on the press platform cleaning the molds when the incident occurred. Another process technician looked at the HIMM controller and noticed it was in automatic cycle, paused mode. The press's gates were closed. The process technician pressed the F2 button to restart the machine. The HIMM cycled and the press ram closed, crushing the decedent. The HIMM had to complete its cycle before the mold area would open. The decedent was declared dead at the scene. MIFACE Summary of MIOSHA Investigation: [Case 363](#).

**Case 77.** A male shot blast operator in his 60s died when a firm-built 632-pound steel plate guard fell on him. Parts to be blasted in the machine were too long to fit within the machine and allow the doors to be closed. The firm had previously manufactured two 130-inch-tall by 72-inch-wide one-quarter-inch plate steel guards to extend the enclosure, each weighing approximately 632 pounds. A 15-inch by 3-inch "L" bracket was welded to the back of each guard. A forklift was used to hang the steel plate guards on a rail located on the top of the shot blast enclosure. The firm had instructed employees to climb on top of the enclosure to verify the "L" brackets were properly nested over the rail. The decedent crawled under the guards and entered the blast area with a shovel. While crawling out of the machine, it is hypothesized he bumped one of the guards causing it to fall on him. Post investigation determined the guards had not been hung properly with the edge of the "L" bracket sitting on top of the rail opposed to being nested over it. It was unknown why the decedent crawled under the guards – no part was in the machine at the time of the incident. The shot blast table could be rolled out of the machine to be cleaned. Additionally, fellow employees indicated that the shot blast table should be cleaned prior to installing the plates. The decedent was found by his coworkers, who called 911. He was declared dead at the scene. MIFACE Summary of MIOSHA Investigation: [Case 356](#).

**Case 78.** A male lathe operator in his 20s died when his shirt became entangled on a 1 7/8-inch piece of 1-inch diameter bar stock. The decedent purchased the South Bend manufactured 16-inch lathe at an auction and placed the lathe in a dimly lit and congested area in the workshop near a shelving unit on a wall. The lathe had a pass-through chuck. The work piece, a 1-inch round by approximately 3-foot long bar steel stock, had been cut to length with a band saw. A 1-7/8-inch piece of the bar stock extended from the end of the lathe (tailstock); its edge was sharp and had a burr. The bar stock was located approximately 46 1/2-inches above floor level. It was not known why the decedent was at the tailstock of the lathe.



[Case 78](#). Male lathe operator died when his shirt became entangled on a 1 7/8-inch piece of 1-inch diameter bar stock.

Several possible incident scenarios have been developed: 1) he was leaning over the rotating tailstock to obtain a tool from the shelves behind the lathe or 2) he walked behind the rotating tailstock to obtain a tool from the shelves behind the lathe. At some point, the right pocket of his shirt was caught by the rotating tailstock burr. His shirt wrapped around the stock and tightened

at the decedent's neck and chest. A coworker working nearby heard a noise, looked over, and saw him. He ran outside and informed the decedent's father. His father instructed him to shut off the generator which powered the unit and then they worked to remove the decedent from the entanglement. Emergency response was called and the decedent was transported to a local hospital, where he died approximately two weeks later from brain injury due to a loss of oxygen. MIFACE Investigation Report: [14MI034](#).

## **MOTOR VEHICLE (28)**

**Cases 79 & 80.** A male farmer in his 60s and a male laborer in his 30s died when the pickup truck they were traveling in was struck-by a train on the passenger side. The decedents were traveling on a private road on the farmer's property collecting firewood when the pickup crossed over the unmarked/unguarded railroad crossing. The train dragged the pickup truck approximately 1/4-1/2 mile down the tracks.

**Case 81.** A male builder in his 50s died in a motor vehicle crash. The decedent was driving a pickup truck in a southwest direction on a wet, 4-lane roadway with a posted speed limit of 45 mph. The decedent was in the left lane and had crossed the center line marker. Trying to gain control of the vehicle, the decedent overcorrected causing the pickup to leave the roadway to the right and striking the curb. The vehicle then entered a ditch, struck a decorative pole and then went airborne as it cleared a private driveway. The decedent's vehicle struck a parked vehicle in a parking lot. The decedent was not wearing a lap belt/shoulder harness. The pickup's airbag deployed.

**Case 82.** A male construction laborer in his 30s died when the pickup truck in which he was a passenger struck a semi-trailer that was blocking the roadway. The driver of the pickup truck was northbound on a dark, unlit, dry 2-lane roadway with a posted speed limit of 55 mph. The semi-truck was hauling a trailer containing a concrete bridge beam. The truck/trailer was in the process of completing a right turn (northbound) to exit a driveway. The semi had stopped with the tractor on the west shoulder due to a vehicle passing the escort car located approximately 50 yards in front of the semi. The trailer completely spanned and blocked the roadway. The escort car was positioned on the north side of the semi-tractor trailer when the incident occurred. The pickup struck the trailer. The decedent was located in the rear passenger seat of the pickup. He was not wearing his seat belt. The vehicle's airbags deployed.

**Case 83.** A male septic excavation service owner/operator in his 50s died when his pickup truck was struck-by a semi-tractor. The decedent was driving the pickup truck travelling southbound on a dry, 2-lane roadway with a speed limit of 55 mph. The incident occurred at an intersection. A semi-truck was traveling westbound and had the right-of way. The decedent failed to yield to the semi and, while making his turn, the semi struck his pickup truck on the driver's side. The decedent's truck spun around and was struck a second time, causing the driver's side door to open. The decedent was not wearing his safety belt/harness and was ejected from the vehicle. The pickup's airbags deployed.

