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2015 ANNUAL REPORT

TRACKING WORK-RELATED DEATHS IN MICHIGAN



2015 Annual Report Tracking Work-Related Fatalities in Michigan

A Joint Report
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Table of Contents

| | |
|--|----|
| Executive Summary..... | 1 |
| Background | 2 |
| Methods | 3 |
| Results | 5 |
| Demographics..... | 6 |
| Race..... | 6 |
| Age..... | 6 |
| Geographic Distribution | 9 |
| Occupation | 10 |
| Working Status of the Decedent | 11 |
| Location of Death..... | 12 |
| Illegal Drug/Alcohol/Medication Use | 13 |
| Work-Related Fatality Incidence Rates | 15 |
| Industry Highlights, Michigan 2015 | 15 |
| Means of Work-Related Death | 23 |
| Means of Death by Cause | 25 |
| Aircraft..... | 25 |
| Animal..... | 25 |
| Asphyxiation..... | 25 |
| Drowning..... | 25 |
| Drug Overdose | 25 |
| Electrocution | 26 |
| Fall..... | 26 |
| Fire/Explosion..... | 27 |
| Homicide | 27 |
| Machine | 28 |
| Motor Vehicle..... | 29 |
| Suicide..... | 33 |
| Toxic Exposure | 33 |
| Unknown..... | 33 |
| MIOSHA Fatality Investigations..... | 33 |
| MIFACE Contact with Companies | 36 |
| Health and Safety Initiatives..... | 36 |
| Hispanic Initiative | 36 |
| Sensitivity of Injury at Work Box on Death Certificate | 37 |
| Number of 2015 Deaths Compared to Michigan CFOI..... | 38 |
| Case Narratives..... | 38 |
| Discussion | 40 |
| Importance of Using Multiple Data Sources..... | 48 |
| Prevention Material Dissemination | 48 |
| Summary | 49 |
| Acknowledgement..... | 50 |
| APPENDIX I..... | 51 |
| Aircraft..... | 51 |

| | |
|---------------------|----|
| Animal..... | 52 |
| Asphyxiation..... | 53 |
| DROWNING..... | 53 |
| Drowning..... | 53 |
| Electrocution..... | 54 |
| Fall..... | 55 |
| Fire/Explosion..... | 58 |
| Homicide..... | 59 |
| Machine..... | 61 |
| Motor Vehicle..... | 64 |
| Struck-By..... | 70 |
| Suicide..... | 78 |
| Toxic Exposure..... | 79 |
| Unknown..... | 80 |

Tables and Figures

[Table 1.](#) Demographic Characteristics of 136 Work-Related Fatalities, Michigan 2015

[Table 2.](#) Traumatic Work-Related Fatalities by Age of Victim and Industry Sector, Michigan 2015

[Table 3.](#) County of Fatal Work-Related Injury, Michigan 2015

[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 2015

[Table 5.](#) Number of Traumatic Work-Related Fatalities by Industry and Rates by Number of Employees and by Hours Worked, Michigan 2015

[Table 6.](#) Traumatic Work-Related Fatalities by Industry Sector, Michigan Incidence Rates Compared to US Incidence Rates, 2015

[Table 7.](#) Traumatic Work-Related Fatalities by Means of Death and Industry Sector, Michigan 2015

[Table 8.](#) Work-Related Fatalities and Number of MIOSHA Work-Related Fatality Compliance Inspections, Michigan 2015

[Table 9.](#) Sensitivity of Death Certificate Injury at Work Box Predicting Fatal Injury at Work, Michigan 2015

[Table 10.](#) Traumatic Work-Related Fatality Narratives by Means of Death and Industry Sector, Michigan 2015

[Table 11.](#) Age at Time of Death, Agriculture, Michigan 2001-2015

[Table 12.](#) Cause of Death by Year, Michigan 2001-2015

[Table 13.](#) Number and Percent of Motor Vehicle-related Work-Related Deaths by Industry Sector, Michigan 2001-2015

[Table 14.](#) Number of Construction Deaths and Number and Percent of Fatal Falls by Year, Michigan 2001-2015

[Table 15.](#) Fatality Rate by Age Group and Employment Number and Percent of Civilian Non-institutional Population, Michigan 2015

[Table 16.](#) Number of Deaths per Year by Industry Sector for the Six Industry Sectors with the Largest Number of Deaths per Year, Michigan 2001-2015

[Figure 1.](#) Number and Incidence Rate of Work-Related Fatalities in Michigan, 1995-2015

[Figure 2.](#) Age Distribution of Work-related Fatalities, Michigan 2015

[Figure 3.](#) County of Fatal Work-Related Injury, Michigan 2015

[Figure 4.](#) Number of Deaths by Standard Occupational Classification, Michigan 2015

[Figure 5.](#) Location and Number of Fatal Work-Related Injuries, Michigan 2015

[Figure 6.](#) Number of Agriculture Work-related Fatalities and MIOSHA Inspections, Michigan 2001-2015

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 15th annual Michigan Fatality Assessment and Control Evaluation (MIFACE) report on acute traumatic work-related (WR) deaths in Michigan. There were **136 work-related deaths in 2015**, a decrease of 7 deaths compared to 2014 representing 134 employers and 134 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 Division of Occupational & Environmental Medicine ([MSU OEM](#)) website. Key findings for 2015:

- The number of work-related deaths (136) and the fatal injury rate (3.0 deaths/100,000 workers) were down compared to 2014 (143 work-related fatalities, 3.2/100,000 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 since 1995 have fluctuated from 134-155 deaths per year with a rate 3.0-3.3/100,000 workers.
- Construction (28 deaths, 20.6% of all fatalities) had the largest *number* of work-related deaths but agriculture had the highest *risk* of death (24.7 deaths/100,000 workers) and agriculture was second in the number of work-related deaths (21 deaths, 15.4%). Transportation and Warehousing was third in number and risk (18 deaths, 13.2%; 13.3 deaths/100,000 workers) of a work-related death. Manufacturing, although fourth in the number of deaths (16, 11.8%) had one of the lower risks of death (2.7 deaths/100,000 workers).
- The most common cause of death was from a motor vehicle crash (27 deaths, 19.9%), followed by homicide incidents (22, 16.2 %), struck by incidents (21, 15.4%), falls (18, 13.2%), and machines (15, 11.0%).
- The number of suicides at work increased in 2015 to 12 compared to nine in 2014.
- Individuals who died were most likely to be men (88.2%) and Caucasian (79.4%). The average age was 48.7 years old and ranged from 14 to 86 years of age.
- Foreign-born workers accounted for 12.5% of all work-related deaths in Michigan in 2015.
- Illegal drugs, alcohol or side effects of prescribed and over-the-counter medication were potential factors in approximately 20% of the non-suicide and non-drug abuse deaths.
- By occupational group, Management had the largest number of work-related deaths (37) followed by Transportation & Material Moving (29) and then Construction & Extraction (18).
- Forty-four of Michigan's 83 (53.0%) counties had a work-related fatality. Wayne County had the highest number (30, 22.1%), followed by Oakland (14, 10.3%) and Macomb Counties (10, 7.4%).
- Of the 136 work-related fatalities, 29 (21.3%) were MIOSHA program-related and were investigated by a MIOSHA compliance officer.

Definitions

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

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

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

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

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

Background

In 2001, MSU OEM instituted a tracking program for all traumatic work-related deaths, first with financial assistance from 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 the types of industries and work situations where workers are dying from acute traumatic incidents;
- Identify the underlying causes of the work-related fatality, and
- Formulate and disseminate prevention strategies to reduce future work-related fatalities.

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

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

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

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

Methods

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

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

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

- ◇ **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 accompanied the MIOSHA compliance officer with employer agreement. In addition, MIFACE interviewed the compliance officers about their investigation.



[Case 109](#). Business owner died due to asphyxia when she was wedged between an electrical box and the business's stationary security chain link fence.

Results

There were 136 acute traumatic work-related fatalities in 2015. One hundred thirty (95.6%) of the 136 work-related traumatic incidents occurred in 2015; a description of the six individuals who died in 2015 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 male circus performer in his 70s died from complications of a 22-foot fall during a performance in 1962.
- A male delivery-truck driver in his 60s died from medical complications of a 1980 gunshot wound sustained during a robbery.
- A female aviation industry manager in her 70s died of complications sustained in a 1989 airplane crash. The pilot and copilot died at the time of the crash and another passenger died shortly thereafter.
- A male heavy equipment operator in his 50s died from complications of an exposure in 1989 to toxic gases.
- A male milling supervisor in his 70s died of medical complications from a fall in 2000 from a man lift elevator into the elevator's 4-foot-by-4-foot pit 15 years ago.
- A male gas station attendant in his 80s tripped on a mat and fell, stating he injured his shoulder. Several days later, he fell striking his head.

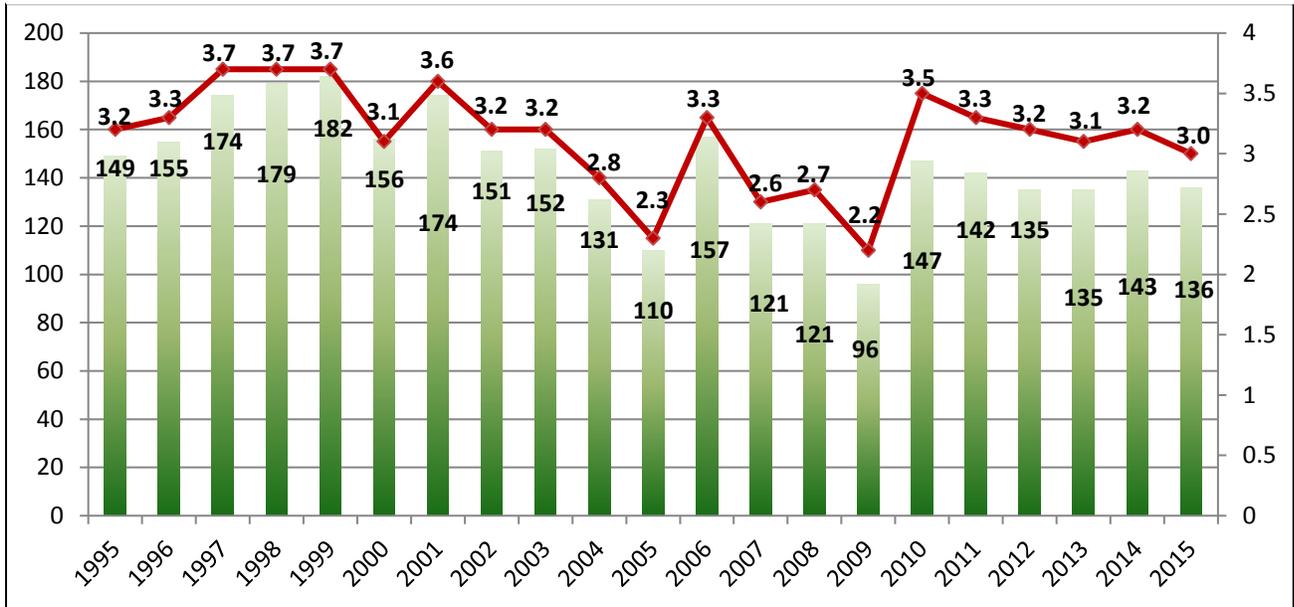
The 136 individuals who died had 134 different employers. An automobile manufacturing company had three separate incidents; one plant had two deaths occur (struck-by, machine-related) and another location had one death occur (drowning while at a work event). Another co-owner of the business shot two individuals, who owned an agricultural business.

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



[Case 33](#). Sheet metal laborer died from smoke and soot inhalation complications as a result of a fire during the relining of an aggregate and hand hopper.

Figure 1. Number and Rate per 100,000 workers of Work-Related Fatalities in Michigan, 1995-2015



The **red** line shows incidence rate per 100,000 workers. The **green** columns show the number of work-related deaths per year. Incidence rates shown from 1995-2000 were obtained from the [BLS](#) website. Rates shown for 2001-2015 were determined from MIFACE statistics.

Demographics

Table 1 shows the demographic characteristics of the 136 traumatic work-related fatalities in Michigan in 2015. Demographic characteristics were obtained from the individual’s death certificate.

Race

Of the 120 males who died, 94 were Caucasian and 16 were African American. Sixteen women, 14 Caucasian and 2 African American, died.

Eleven individuals were of Hispanic ethnicity, all of whom were male. Death certificates indicated the race as Caucasian for seven of the 11 individuals. The race of three individuals was identified as Hispanic, and one individual’s race was identified as Spanish.

Age

The age at time of death ranged from 14 to 86 years. The average age was 48.7 years, up from 47.9 years of age in 2014. For men, the ages ranged from 18-86 years, and for women, the ages ranged from 14-70 years. The average age for men at the time of death was 49.5 years; for women, it was 42.8 years (**Table 1** and **Figure 2**).

Twenty-five individuals were 66 years of age or older when they died due to an acute work-related event. Five (20.0%) of the 25 individuals were injured prior to 2015; the dates of injury were 1962, 1980, 1989, 2000 and 2014. The 20 remaining deaths occurred across 10 of the 18 industry sectors.