**Case 84.** A male truck driver in his 40s died when his semi-tractor trailer loaded with milk cartons left the roadway and crashed into trees. The decedent was traveling westbound on a dry,

2-lane roadway with a posted speed limit of 55 mph. The decedent lost control of the semi on a curve, which had a posted speed limit of 30 mph. The decedent's semi crossed over into the eastbound lane, struck a guardrail, flipped over, and then rolled down an embankment. Investigating police noted that the tire marks left by the tires on the driver's side of the tractor trailer were not skid marks, but did show the weight of the tractor/trailer shifting to the left as it progressed into the turn and ended approximately five feet from the guardrail at which point the tractor/trailer overturned. The decedent was not wearing a seat belt.

**Case 85.** A male truck driver in his 50s died when the delivery truck he was driving slid on an icy road, entered a railroad crossing, and struck a train. The decedent was traveling on a very icy and snow-covered 2-lane roadway with a non-posted speed limit of 25 mph. It was snowing lightly at the time of the incident. The train conductor indicated in the police report that the decedent did not appear to notice the train coming, and at the last moment, applied/locked up the brakes, but on the icy roadway slid into the train. The decedent was not wearing a seat belt and was ejected from the delivery truck. The truck was not equipped with an airbag.

**Case 86.** A male automobile transport driver in his 70s died when the pickup truck he was driving crossed the centerline and struck an oncoming vehicle. The decedent was traveling eastbound on a wet, 3-lane road way with a posted speed limit of 55 mph. As he entered the junction of another highway, he crossed the centerline and struck the oncoming vehicle. The decedent was wearing his seatbelt. The truck's airbag deployed.

**Case 87.** A male heating company salesman in his 40s died when the cargo van he was driving struck a semi-truck. The decedent was travelling westbound on a snow-covered, 2-lane roadway with a posted speed limit of 55 mph. The decedent's van was traveling behind a county snow plow. Due to high winds, the snow plow created a "whiteout" condition behind and to the side of vehicle. The police report indicated that the decedent was following the plow too closely and he became disoriented on the roadway. The cargo van crossed the centerline and the driver's side of the cargo van struck an eastbound semi-truck. The decedent was wearing a seatbelt/shoulder harness. The vehicle's airbag deployed.

**Case 88.** A male truck driver in his 40s died when his semi-truck swerved into the center lane of an expressway, struck another semi, and then continued across the expressway, striking a bridge abutment. The semi exploded on impact. The dry, 3-lane expressway had a posted speed limit of 70 mph. The decedent was traveling northbound in the right lane. Witnesses indicate that the decedent's semi-tractor abruptly swerved from the right lane into the center lane. After striking the semi traveling in the center lane, the decedent's semi struck a bridge abutment. The decedent's semi was pushed to its final resting position by the semi that had been struck. The cause(s) of the abrupt maneuver into the center lane was unknown. It is unknown if the decedent was wearing his seat belt. The semi-tractor was not equipped with an airbag.

**Case 89.** A male semi-truck driver in his 60s died when his semi overturned after striking another semi's rear axle and its duals that had separated from the other semi's cab and were lying in the roadway. The decedent's semi was traveling in the center lane of a dark, unlit 3-lane roadway with a posted speed limit of 60 mph. Witnesses stated that the decedent slammed on his brakes and steered the cab/trailer hard to the right. The semi left the roadway and overturned,



coming to rest on its side in a ditch. The decedent was wearing his safety belt/harness. The tractor's airbag did not deploy.

**Case 90.** A male truck driver in his 40s died when the semi he was driving left the roadway, struck several trees and caught fire. The decedent was traveling westbound on a dry, 2-lane roadway with a posted speed limit of 70 mph. A previous motor vehicle collision had slowed/stopped the roadway traffic. The decedent applied his brakes but was unable to stop in time for the slowed traffic. He turned his semi to the right (north) and left the roadway. He lost control of the semi in a ditch, struck several small trees, crashed through a fence causing the cab to tip onto its side. The cab caught fire (police surmised the fire was caused by a damaged fuel lines or a damaged fuel tank). Witnesses indicated the decedent was pinned in the cab and was alert after the crash. When the cab caught fire, two individuals used fire extinguishers in an unsuccessful attempt to extinguish the flame. The decedent could not escape the burning cab. It is unknown if the decedent had been wearing his seatbelt. The cab was not equipped with an airbag.

**Case 91.** A male semi-truck driver owner/operator in his 50s died when he was struck in a hit-and-run incident after pulling over to the paved right shoulder of a dry, 4-lane lane expressway with a posted speed limit of 70 mph. The roadway was unlit and curved slightly to the west. He was driving a 2005 International Tractor semi-truck with a box style attached empty trailer northbound when he was notified by passing motorists that there was a problem with the trailer's tail lights. He called his wife on his cell phone just before pulling over onto the shoulder to let her know about the problem and that he was going to check the lights to avoid getting a ticket. The decedent exited the freeway to the right shoulder. He was fully on the shoulder when he parked the tractor/trailer. Leaving the tractor unit running and prior to exiting the tractor cab, he activated the hazard lights. The hazard lights were operational and the tractor's front headlights were lit. The responding police determined that the decedent was standing near the fog line when he was struck-by the passenger side of an automobile. His left shoe was found wedged under the first trailer axle on the driver's side. He was found lying face down in the roadway between the two right lanes, just north of his semi-truck. The tractor cab was not equipped with a forward-facing camera. The decedent was not wearing a high visibility vest.

**Case 92.** A male petroleum company truck driver in his 20s died when the truck he was driving left the roadway, rolled, struck a tree and then exploded. The decedent was travelling southbound on a 2-lane roadway with an un-posted speed limit of 55 mph. The police investigation found that the decedent gradually left the roadway to the right and entered a ditch, causing the truck and tanker, which contained ethanol, to overturn onto the passenger side. The truck and tanker struck a tree, ignited, and then exploded. Due to the fire, it was unknown if the decedent was wearing a seatbelt/shoulder harness. The truck was not equipped with an airbag.

**Case 93.** A male semi-truck driver in his 50s died when his semi entered the median and overturned. The decedent was traveling northbound on a dry, 2-lane roadway with a posted speed limit of 60 mph. The decedent was in the left (passing) lane when for reasons unknown, the semi, hauling a flatbed trailer with two large coils of steel, left the west side of the roadway, entered the median and overturned. The trailer also overturned and the coils were lying on the

ground detached from the trailer. The decedent was wearing his seatbelt/shoulder harness. The semi's airbags did not deploy.

**Case 94.** A male semi-truck driver in his 70s died when his semi-tractor hauling a tanker struck a backing railroad train. The locomotive was backing two tanker cars west to east across the road/crossing. The railroad crossing lights were flashing and the cross arms were down across the roadway. The decedent was traveling southbound on a dry, 2-lane roadway with a posted speed limit of 55mph. The decedent's semi-tractor struck the west end of the second tanker car near where it attached to the first tanker car. The decedent was traveling at the speed limit and did not apply the semi's brakes prior to striking the tanker according to witnesses. The force of the crash caused the tanker to tip over to its side and destroyed the decedent's tractor cab. Autopsy results indicated that the crash was not a result of a medical condition. The cause of the crash is unknown. The semi cab was not equipped with an airbag. The police report indicated that the decedent's seatbelt use was unknown.

**Case 95.** A male bus driver in his 40s died when his bus struck a building. The roadway had 5 total lanes, two lanes traveling east and two lanes traveling west with a middle turn lane. The roadway was dry and had an un-posted speed limit of 30 mph. The decedent was traveling eastbound and slowly crossed over the center lane and then the westbound lanes, jumped the curb and then struck a building. It was unknown if the decedent was wearing a safety belt. The vehicle was not equipped with an airbag.

**Case 96.** A male bank carrier in his 50s died in a head-on collision with a westbound SUV that had crossed over into the eastbound lanes. The decedent's minivan was traveling eastbound on a dry, 2-lane expressway with a posted speed limit of 70 mph. The SUV driver had been driving westbound and used the emergency access roadway between the eastbound and westbound expressway to enter the eastbound expressway. Several vehicles were able to avoid the oncoming SUV. The decedent, whose vehicle was traveling behind a vehicle hauling a boat, could not see the oncoming SUV. The SUV struck the boat and then struck the decedent's vehicle head on. Immediately after the crash, a witness attempted to provide aid to the decedent but was unable to do so because the decedent's vehicle caught fire, and then exploded. The driver's airbag inflated. The decedent's seat belt use was unknown.

**Case 97.** A male process designer in his 40s died of complications of a 2013 crash. He was driving a passenger vehicle enroute to consult with a client when his vehicle struck a parked tow truck. He was southbound on an icy, 4-lane roadway with a posted speed limit of 70 mph. He was traveling in an outside lane which looked clear, but had a thin layer of ice. The inside lane had a packed ice and snow layer. The decedent lost control of the car and it rotated counter clockwise approximately 110-degrees and then slid into the rear of the tow truck that was parked, while working to remove another vehicle that was stuck in the snow. The decedent was wearing his seatbelt. The airbag did not deploy.

**Case 98.** A male waste hauling firm truck driver in his 50s died when the raised roll-off bed of his truck struck a pedestrian bridge overpass. The decedent was traveling northbound in the right lane of a dry, 3-lane roadway with a posted speed limit of 55 mph. It was dark at the time of the incident, but the roadway was lit by overhead lamps. The elevated bed for the roll-off

container struck the pedestrian bridge overpass resulting in the overpass collapsing onto the roadway. Responding police found that a safety device had been bypassed with a paper clip; the paper clip had been placed on a switch contact point for the hoist/steel bed. Under operational conditions, when the truck bed rises, the connection is lost with the switch/contact point, an audible alarm sounds and a hoist light inside the cab illuminates. With the paper clip in place, the audible alarm did not sound and the hoist light inside the cab did not illuminate. It is unknown if the decedent was aware of this bypass situation. The decedent was not wearing a safety harness/belt and was thrown from the cab as a result of the collision. The vehicle's airbag deployed.

**Case 99.** A female university custodian in her 50s died when struck-by a bus. The incident occurred at an intersection with flashing red signals in all directions. The bus driver was traveling westbound on a damp, 3-lane roadway with speed limit of 25 mph. There was a light misting rain at the time of the incident. The driver entered the left turn lane and waited for an eastbound vehicle. An eastbound vehicle stopped at the intersection. The bus driver then began the left turn into the southbound roadway. The pedestrian signals were not operational (normal for the time of day). The decedent was walking eastbound, crossing the southbound street in the crosswalk when she was struck-by the driver's side of the bus. She had walked approximately 18 feet into the crosswalk when she was struck and thrown forward approximately 12 feet.

**Case 100.** A Hispanic female fast food chain regional manager in her 40s died in a motor vehicle crash. A pickup truck was traveling northbound in the left lane of an icy 2-lane highway with a posted speed limit of 70 mph. The pickup driver lost control on a curved portion of the highway, running off the roadway to the left. The pickup truck crossed the median and struck the decedent's southbound vehicle head-on. The decedent was wearing her lap belt/safety harness. The decedent's vehicle's airbags deployed.

**Cases 101 & 102.** Two female volunteers for a social service organization, aged 73 years and 76 years, died when their oncoming specialized novelty vehicle struck a car turning left at an intersection. The novelty vehicle (a truck/motor home modified to resemble a steam train) had the right of way travelling southbound on a dry, 2-lane roadway with a posted speed limit of 55mph. The car stopped at the intersection, and then proceeded onto the north-south roadway and was struck broadside by the novelty vehicle. The two volunteers were sitting in an unenclosed area on wood benches that were not equipped with seatbelts in the back of the vehicle. The collision resulted in the two decedents being ejected from the back of the vehicle

**Case 103.** A male sheriff in his 20s died in a motor vehicle incident. The decedent assumed the pursuit of a high speed chase of a fleeing vehicle on a dark, unlit, undulating, curvy, 2-lane roadway with a posted speed limit of 55 mph. The decedent lost control of his vehicle and left the roadway striking some trees. The decedent was wearing his seatbelt/shoulder harness. The vehicle's airbags deployed.