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

Seven (28.0%) of the 25 individuals aged 66 years or older died due to a fall, six (24.0%) individuals died in a machine-related incident, four (16.0%) individuals died due to a motor vehicle crash, three (12.0%) individuals died in a struck-by incident, and three (12.0%) individuals died from a gunshot wound (homicide). One death each (4.0%) was attributable to a toxic exposure and an airplane crash.



Case 67. Journeyman maintenance technician died when she was pinned between two parts while troubleshooting a robotic operation.

| Table 1. Demographic Characteristics* of 136 Work-Related Fatalities, Michigan 2015 | | |
|--|---------------|----------------|
| Demographic Characteristics | Number | Percent |
| Gender | | |
| Male | 120 | 88.2 |
| Female | 16 | 11.8 |
| Race | | |
| White | 108 | 79.4 |
| Black | 18 | 13.2 |
| Asian/Pacific Islander | 1 | 0.7 |
| American Indian/Alaskan Native | 1 | 0.7 |
| Arab | 1 | 0.7 |
| Hispanic | 3 | 2.2 |
| Spanish | 1 | 0.7 |
| Vietnamese | 1 | 0.7 |
| Asian Indian | 1 | 0.7 |
| Syrian | 1 | 0.7 |
| Age | | |
| <20 | 3 | 2.2 |
| 20-29 | 18 | 13.2 |
| 30-39 | 21 | 15.4 |
| 40-49 | 26 | 19.1 |
| 50-59 | 31 | 22.8 |
| 60-69 | 21 | 15.4 |
| 70-79 | 11 | 8.1 |
| 80-89 | 5 | 3.7 |
| Education | | |
| Less than High School | 26 | 19.4 |
| High School Graduate | 62 | 46.3 |
| GED | 4 | 3.0 |
| Some College (1-4 years) | 37 | 27.6 |
| Post College (5+ years) | 5 | 3.7 |
| Unknown | 2 | -- |
| Country of Origin | | |
| United States | 119 | 87.5 |
| Mexico | 5 | 3.7 |
| Canada | 4 | 2.9 |
| Iraq | 1 | 0.7 |
| India | 1 | 0.7 |
| Germany | 1 | 0.7 |
| Bangladesh | 1 | 0.7 |
| Uzbekistan | 1 | 0.7 |
| Jamaica | 1 | 0.7 |
| Vietnam | 1 | 0.7 |
| Syria | 1 | 0.7 |
| Totals | 136 | |
| * Source: Death Certificate (percent does not add to 100 due to rounding) | | |

Figure 2. Age Distribution of Work-related Fatalities, Michigan 2015

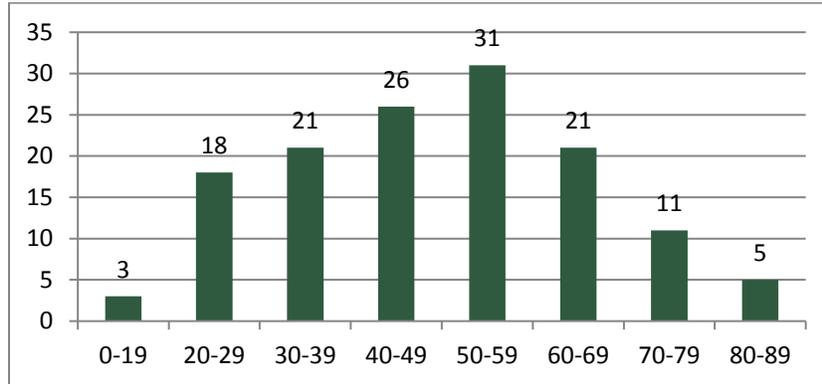


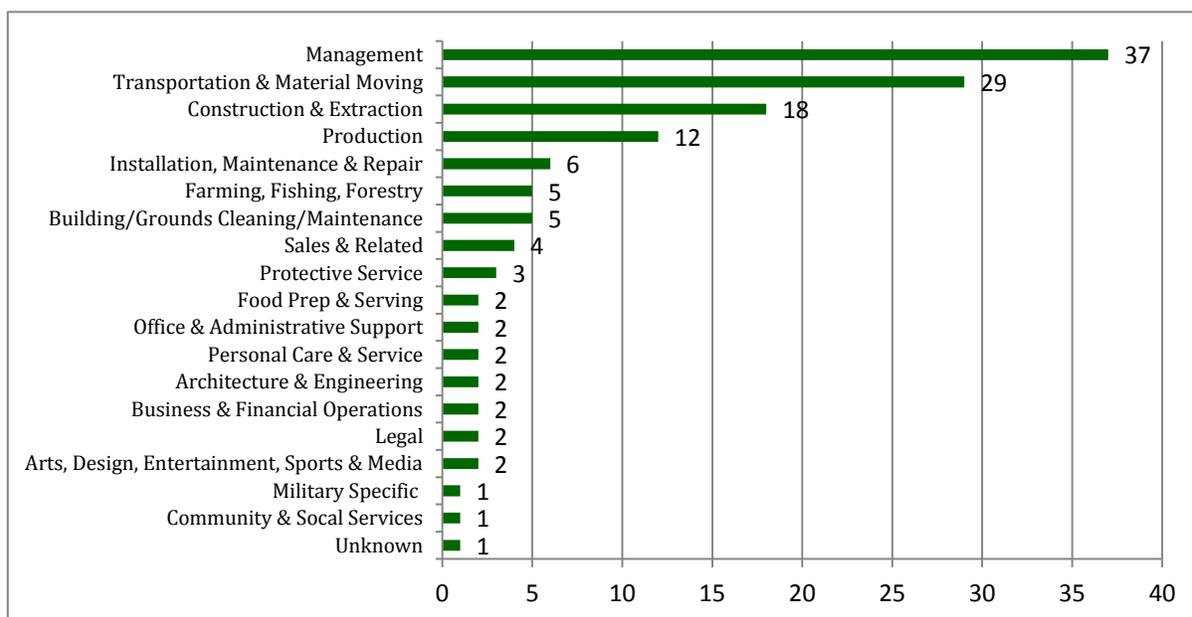
Table 2. Traumatic Work-Related Fatalities by Age of Victim and Industry Sector, Michigan 2015

| Industry Sector (NAICS Code) | 0-19 | 18-65 | 66+ | Total |
|---|----------|------------|-----------|------------|
| | Number | Number | Number | |
| Agriculture, Forestry, Fishing & Hunting (11) | 2 | 11 | 8 | 21 |
| Construction (23) | 1 | 26 | 1 | 28 |
| Manufacturing (31-33) | -- | 15 | 1 | 16 |
| Wholesale Trade (42) | -- | 3 | 1 | 4 |
| Retail Trade (44-45) | -- | 7 | 2 | 9 |
| Transportation & Warehousing (48-49) | -- | 15 | 3 | 18 |
| Finance & Insurance (52) | -- | 1 | -- | 1 |
| Real Estate & Rental & Leasing (53) | -- | 3 | 3 | 6 |
| Professional, Scientific, & Technical Services (54) | -- | 1 | 1 | 2 |
| Administrative & Support & Waste Management & Remediation Services (56) | -- | 7 | 3 | 10 |
| Health Care & Social Assistance (62) | -- | 1 | -- | 1 |
| Arts, Entertainment & Recreation (71) | -- | 3 | 2 | 5 |
| Accommodation & Food Services (72) | -- | 5 | -- | 5 |
| Other Services (except Public Administration) (81) | -- | 3 | -- | 3 |
| Public Administration (92) | -- | 7 | -- | 7 |
| Totals | 3 | 108 | 25 | 136 |