**Cases 104 & 105.** Two female county workers, a social worker in her 40s and a child protection worker in her 30s, died in a motor vehicle crash. The passenger car they were traveling in had been traveling northbound on a dry, 2-lane roadway with a posted speed limit of 25 mph. Their vehicle was stopped on the roadway waiting to make a left-hand turn; the left turn blinker was

activated. A semi-tractor/trailer with a load of gravel was traveling northbound. According to witnesses, the semi driver was driving erratically; the driver was leaving the roadway and at some points going into oncoming traffic forcing cars off of the roadway. Another vehicle (Vehicle 1) travelling northbound in front of the semi noted the decedents' vehicle stopped and began to tap the brakes to warn the semi of the decedents' vehicle. Vehicle 1 passed the decedents' vehicle on the right (passenger) side. The semi driver did not slow down or apply the semi's brakes. The semi struck the rear of the decedents' vehicle, causing it to spin into the oncoming lane, where the rear of the vehicle was struck-by a southbound vehicle. Police investigation found that the decedent was distracted by a cell phone conversation at the time immediately before and at the time of the incident. Both decedents were wearing their seatbelts/shoulder harnesses. The vehicles airbag did not deploy. The driver of the semi was found to have hydrocodone and diazepam in his bloodstream at the time of the incident.

**Case 106.** A male operations training specialist for the Army National Guard in his 70s died from complications of a motor vehicle crash that occurred in 1979. The decedent was driving a pickup truck to another location for an audit. He lost control and hit a snow bank causing the pickup to roll over. Due to the length of time between the incident and the death, a police report could not be obtained.

### **STRUCK-BY (28)**

**Case 107.** A male farmer in his 30s died when he was struck-by hay tongs. The decedent had been placing loose hay in the barn from a wagon with a team of Clydesdale horses. He was part way up to the hay mow on the barn ladder when something spooked the horses. The decedent's family member was unable to control the team and the horses bolted. A block and tackle weighing about 40-50 pounds was ripped off its track from the top of the barn and was dropped to the bottom of the barn ladder onto the barn floor. Due to the ropes and pulley system, metal 5-foot-wide hay tongs still attached to its own block and tackle struck his head, and then landed over a wall into a granary located approximately five feet away from where he had been standing on the ladder. The decedent was knocked from the ladder and fell to the platform on the second tier of the ladder column.

**Case 108.** A male farmer in his 70s died when he was struck-by the ash tree he had felled. Witnesses stated that he had stopped cutting the tree and stepped back. The tree, which had been leaning away from him during the felling process, twisted as it fell and when it hit the ground, it "kicked back" and struck the decedent's head.

**Case 109.** A male farmer in his 60s died when he was struck-by a tree he was felling on the north side of a farm field. The tree was approximately 35 feet tall and 12-15 inches diameter at its base. The decedent was using his gas powered chain saw to cut this tree, a portion of which was hanging over the farm field. The decedent did not make the appropriate notches in the tree prior to making the cut approximately 6 feet above the ground. It appeared to responding police that the tree shifted as it fell and struck him in the chest and then landed and came to rest on top of him.

**Case 110.** A male dairy farmer in his 20s died when he was crushed by a freestanding grain bin holding approximately six tons of grain. Two horses attached to a manure spreader were inside a barn. For reasons unknown, the horses were spooked, and ran out of the barn, still attached to the manure spreader. The horses and/or the spreader struck the freestanding, unsecured grain bin and it tipped over onto the decedent as he was chasing after the horses.

**Case 111.** A male dairy farm maintenance shop laborer in his 40s died when he was struck-by a non-seated, pressurized, tubeless, 16-inch diameter tine rake tire he was servicing. Two of the decedent's coworkers had made several attempts to seat the tire bead on the rim. The tire was not removed entirely from the rim. They cleaned the beads, added a sealant and placed approximately 34-psi of air into the tire. The tire held the air but would not seat properly; the bead would not properly seat on one side. The two employees broke the tire down two additional times, added more "Slick" lubricant and also used soapy water from a spray bottle, but each time they were unsuccessful in properly seating the tire. In addition, one of the two workers indicated he also hit the tire with a hammer to get it to seat and picked up the tire and dropped it many times. The workers could not remember if they tried a "bead seater" to seat the tire. When the tire did not seat, they quit working on it and a decision was made to take it to a nearby service station in the morning. The decedent quit his job task and attempted to seat the tire. He was observed dropping the tire several times. When these attempts were unsuccessful, he obtained a hammer from one of his coworkers and attempted to seat the tire by striking it repeatedly while the tire/rim was lying flat on the cement floor in the maintenance shop. After his last hammer strike, the tire explosively separated from the rim and propelled upward, striking him in the chest/neck/face. After regaining consciousness, he indicated he was having trouble breathing. Emergency response personnel transported him to a nearby hospital where he died shortly after arrival. MIFACE Summary of MIOSHA Investigation: [Case 353](#).

**Case 112.** A male logger in his 60s died when a tree he was felling struck him. The decedent was in a wooded area behind his home. A family member followed a path made by the decedent and found the decedent's tractor still running at the top of a hill. The family member then found the decedent pinned beneath an approximately 20-inch diameter tree.

**Case 113.** A male logger in his 50s died when he was struck-by a tree he had just felled. The decedent and a family member had been out cutting trees. The family member went to another area to do some work. The family member did not hear the chainsaw and eventually called out to the decedent. When he did not answer, the family member went back to the decedent. The chain saw was in "idle" mode lying next to him. He was found with two trees on top of him. The family member called for emergency response. He was declared dead at the scene.