Occupation

Figure 4 shows the occupation distribution of 135 of the 136 work-related deaths utilizing 2000 Standard Occupational Classification (SOC) categories; the occupation of one individual was unknown. Occupation was determined from the reporting source data. The 2000 SOC categories are divided into 23 major groups 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 2015



The Management Occupations job family classification had the largest number of deaths (37, 27.4%), and included workers spanning multiple industries. Of the 37 individuals identified as conducting a work activity in this job family, 15 of the 37 (40.5%) deaths occurred in the Agriculture, Forestry, Fishing & Hunting industry sector. Six of the 37 (16.2%) deaths occurred in Real Estate, Rental & Leasing; two of the six individual were retired farmers leasing land to other growers and were performing maintenance activities on their leased property at the time of the fatal injury. Four of the 37 (10.8 %) individuals within the Management Occupations job family worked in Construction. Retail Trade and Administrative & Support & Waste Management & Remediation Services each had three deaths (8.1%). Two deaths occurred in Manufacturing, and one death occurred in each of the following industry sectors: Transportation & Warehousing, Finance & Insurance, and Professional, Scientific, & Technical Services.

Transportation and Material Moving had the second largest number of deaths (29, 21.5%). Twenty-two (75.9%) individuals were working as a motor vehicle operator: as a truck driver (Driver/Sales Workers (5), Truck Drivers, Heavy and Tractor-Trailer (12), Truck Drivers, Light or Delivery Services (2), Taxi Driver/Chauffeur (1), Car Transporter (1), and Pickup Driver (1)). Three individuals were Material Moving Workers: (Crane and Tower Operator,

Industrial Truck and Tractor Operator (2)). One individual was a supervisor of material moving workers, one individual was a railroad worker, one individual was a sailor and one individual was a gas station attendant. Six industry sectors were represented in the Transportation and Material Moving job family. Transportation & Warehousing had 16 fatal injuries of workers in this job family, and three individuals each worked in the following industry sectors: Construction, Manufacturing, Retail Trade and Accommodation & Food Service. Wholesale Trade had one death of a transportation and material moving worker.

The individual with the unknown occupation worked in Health Care and Social Assistance.

Working Status of the Decedent

One hundred thirty-four employers were associated with the 136 individuals who died in 134 separate incidents.

The employer/employee status was known for all of the work-related deaths. Eighty-four (61.8%) individuals were identified as employees; two of these individuals were temporary workers. Fifty (36.8%) were identified as self-employed or the owner/co-owner of the business, and two (1.5%) individuals were identified as volunteers at work.



[Case 66](#). Waste Treatment/energy center operator was crushed between the plates of a hydraulic filter press.

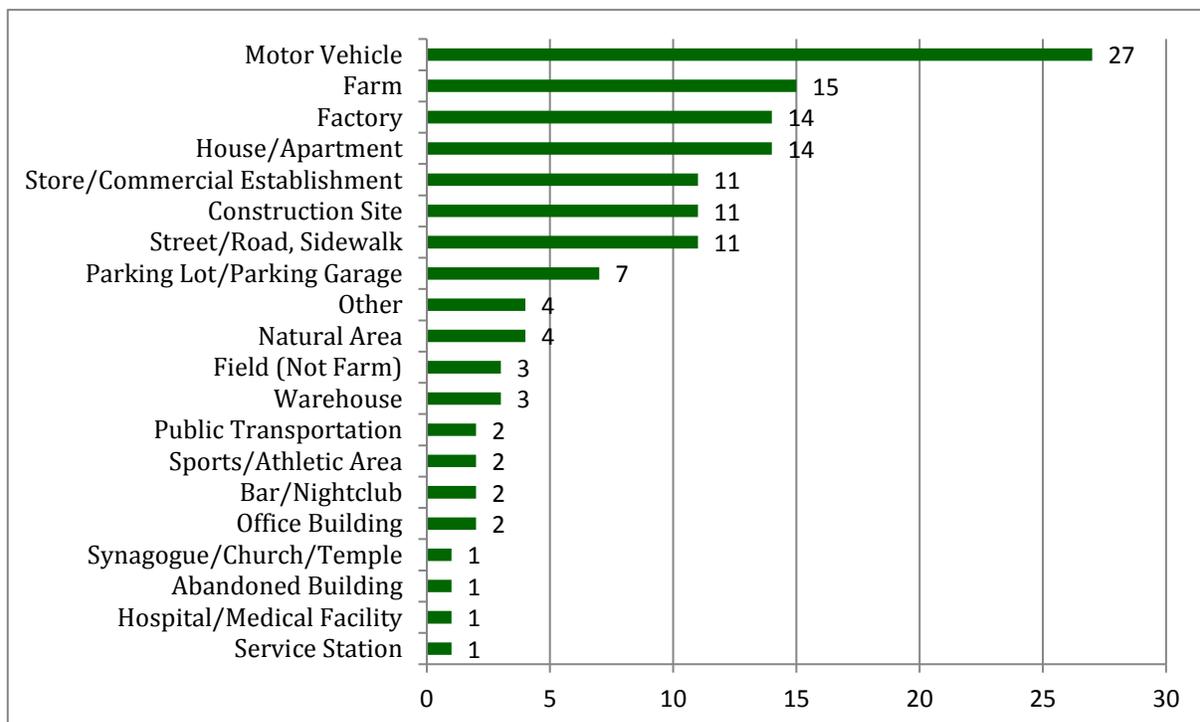
The decedent was working alone in 86 (66.7%) incidents and with a coworker in 45 (34.9%) incidents. The work status was unknown in five incidents. For homicides, the decedent was working alone in 17 (81.0%) incidents and with a coworker in 4 (19.0%) incidents. For one homicide, it was unknown if the decedent was working alone or with a coworker at the time of the incident.

The location of injury for the fatal incident was identified for all 136 deaths. Beginning in 2012, MIFACE began using a coding system for location as follows: a) Designations of specific buildings (such as “house, apartment” or “bar, nightclub”) include both the building itself and the area directly outside, such as a driveway, porch, or front walk; b) If a victim was injured in a variety of locations (e.g., the victim was stabbed on a bus and was pursued by the attacker off the bus and into a store and stabbed a second time), the location at which the victim was first injured was coded; c) Events that occurred on public sidewalks were coded as “street,” with the exception of those occurring on sidewalks that were the private property of an adjacent building, which were coded to the building. For example, an incident that occurred on a walkway on the front lawn of a home was coded as “house, apartment”. If an incident occurred in a garage at a private home, “house, apartment” was coded. If an incident occurred in a commercial parking garage, parking lot, or a garage used by four or more

different households (e.g., a garage serving a large apartment building), the location “parking lot/public parking 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 depicts the distribution of incident locations for the 2015 traumatic deaths. A motor vehicle was the location where the largest number of the fatal injuries occurred (27, 19.9%). Farms were the location of the incident for 15 (11.0%) work-related deaths, and house/apartment and factories were the location for 14 (10.3%) injuries each. Construction sites, commercial establishments and streets were the site of 11 (8.1%) injuries each. The incidents in “Other” include a public work yard, fairgrounds trailer, a courthouse and a circus.

Figure 5. Location and Number of Fatal Work-Related Injuries, Michigan 2015



Location of Death

For 75 (55.1%) individuals, the place of death was at the scene of the traumatic incident. For 55 (40.4%) individuals, the death certificate indicated the death occurred in the hospital. Three (2.2%) individuals died in a long-term care facility (one of which was under hospice care) and three (2.2%) individuals died at a residential home.

Illegal Drug/Alcohol/Medication Use

Of the 121 individuals whose death was not a suicide (12 deaths) or a drug overdose (3 deaths), a toxicology screen for alcohol, illegal drugs, prescription or non-prescription medications was known to have been performed on 84 (69.4%) individuals; 52 of these (61.9%) individuals had detectable levels of at least one of these substances. Twenty-four (46.2%) of the 52 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 hydrocodone and marijuana was from the use of a prescribed medication or from illegal use.



Case 103. Tree helper/grounds person died when he was struck by a tree branch during a tree trimming operation at a golf course.

| 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 2015 | | | | | |
|---|--------------------------------|--------------------------------------|--|-------------------------------------|---|
| Incident Type | Alcohol (blood level %) | Prescription | Marijuana &/or marijuana metabolite | Cocaine, Heroin, metabolites | Unknown Prescription/ Non Prescription |
| Fire/Explosion | 0.148 | | | | |
| Motor Vehicle | Methanol Intoxication | | | | |
| Fall | | | √ | | |
| Motor Vehicle | | | √ | | |
| Fall | | | | √ | |
| Homicide | | | √ (U)* | | |
| Machine | | | √ | | |
| Homicide | | | √ | | |
| Motor Vehicle | | | √ | | |
| Motor Vehicle | | | √ | | |
| Homicide | | | √ | | Amphetamine |
| Motor Vehicle | | | √ | | |
| Motor Vehicle | | | √ | | |
| Struck-by | | | √ | | |
| Drowning | | Phenobarbital Phenytoin | | | Amphetamine |
| Fire/Explosion | | Laudanosine Midazolam Fentanyl | | | |
| Struck by | | Hydrocodone Gabapentin | | | |
| Motor Vehicle | | Hydrocodone | | | |
| Fall | | Citalopram Hydroxyzine | √ | | Dextromethorphan |
| Motor Vehicle | | Citalopram/ Escitalopram | | | |
| Struck-by | | | | | Amphetamines |
| Machine | | Bupropion | | | |
| Machine | | Benzodiazepine (U) | | | Amphetamine |
| Homicide | | Alprazolam Amphetamine | | √ | |

* U – Urine

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 that 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 2015

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:

Six industry sectors had fewer work-related deaths or a lower employment-based incidence rate in 2015 compared to 2014:

| Industry | Decrease in Number of Deaths from 2014 | Number of 2015 WR Deaths | 2015 Incidence Rate | Number of 2014 WR Deaths | 2014 Incidence Rate |
|---------------------------------|--|--------------------------|---------------------|--------------------------|---------------------|
| Agriculture | 4 | 21 | 24.7 | 25 | 30.5 |
| Wholesale Trade | 3 | 4 | 2.4 | 7 | 4.2 |
| Transportation & Warehousing | 1 | 18 | 13.3 | 19 | 14.7 |
| Retail Trade | 4 | 9 | 1.9 | 13 | 2.8 |
| Health Care & Social Assistance | 3 | 1 | 0.2 | 4 | 0.7 |
| Other Services | 10 | 3 | 1.8 | 13 | 7.6 |

Seven industry sectors had a higher number of work-related deaths and a higher employment-based incidence rate in 2015 compared to 2014:

| Industry | Increase in Number of Deaths from 2013 | Number of 2015 WR Deaths | 2015 Incidence Rate | Number of 2014 WR Deaths | 2014 Incidence Rate |
|--|--|--------------------------|---------------------|--------------------------|---------------------|
| Construction | 5 | 28 | 18.9 | 23 | 16.3 |
| Manufacturing | 8 | 16 | 2.7 | 8 | 1.4 |
| Real Estate & Rental & Leasing | 3 | 6 | 11.7 | 3 | 5.9 |
| Professional, Scientific, & Technical Services | 1 | 2 | 0.7 | 1 | 0.4 |
| Administrative & Support & Waste Management & Remediation Services | 2 | 10 | 3.4 | 8 | 2.7 |
| Arts, Entertainment & Recreation | 2 | 5 | 10.0 | 3 | 6.2 |
| Public Administration | 1 | 7 | 3.0 | 6 | 2.6 |

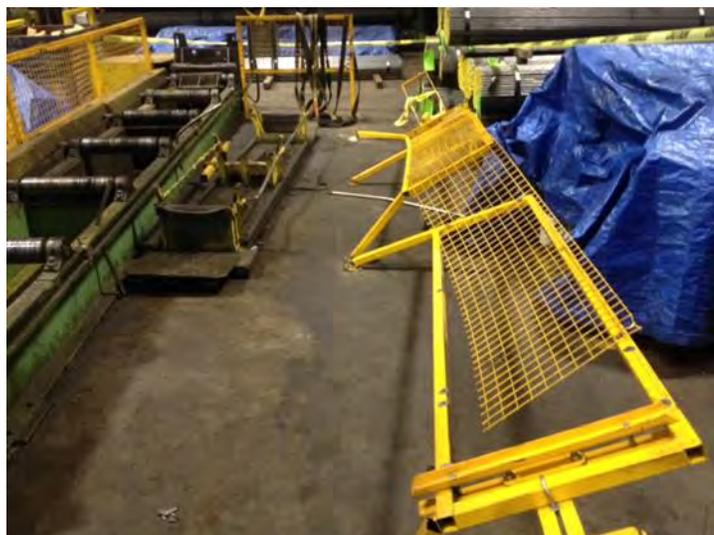
Two industry sectors had the same number of work-related deaths and the same employment-based incidence rate in 2015 compared to 2014.