**Case 114.** A male logger in his 30s died when a tree fell on him. The decedent was cutting two separate trees. Tree #1 had been felled, but became lodged in Tree #2 as it fell. The decedent used a second chainsaw and made a cut on Tree #2. The chainsaw was wedged into Tree #2. He then returned to make a relief cut on Tree #1 with another chain saw when Tree #2 splintered and broke. A part of Tree #2 fell onto him.

**Case 115.** A male logging firm owner in his 40s died when he was struck-by a rotten section of a poplar tree he had felled with a Husqvarna 395XP chain saw. The poplar tree was approximately

50 feet in length. The upper portion of this tree was dead and extremely rotten. Lying in the stump area were pieces of the tree approximately 5 feet long and 8 inches in diameter. The decedent was wearing a hard hat and safety glasses. A coworker sitting in a processor located approximately 30 feet away witnessed the incident. The coworker indicated that the decedent cut down the tree and took a few steps away from the stump. When the decedent turned to look back at the falling tree, he was struck in the head by a section which had broken off and bounced back in his direction. Several tree pieces of varying lengths laid to the west of the stump. The work area was congested with trees as logging activities in this area was just commencing. MIFACE Summary of MIOSHA Investigation: [Case 352](#).

**Case 116.** A male logger in his 30s died when a tree he was felling with a chainsaw struck him. Coworkers who were standing approximately 150 feet away heard the tree fall. They looked over in the decedent's direction and did not see him. One of the coworkers walked to the tree and saw the decedent on the ground with his chain saw at his feet. Coworkers thought that after the decedent finished cutting the tree, he moved to cut another tree when he was struck-by the tree he had felled. There was no cellular service at their location so they had to go to a nearby home to call for emergency response.



Case 116. Logger died when a tree he was felling with a chainsaw struck him.

**Case 117.** A male farmer/mechanic in his 20s was crushed when he was trapped between a trailer and a New Holland chopper tractor while assisting in freeing a stuck Case tractor and trailer filled with chopped corn. The incident occurred in a very wet and muddy corn field; the mud was several feet deep. Driver 1 was cutting corn with a New Holland Forage Cruiser chopper. Driver 2 was driving a Case tractor pulling a trailer; Driver 2 was stuck. The decedent arrived at the incident scene driving his tractor. The three individuals all worked for different firms. They discussed where they were going to attach the chains to Driver 2's tractor. A problem arose when they observed that there were no secure locations on the front of Driver 2's tractor. They decided to attach the chains to the rear of the trailer attached to the stuck tractor. The chains used were short, and the space between the back of Driver 1's tractor and the rear of the trailer was only a few feet apart. The decedent stayed on the ground while the other drivers ascended onto their respective tractors. They did not have radios or communication between the tractors and they were using hand signals. Driver 1 observed the decedent in his rear view mirror that everything was "good to go". He then observed the decedent hold up one finger to "hold a second" and then saw him step between the trailer and his tractor. Driver 1 then saw and felt Driver 2's tractor move. Driver 2 had just placed his tractor into "Neutral" from "Park". The decedent was positioned between the rear of Driver 2's trailer and Driver 1's tractor. Driver 1 moved his tractor forward a short distance and then got out of the tractor. He waved to Driver 2 to get his attention to stop activity. Driver 1 observed the decedent under the trailer, not breathing. He immediately pulled him out from beneath the trailer and yelled for Driver 2 to call 911. He was declared dead at the scene.



**Case 118.** A male home improvement general laborer in his 50s died when a garage wall collapsed onto him. The decedent was attempting to lift the garage on both sides using two lift mechanisms. He was positioned on the right side of the garage. The wall started to collapse toward the outside and the left wall collapsed toward the middle of the garage. The top portion of the left garage wall collapsed onto him.

**Case 119.** A male excavating company owner in his 50s died in a trench collapse. The decedent and a residential developer had a verbal contract to perform a sanitary sewer tap into a 60-inch sewer pipe for a new home under construction. The decedent used a CAT 325BL excavator to dig a 15-22 foot deep, varied width excavation. The west side of the excavation was nearly vertical. The decedent centered and placed the 4-foot 6-inch wide excavator bucket at the top of west wall apparently to provide wall support. The angle of repose for the north and south walls were estimated by MIOSHA at 700 (best case) and 760 (worst case). When the decedent obtained the construction permit, he was told by a city



Case 119. Excavating company owner died in a trench collapse.

official that he needed to post a surety bond and use a trench box during the sewer tap. One worker was retrieving a piece of pipe when the incident occurred. The decedent had a friend attend to the outside of the excavation to watch the walls. The decedent entered the excavation without installing shoring or a trench box. He had completed the sewer tap into the 60-inch diameter sewer main and was preparing to install a pipe. He was standing next to the south wall near the 60-inch sewer when the friend yelled for him to watch out. He could not react in time when the south (left) wall of the excavation collapsed. The friend called emergency response. The first responders contacted another excavating contractor working nearby and he entered the excavation. The first responders and others who had entered the excavation had uncovered the decedent's head and arms almost to his waist when a second collapse (south wall and southwest corner) occurred and injured a first responder. Rescuers in the excavation were placing plywood and studs to shore the walls when an emergency responder noticed that clay was ready to fall in the northwest corner of the excavation. All rescue workers were ordered out of the excavation. The northwest wall's clay eventually fell and reburied the decedent. Trench rescue teams were called and the decedent's body was recovered from the excavation two days later. MIOSHA tested the blue and grey clay excavation spoils with a penetrometer and found the blue clay at 0.5-1.0 tons per square foot and the grey clay at 1.25-1.75 tons per square foot. MIFACE Summary of MIOSHA Investigation: [Case 364](#).