| Industry | Number 2014 & 2015 WR Deaths | Incidence Rate 2015 | Incidence Rate 2014 |
|------------------------------|------------------------------|---------------------|---------------------|
| Finance and Insurance | 1 | 0.6 | 0.6 |
| Accommodation & Food Service | 5 | 1.4 | 1.4 |

Three industry sectors had work-related deaths in 2014 but did not have a death in 2015:

| Industry | Number of 2014 WR Deaths | Incidence Rate 2014 |
|-------------|--------------------------|---------------------|
| Utilities | 1 | 5.1 |
| Information | 1 | 1.8 |
| Education | 2 | 0.5 |

The industry sector with the highest employment-based industry rate was Agriculture (24.7 deaths/100,000 workers), followed by Construction (18.9 deaths/100,000 workers) and then Transportation and Warehousing (13.3 deaths/100,000 workers). Within Agriculture, the Forestry and Logging subsector had the highest incidence rate (56.9 deaths/100,000 workers), although the industry subsector with the highest overall incidence rate was Water Transportation (under Transportation and Warehousing), which had an incidence rate of 131.6 deaths/100,000 workers.



Case 108. Crane operator trainee died when struck by a 9,400-pound bundle of steel round stock.

Table 5. Number of Traumatic Work-Related Fatalities by Industry and Rates by Number of Employees and by Hours Worked, Michigan 2015

| | | | Employment-Based | | Hours-Based | |
|---|-----------|-------------|-------------------------------|-------------------|---------------------------|-------------------|
| | | | Number Employees ^a | Rate ^b | Number Hours ^a | Rate ^c |
| Agriculture, Forestry, Fishing & Hunting (11) | 21 | 15.4 | 85,158^{df} | 24.7 | ** | ** |
| Crop Production (111) (Owners/Operators) | 6 | 4.4 | 51,281 ^d | 11.7 | ** | ** |
| Animal Production (112) (Owners/Operators) | 5 | 3.7 | 29,023 ^d | 17.2 | ** | ** |
| Crop Production (111) (Hired Workers) | 1 | 0.7 | 65,177 ^d | 1.5 | | |
| Animal Production (112) (Hired Workers) | 3 | 2.2 | 18,274 ^d | 16.4 | | |
| Forestry & Logging (113) | 1 | 0.7 | 1,757 ^f | 56.9 | ** | ** |
| Support Activities for Agriculture & Forestry (115) | 1 | 0.7 | 3,097 ^f | 32.3 | ** | ** |
| Unknown | 4 | 2.9 | ** | ** | ** | ** |
| Construction (23) | 28 | 20.6 | 148,300 | 18.9 | 38.7 | 19.5 |
| Construction of Buildings (236) | 4 | 2.9 | 33,900 | 11.8 | 37.3 | 12.7 |
| Heavy & Civil Engineering Construction (237) | 4 | 2.9 | 15,800 | 25.3 | ** | ** |
| Specialty Trade Contractors (238) | 18 | 13.2 | 98,600 | 18.3 | 39.5 | 18.5 |
| Unknown | 2 | 1.5 | ** | ** | ** | ** |
| Manufacturing (31-33) | 16 | 11.8 | 587,600 | 2.7 | 41.8 | 2.6 |
| Food (311) | 2 | 1.5 | 34,800 | 5.7 | ** | ** |
| Plastics & Rubber Products (326) | 1 | 0.7 | 39,900 | 2.5 | ** | ** |
| Nonmetallic Mineral Product (327) | 1 | 0.7 | 10,700 | 9.3 | ** | ** |
| Primary Metal (331) | 4 | 2.9 | 22,300 | 17.9 | ** | ** |
| Fabricated Metal Product (332) | 2 | 1.5 | 81,400 | 2.5 | 42.5 | 2.3 |
| Machinery (333) | 2 | 1.5 | 72,200 | 2.8 | 43.4 | 2.6 |
| Transportation Equipment (336) | 4 | 2.9 | 173,900 | 2.3 | 49.2 | 1.9 |
| Wholesale Trade (42) | 4 | 2.9 | 169,500 | 2.4 | 38.8 | 2.4 |
| Merchant Wholesalers, Durable Goods (423) | 3 | 2.2 | 95,900 | 3.1 | 39.2 | 3.2 |
| Merchant Wholesalers, Non-durable Goods (424) | 1 | 0.7 | 49,900 | 2.0 | ** | ** |
| Retail Trade (44-45) | 9 | 6.6 | 467,500 | 1.9 | 29.9 | 2.6 |
| Motor Vehicle & Parts Dealers (441) | 2 | 1.5 | 61,600 | 3.2 | 38.3 | 3.4 |
| Building Material and Garden Equipment and Supplies Dealers (444) | 2 | 1.5 | 43,400 | 4.6 | ** | ** |
| Food & Beverage Stores (445) | 2 | 1.5 | 78,400 | 2.6 | ** | ** |
| Gasoline Stations (447) | 1 | 0.7 | 26,400 | 3.8 | ** | ** |
| Sporting Goods, Hobby, Book & Music (451) | 1 | 0.7 | 20,000 | 5.0 | ** | ** |
| Miscellaneous Store Retailers (453) | 1 | 0.7 | 25,900 | 3.9 | ** | ** |
| Transportation & Warehousing (48-49) | 18 | 13.2 | 135,000 | 13.3 | ** | ** |
| Air Transportation (481) | 1 | 0.7 | 12,300 | 8.1 | ** | ** |
| Water Transportation (483) | 1 | 0.7 | 760 ^f | 131.6 | ** | ** |
| Truck Transportation (484) | 9 | 6.6 | 46,100 | 19.5 | ** | ** |
| Transit & Ground Passenger Transportation (485) | 2 | 1.5 | 8,507 ^f | 23.5 | ** | ** |
| Support Activities for Transportation (488) | 4 | 2.9 | 14,507 ^f | 27.6 | ** | ** |
| Warehousing & Storage (493) | 1 | 0.7 | 14,900 | 6.7 | ** | ** |

Table 5. Number of Traumatic Work-Related Fatalities by Industry and Rates by Number of Employees and by Hours Worked, Michigan 2015, cont.