**Case 120.** A male roadway construction traffic regulator in his 20s died when he was struck-by a pickup truck. The decedent was a college student participating in an internship with the firm. A truck attached to an arrow board and a traffic regulator was positioned in the eastbound lane (not on the shoulder as required by the Michigan Department of Transportation) of a 2-lane



roadway which was undergoing foundation testing. This was the firm's first day at the jobsite. A morning meeting was held between the firm's employees regarding the setup of the temporary traffic controls for the vehicles traveling eastbound. The firm's employees moved the arrow board closer to the road boring activity. Forty-two-inch cones were utilized to define the taper. The decedent was standing next to the flashing arrow sign in the eastbound lane. The decedent and the traffic regulator for the westbound lane had just switched their signs to allow the eastbound traffic to flow. The driver of the pickup truck was looking at some deer in the field and didn't see the decedent and his Stop sign until he hit him. When the decedent was struck-by the pickup, he was propelled in a northwest direction more than 75 feet. Section 6E.02 of the Michigan Manual of Uniform Traffic Devices (MMUTCD) states the apparel background (outer) material shall be fluorescent orange-red, fluorescent yellow-green or a combination of the two as defined in the ANSI standard. The background color on the decedent's jacket was black. Emergency response was called. After arrival, he was declared dead at the scene. MIFACE Summary of MIOSHA Investigation: [Case 362](#).

**Case 121.** A Hispanic male brick mason in his 60s died from complications of injuries he sustained in 2007 when he was struck-by a falling 12-foot-long metal wall stud. The decedent had been assigned to erect a block wall along the east side of the ground floor. Directly above the location where he was working, the exterior wall of the second floor had not been completed. Bundles of wall studs had been off-loaded and stacked on the second floor. There was a 2 3/4-inch toe board on the edge of the second floor and a guardrail consisting of two steel cables attached to the building's steel columns; the rest of the second floor was open and exposed. An employee of another subcontractor was installing studs on the west side of the building. He walked to the northeast side of the second floor to retrieve a bundle of wall studs. As he removed one bundle of studs from the west side of the pile (bunk), the unstable bunk tilted and shifted, causing the studs to slide or roll over the east edge of the second floor and fall to the ground, striking the decedent on his head.

**Case 122.** A male carpenter in his 50s was helping to install an overhead commercial garage door while standing near the top of a ladder. A spring loaded tool he was using snapped and struck him on his head. Witnesses stated he lost consciousness, and then fell from the ladder.

**Case 123.** A male production control laborer in his 30s died when he was struck-by the manifold of a prototype aluminum fuel distribution system that exploded. Firm 1 was contracted by a business consortium to "spearhead" the fabrication and manufacture of their prototype aluminum fuel distribution system (system). Firm 1 "hired" the decedent's employer (Firm B) to fabricate the system, which consisted of eight, 6-foot long by 6-inch diameter aluminum tubes containing activated carbon "hockey pucks" in a sleeve. The tubes were welded side-by-side to a 4-foot 7-inch-wide manifold. The development of the system was under pressure to get the job finished so it could be displayed at an upcoming convention. The system had not been tested hydrostatically prior to the pneumatic testing. To test the system, Firm B built an approximately 7-foot-wide by 8-foot long by 2-foot high "tank" constructed of 1/2-inch plywood and 2 x 6 pieces of lumber. The tank was positioned in an east-west orientation. Inside of the tank was a liner and the tank was filled with water. To test the fuel system, the system was strapped to a steel plate and lowered into the tank by a forklift. Argon gas was introduced through an intake valve welded on the manifold. The system had failed four tests; the system leaked around the manifold seam

and bolts before the desired pressure was reached. The incident occurred while performing the 5th test. The decedent was one of four individuals at the test site; one individual from Firm 1 and three from Firm B. The manifold was positioned to the west and the aluminum tubes to the east. At approximately 600-psi, leakage around the manifold and bolts was observed. A representative from Firm 1 was planning to perform a deflection test of the metal. It appears the prototype was raised to allow for deflection measurements. The argon gas was turned off so the system could be depressurized so another measurement could be performed. The decedent was positioned on the west side of the tank and another Firm B employee was walking toward the decedent to help unscrew the argon line when the system exploded. The west side of the tank collapsed when the manifold and aluminum tubes separated. The decedent was struck-by the manifold and thrown approximately 60 feet to the west. The aluminum tubes became projectiles to the east, with one causing a deflection of a steel beam and one landing approximately 135 feet away after impacting other objects. Emergency response was called and the decedent was taken to a nearby hospital where he died shortly after arrival. MIFACE Summary of MIOSHA Investigation: [Case 370](#).

**Case 124.** A male laborer in his 30s died when he was struck-by a load of solid metal pipes that shifted on its rigging. The decedent was using a R&M 5-ton overhead gentry crane with a 2-leg 5-ton steel alloy chain sling to move a 3101-pound load of banded 12-foot 2-inch long by 12-inch diameter solid metal pipes a distance of 100 feet from a scale to a flatbed trailer. The load should have been rigged using a 2-chain sling system. The decedent improperly rigged the load using only one 2-leg chain sling and secured such “hook-to-hook”. It appeared the decedent lost control of the bundle as he was loading and the bundle swung around and struck him on the right side of his body. He subsequently fell to the floor, striking his head on a steel “pan” which was used to store other items. When he was found, emergency response was called and declared him dead at the scene. The decedent was not wearing a hard hat.



Case 124. Laborer struck-by a load of solid metal pipes that shifted on its rigging.

**Case 125.** A male tire service technician in his 30s died due to asphyxiation when the semi-truck cab he was working under came down on his chest. The decedent was “on call” and was performing an after-hours service call to repair a flat, passenger-side front steering tire of a semi-truck. The incident occurred in a dark parking lot. The decedent attempted to replace the tire with the rim still mounted on the vehicle instead of removing the tire and placing the tire in the safety cage located on the service truck. The decedent used a 20-ton hydraulic bottle jack placed behind the tire on the shackle of the leaf spring to raise the semi cab. He did not use the two jack stands on the service truck as secondary support. With the tire/tire rim still mounted to the truck, the decedent removed the flat tire. When he placed the new tire on the rim, it would not inflate via the airline he attached from the service truck compressor. With the airline still attached, it is postulated that instead of using a 2-foot long tool to turn the T-release valve, the decedent went under the truck and used pliers to turn the T-release valve counterclockwise to

lower the jack just enough to seat the tire. Unexpectedly, the jack pressure released and with no air in the tire, the truck cab landed on his chest. MIFACE Summary of MIOSHA Investigation: [Case 350](#).

**Case 126.** A male truck driver in his 20s died when he was pinned between two trailers at a transportation hub. Loaded semi-trailers were staged by a switcher truck for pickup and were parked approximately 6 to 12 inches apart. The decedent was in the process of picking up a loaded semi-trailer when the unwitnessed incident occurred. At approximately 1:30 a.m. the decedent was observed by the switcher driver in the yard backing under his trailer. A few hours later, the tractor was observed to be connected to the trailer and running and it was believed the decedent was sleeping. Between 4:30 a.m. and 5:00 a.m., another switcher driver was staging another trailer and observed the deceased pinned and unresponsive between the two trailers. He contacted his supervisor. The supervisor responded to the area and observed the decedent stuck between the trailers. The supervisor attempted to reach him, but could not. Emergency response was called, and using air bags, were able to remove him from between the trailers. The investigation proved inconclusive as to the cause of this incident. The trailer was found to be properly connected. It appeared the decedent was raising the landing gear on the trailer. It is hypothesized that the trailer kingpin was not properly seated in the fifth wheel and when the landing gear was raised, the trailer shifted enough to pin him. MIFACE Summary of MIOSHA Investigation: [Case 344](#).

**Case 127.** A male truck driver in his 50s died when he was run over by a semi-truck while positioned in a blind spot on the passenger side of a 2011 International semi-tractor cab. On the evening of the incident, several of the decedent's coworkers were present and working together to move truck and associated tankers in and out of a designated parking space at a business. The coworkers were helping to unhook tankers and moving others into place as needed. The 2011 International truck driver was assisted by one of the decedent's coworkers who was, in addition to unhooking trailers, acting as a spotter during both the backing and forward movement of the tractor-tanker unit. The spotter was located on the driver's side and the decedent was located on the



Case 126. Truck driver pinned between two trailers at a transportation hub.



Case 127. Truck driver was run over by a semi-truck while positioned in a blind spot on the passenger side of a 2011 International semi-tractor cab.

passenger side. The decedent cranked the landing gear down while the spotter unhooked the hoses, electrical and connections from the tractor and tanker. The semi-tractor driver was signaled by the spotter to back the tractor to disconnect from the tanker. The spotter saw the decedent standing away from the tractor. The driver backed the tractor and felt the tanker shift and come off the truck. The spotter did not see the decedent prior to signaling the tractor driver to drive forward. The semi-tractor driver checked his mirrors and looked out his windows. He drove forward to disengage the trailer. As the truck driver moved the unit forward, the spotter walked around to the rear of the tractor and saw the decedent lying on the ground. Subsequent investigation showed that the decedent was standing between the passenger side cab, behind the muffler unit and in front of the rear dual tires. As the driver moved forward to disengage the tractor from the tanker, the decedent was run over.

**Case 128.** A male ramp agent in his 20s died when he was pinned by a 2001 Tug 660 Belt Loader Wide Body conveyor against a plane. The decedent was a member of a three-person crew who were preparing to load a plane parked at an airport gate. The decedent was to open the plane's right side back cargo door. Coworker 1 walked to an office to get a scanner. Coworker 2 was driving a 2001 Tug 660 Belt Loader Wide Body that was owned by another company and leased to the decedent's employer. The belt loader was used to load luggage/cargo onto the plane. The decedent's employer was required to maintain the equipment and train their employees on its use. While the decedent was attempting to open the cargo door, Coworker 2 drove the belt loader and positioned it approximately six feet away and directly behind the decedent. The decedent was having trouble opening the cargo door. Coworker 1 was walking back to the plane and witnessed the incident. Coworker 2 saw the decedent having trouble with the latch and wanted to help/show him how to open the cargo door. Coworker 2 pushed the belt loader's shift lever forward thinking the loader was in neutral (it was still in gear), took his foot off the brake, and quickly jumped off the loader. Because the loader was in gear and the emergency brake was not set, the loader lunged forward, crushing the decedent between the end of the conveyor on the belt loader and the side of the plane. Coworker 2 returned to the loader seat, placed it in reverse, and backed up. While awaiting emergency response, the fueler of the airplane performed CPR. The decedent was transported by emergency personnel to a local hospital where he was declared dead. MIFACE Summary of MIOSHA Investigation: [Case 357](#).

**Case 129.** A male tree trimming crew foreman/flagman in his 40s died several weeks later from the injuries sustained when he was struck-by a driver entering the work zone. The decedent was the foreman of a two-person crew (Decedent and Crewmember 1). The decedent determined that a flagging crew was necessary to maintain safety during the tree trimming activity, so his crew and another 2-person crew (Crewmembers 2 and 3) met at the incident site. The incident site was a straight black top road in a rural neighborhood with a 45 mph posted speed limit. There were no visual obstructions. After holding a job briefing with the second crew, the decedent and Crewmember 1 set up three temporary/foldable orange construction signs. The first sign advised "Work Area Ahead", the second sign advised "One Lane Road Ahead", and the third sign advised, via a symbol "Flagman Ahead" in both the northbound and southbound lanes. The other crew members placed the truck and the taper cones. The work truck was positioned approximately 30 yards from an intersection in the southbound lane and the taper started at the corner. Crewmember 1 was acting as a second flagger; he was positioned on the curb side of the truck, approximately 15 feet behind the truck at the beginning of the taper zone with the SLOW side of



his paddle facing the truck. Crewmember 2 was getting ready to go up in the truck and saw both of the flagmen in position. Crewmember 1 saw the decedent walk to his location and then he looked to regulate the northbound traffic. The decedent, who was wearing a reflective vest, was standing next to an orange cone operating his traffic control sign when he was struck-by the southbound vehicle. The police report indicated that the driver reached for his oxygen tank that had been laying on the arm rest between the driver and passenger seat as it began to slide off the arm rest. Emergency response was called and he was transported to a nearby hospital. He died several weeks later from the injuries sustained at the time of the incident. MIFACE Summary of MIOSHA Investigation: [Case 368](#).