| Industry Sector (NAICS Code) | Number | Percent | Employment-Based | | Hours-Based | |
|--|------------|------------|----------------------------------|-------------------|------------------------------|-------------------|
| | | | Number Employees ^a | Rate ^b | Number Hours ^a | Rate ^c |
| Finance & Insurance (52) | 1 | 0.7 | 155,900 | 0.6 | 36.9 | 0.7 |
| Credit Intermediation & Related Activities (522) | 1 | 0.7 | 73,100 | 1.4 | ** | ** |
| Real Estate & Rental & Leasing (53) | 6 | 4.4 | 51,300 | 11.7 | ** | ** |
| Real Estate (531) | 5 | 3.7 | 37,600 | 13.3 | ** | ** |
| Rental & Leasing Services (532) | 1 | 0.7 | 12,805 ^f | 7.8 | ** | ** |
| Professional, Scientific, & Technical Services (54) | 2 | 1.5 | 286,600 | 0.7 | 36.4 | 0.8 |
| Professional, Scientific, & Technical Services (541) | 2 | 1.5 | 286,600 ^f | 0.7 | ** | ** |
| Administrative & Support & Waste Management & Remediation Services (56) | 10 | 7.4 | 291,700 | 3.4 | ** | ** |
| Administrative & Support Services (561) | 10 | 7.4 | 279,434 ^f | 3.6 | ** | ** |
| Health Care & Social Assistance (62) | 1 | 0.7 | 609,900 | 0.2 | 31.5 | 0.2 |
| Social Assistance (624) | 1 | 0.7 | 74,300 | 1.3 | ** | ** |
| Arts, Entertainment, & Recreation (71) | 5 | 3.7 | 50,200 | 10.0 | 23.8 | 16.7 |
| Performing Arts, Spectator Sports, & Related Industries (711) | 3 | 2.2 | 9,300 | 32.3 | ** | ** |
| Amusement, Gambling & Recreation Industries (713) | 2 | 1.5 | 36,600 | 5.5 | ** | ** |
| Accommodation & Food Services (72) | 5 | 3.7 | 363,500 | 1.4 | 22.8 | 2.4 |
| Food Services & Drinking Places (722) | 5 | 3.7 | 322,600 | 1.5 | ** | ** |
| Other Services (except Public Administration) (81) | 3 | 2.2 | 167,300 | 1.8 | 32.4 | 2.2 |
| Repair & Maintenance (811) | 2 | 1.5 | 40,200 | 5.0 | ** | ** |
| Religious, Grantmaking, Civic, Professional & Similar Organizations (813) | 1 | 0.7 | 87,400 | 1.1 | ** | ** |
| Public Administration (92) | 7 | 5.1 | 235,400 | 3.0 | ** | ** |
| Executive, Legislative & Other Government Support (921) | 2 | 1.5 | ** | ** | ** | ** |
| Justice, Public Order, & Safety Activities (922) | 3 | 2.2 | ** | ** | ** | ** |
| National Security and International Affairs (928) | 1 | 0.7 | ** | ** | ** | ** |
| Totals | 136 | | 4,500,000^e | 3.0 | | |

^a Source: Michigan Department of Technology, Management and Budget, Office of Labor Market Information and Strategic Initiatives, Industry-Current Employment Estimates by Industry (CES), Michigan, Year: 2015. March 31, 2017. <http://milmi.org/datasearch>

^b Incidence rates calculated per 100,000 workers.

^c Rate represents the number of fatal occupational injuries per 100,000 full time equivalent workers and was calculated as: $(N/EH) \times 200,000,000$ 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)

^d Source: USDA, National Agricultural Statistics Service. 2012 Census of Agriculture, AC-12-A-22, Released May 2015. Accessed August 9, 2017. Michigan State and County Data, Table 68. Summary by North American Industry Classification System: 2012. https://www.agcensus.usda.gov/Publications/2012/Full_Report/Volume_1_Chapter_1_State_Level/Michigan/st26_1_068_068.pdf

Note: previous annual reports have utilized the number of farms (from the Table 51. Selected Characteristics of Farms by North American Industry Classification System) to estimate the number of owner/operators and hired farm labor, which contributes to the change in rates calculated here compared to those from previous years.

^e Source: Employment status of the civilian non-institutional population by sex, race, Hispanic or Latino ethnicity, and detailed age, 2015 annual averages – Michigan. Bureau of Labor Statistics, Local Area Unemployment Statistics <http://www.bls.gov/lau/table14full15.pdf> Accessed November 13, 2015.

^f Source: Michigan Department of Technology, Management and Budget, Office of Labor Market Information and Strategic Initiatives, Industry-Employment and Wages by Industry (QCEW), Michigan, Year: 2015. March 31, 2017. <http://milmi.org/datasearch>

^g 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 June 01, 2017.

^h 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 2015 as computed by the Bureau of Labor Statistics (BLS). When calculating the fatal injury rates for the United States, BLS excludes workers under the age of 16 years, volunteers and the resident military.

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 2015 (3.0) and hours-based fatality incidence rate (3.1) was lower than the United States hours-based fatality incidence rate (3.4/100,000 FTEs).** Hours-based fatal injury rates should not be directly compared to employment-based rates because of the differences in the denominators used.



[Case 64](#). Farm worker died due to entanglement in a hay elevator conveyor's chain and sprocket.

| Industry Sector (NAICS Code) | Number of Fatalities | 2015 MI Employment-based Rate^{ab} | 2015 MI Hours-Based Rate | 2015 US Hours-Based Rate^f |
|--|-----------------------------|---|---------------------------------|---|
| Agriculture, Forestry, Fishing and Hunting (11) | 21 | 24.7 | 35.2 ^d | 22.8 |
| Construction (23) | 28 | 18.9 | 9.8 ^d | 10.1 |
| Manufacturing (31-33) | 16 | 2.7 | 2.2 ^d | 2.3 |
| Wholesale Trade (42) | 4 | 2.4 | 2.4 ^e | 4.7 |
| Retail Trade (44-45) | 9 | 1.9 | 2.6 ^e | 1.8 |
| Transportation & Warehousing (48-49) | 18 | 13.3 | 5.9 ^d | 13.8 |
| Financial Activities (52) | 1 | 0.6 | 3.5 ^d | 0.9 |
| Real Estate and Rental and Leasing (53) | 6 | 11.7 | ** | ** |
| Professional & Business Services (54, 56) | 12 | 2.1 ^c | ** | 3.0 |
| Educational & Health Services (61, 62) | 1 | 0.1 ^c | ** | 0.7 |
| Leisure & Hospitality (71, 72) | 10 | 2.4 ^c | 2.5 ^d | 2.0 |
| Other Services (except Public Administration) (81) | 3 | 1.8 | 2.2 ^e | 3.0 |
| Public Administration (92) | 7 | 3.0 | 4.0 ^d | 1.9 |
| Total | 136 | 3.0 | 3.1^d | 3.4 |

^a Sources: USDA, National Agricultural Statistics Service. 2012 Census of Agriculture, AC-12-A-22, Released May 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 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, 2015. www.milmi.org/cgi/dataAnalysis/.