**Case 130.** A male tree trimming firm owner in his 70s died when he was pinned between the dump bed and frame of his 1985 Ford F250. The truck was parked, not running, with the hood up, battery charger attached and the keys in the ignition. Positioned on the driver's side, the decedent had been working on the lift bed's hydraulic line under the unsupported raised dump bed. The hydraulics failed, causing the bed to come down and pin the decedent.

**Case 131.** A male semi-truck driver in his 50s died when he was struck-by the pup trailer of another semi (Truck 1) when maneuvering in a sugar beet field. The operator of a Terra Felis 2 was loading semi-tractor trailers with sugar beets already harvested and placed in rows. The incident occurred at night and there was no auxiliary lighting in the field. Truck 1 and Truck 2 were in the field facing south, waiting to be loaded when the decedent arrived. Truck 1 had its headlights off so the lights would not blind the Terra Felis 2 and a north-facing truck (Truck 3) being loaded. Part of the work process required that sugar beet samples be obtained for each tractor trailer load. Usually, there was an employee of the sugar beet growers present, but this employee had left the field to get fuel. The driver of Truck 3 did not know how to obtain the samples, so the driver of Truck 2 went to the Terra Felis 2 obtained the sugar beet samples and took them to Truck 3's driver. Truck 2's driver went back to the Terra Felis 2 and watched the operator finish topping off Firm 3's truck. When Truck 3's trailers were full and pulled away, Truck 1's driver turned on the semi's headlights, pulled straight ahead and then looped around to the left to travel north to the loading position. The Terra Felis 2 operator loaded the front (lead) trailer from the truck's passenger side. When the lead trailer was loaded, the conveyor boom of the Terra Felis 2, equipped with auxiliary spot lights, swung to load the second "pup" trailer. As the conveyor boom swung, its auxiliary lights shown out into the field in the direction of where Truck 1 looped around prior to being loaded. The driver of Truck 2 and the operator of the Terra Felis 2 noticed a body lying in the field. The Terra Felis operator went to investigate and reported back to call for emergency response. The sheriff noted blood evidence on the driver's side of the second trailer 3rd and 4th axle tires. The decedent was not wearing a reflective vest at the time of the incident. MIFACE Summary of MIOSHA Investigation: [Case 371](#).

**Case 132.** A male corrections officer/haunted corn maze owner in his 30s died when he was struck-by a trailer hitch when the tow strap broke. The decedent was on a bulldozer which had become stuck. He called a family member to come to his location with a pickup and a tow strap to assist in freeing his bulldozer. His family member was reluctant, but backed the truck up to the bulldozer and hooked the tow strap to the bulldozer and the hitch. When signaled by the decedent, the family member accelerated forward. The rear end of the truck lifted off the ground

when it reached the end of the strap. The hitch broke free and "sling-shot" back to bulldozer, striking the decedent.

**Case 133.** A male professional motorcycle racer in his 20s died after his motorcycle was involved in a collision with three other racers. His motorcycle was struck-by another motorcycle during the race. Both motorcycles were traveling at a high rate of speed. It appears that the decedent was thrown from his motorcycle and while on the ground, run over by another motorcycle.

**Case 134.** A female food pantry volunteer in her 60s died when a sports utility vehicle (SUV) backed into a table, causing the table to pin the volunteer against a wood cabinet. The SUV driver was driving the vehicle for the first time. To access the food pantry distribution area, the vehicle was backed up a slightly inclined concrete apron. At the junction of the apron and floor, there was a lip. The driver stopped the vehicle at this lip prior to entering through the overhead door. The driver stated that as he was backing, his foot slipped off the brake pedal, hit the gas pedal and accelerated in reverse. The decedent and another volunteer were sitting in folding chairs behind the table, which was located approximately 12-15 feet from the overhead door opening. Another volunteer was sitting on the table. Other food pantry volunteers, who could see what was happening, yelled to the driver to stop the vehicle. The driver was unable to stop the vehicle before it struck one worker sitting on the table. The vehicle had enough momentum to push the table to the back wall. The decedent was pinned by the table against a wood cabinet. Emergency response was summoned as her fellow volunteers initiated CPR. Emergency response arrived, continued resuscitative efforts while the decedent was transported to a nearby hospital. She was declared dead upon arrival to the emergency room. MIFACE Investigation Report: [14MI095](#).



Case 132. Corrections officer/haunted corn maze owner was struck-by a trailer hitch when the tow strap broke.



Case 134. Food pantry volunteer died when a sports utility vehicle (SUV) backed into a table, causing the table to pin the volunteer against a wood cabinet.

## SUICIDE (9)

**Case 135.** A male millwright/farmer in his 40s died from a self-inflicted hanging.



**Case 136.** A retail salesman in his 20s lived on a farm property and assisted in the farm operation. He died from a self-inflicted gunshot wound.

**Case 137.** A male dairy farmer in his 50s died from a self-inflicted hanging.

**Case 138.** A male carpenter in his 30s died from a self-inflicted hanging.

**Case 139.** A male excavating firm owner in his 40s died from a self-inflicted hanging.

**Case 140.** A male assembler in his 40s died from a self-inflicted gunshot wound.

**Case 141.** A male garden supply store laborer in his 20s died from a self-inflicted gunshot wound.

**Case 142.** A male freighter wheelsman in his 30s died from a self-inflicted hanging.

**Case 143.** A male human resource director in his 50s died from a self-inflicted gunshot wound.