^b Incidence rates calculated per 100,000 full-time equivalent (FTE) workers (from Table 5)

^c Employment-based rate calculated as $(N+N)/(E+E) \times 100,000$ FTE workers (from Table 9): N=Number fatalities (NAICS+NAICS), E=Number Employees (NAICS+NAICS).

^d <https://www.bls.gov/iif/oshwc/cfoi/rate2015mi.htm>

^e Rate represents the number of fatal occupational injuries per 100,000 full time equivalent workers and was calculated as: $(N/EH) \times 200,000,000$ 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) (from Table 5)

^f U.S. Bureau of Labor Statistics, 2015 Census of Fatal Occupational Injuries (final data): Number and rate of fatal work injuries by industry sector, 2015, Release Date: Final data released December 16, 2016. Accessed Aug 9, 2017. <https://www.bls.gov/iif/oshcfoi1.htm#charts>

** No data available from respective sources

Overall Michigan's work-related fatality rate was lowered than the U.S. national rate, however there were four industry groupings with a calculated hours-based incidence rate, higher than to the US hours-based incidence rate: Agriculture, Forestry, Fishing and Hunting; 35.2 compared to 22.8, 54% higher), Retail Trade (2.6 compared to 1.8, 44% higher), Financial Activities (3.5 compared 0.9, 288% higher); Leisure and Hospitality (2.5 compared to 2.0, 25% higher); and Public Administration (4.0 compared to 1.9, 110% higher) (Table 6).

Agriculture

Eleven of the 21 (13.7 deaths/100,000 operators) known work-related deaths in Agriculture in 2015 were identified as a farm operator, while four (4.9 deaths/100,000 hired hands)

were identified as hired labor. It was unknown if four individuals were operators, hired labor, or unpaid workers.

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. 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 the work status for three of the four hired farm workers who died in 2015; of those, only one worked more than 150 days in a calendar year.

Unpaid workers include agricultural workers not on the payroll who performed activities or work on a farm or ranch. MIFACE was unable to identify if an individual was an unpaid worker.

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 2013. Seasonal farm labor was described as “an individual whose principal employment is in agriculture on a seasonal basis, who has been so employed within the last twenty-four months.” 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). Thirteen thousand six hundred-twenty farm operators indicated they hired labor and 3,906 farm operators indicated they hired contract labor (Table 68, 2012 Agricultural Census, Michigan: https://www.agcensus.usda.gov/Publications/2012/Full_Report/Volume_1,_Chapter_1_State_Level/Michigan/st26_1_068_068.pdf).

If the total number of Agricultural operators (80,304), hired farm labor (83,451), and unpaid workers (53,797) identified in the 2012 Agriculture Census are added to the above estimate for migrant and seasonal farm laborers (49,135), as well as to the number of employees



Case 18. Farmer/greenhouse co-owner died when he and the unsecured produce box raised by a tractor/forklift fell approximately seven feet to a concrete floor.

working in Forestry & Logging and Agricultural Support Activities (1,757 and 3,097 individuals, respectively), the total number of workers in Agriculture was 271,541. 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 24.7/100,000 to 7.7 deaths/100,000 workers. With the use of either denominator there is a slight decrease in the rate of agricultural deaths from 2014 to 2015; 30.5 to 24.7 or 9.3 to 7.7/100,000 workers, largely reflecting the decrease in the number of deaths (from 25 to 21). Both rates are appreciably lower than the official BLS rate which only includes hired employees. Comparing the rates for operators or hired labor within either crop or animal production from 2014 to 2015 is difficult, as our method of calculating the number of operators and hired workers changed in 2015 (as described in **Table 5**).



[Case 133](#). Farm hand at a hog-raising operation died from exposure to carbon monoxide from a propane-powered pressure washer that was located in a small room inside of a 14-foot by 17-foot office building with an 8-foot ceiling.

There are a number of issues associated with summing these counts of 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 they utilized migrant workers as part of their hired or contract workers in the 2012 Agricultural Census. Additionally, 94 farms reported that they did not have hired farm workers but they *did* have migrant contract workers on their operation. This suggests that these estimates may contain classification error and/or classification overlaps, in which a worker may be counted more than once in different categories.

The transient nature of crop production further 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 large 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. A similar uncertainty exists for hired hands reported as working 150 days or more. Given that many of these work stints may be for durations significantly shorter than a year, it is possible that many hired workers will work at multiple farms in a year, each of which may count the worker in their reported number of hired workers, again leading to a worker being counted more than once.

Due to these uncertainties regarding the true total number of hired, unpaid, and seasonal/migrant workers, and which of these categories may be overlapping or enveloped by others, the incidence rate of work-related fatalities across Agriculture (24.7/100,000

workers) utilizes only the total number of operators in crop and animal production combined with employee counts for Forestry & Logging and Agricultural Support Activities. It is likely that the most accurate incidence rate lies somewhere between this number and the rate given when all possible counts of hired, unpaid, and migrant labor are combined (7.7/100,000 workers).

Means of Work-Related Death

The means of death was known for 135 of the 136 work-related deaths in Michigan in 2015 (**Table 7**). Motor vehicles were the leading cause of a work-related death (27, 19.9%) in Michigan in 2015. Homicides were the second leading causes of death (22, 16.2%) followed by struck by incidents (21, 15.4%) and then falls (18, 13.2%). The medical examiner could not determine the cause of death for one individual.

Motor vehicles were the leading cause of death in Transportation & Warehousing (8 of 18 deaths, 44.4%) and Public Administration (3 of 7 deaths, 42.9%). A motor vehicle crash was the second-leading cause of death in Agriculture (3 deaths, 14.3%) and third-leading in Construction (5 deaths, 17.9%). Motor vehicles and homicides were the primary causes of death in Retail Trade (3 each, 33.3%).



[Case 94](#). A male farmer/snow plow business owner died when his pickup truck struck a tree.

All industry sectors, with the exception of Professional & Technical Services and Health Care & Social Assistance, had at least one homicide. A homicide was the cause of death for the sole individual who worked in Finance & Insurance.

Struck-by incidents were the primary cause of a work-related death in Manufacturing (6 of 16 deaths, 37.5%) and the second leading cause of death in Construction (6 deaths, 21.4%).

Seven of the 18 fall-related deaths occurred in Construction. A fall was the primary cause of death in Construction (7 deaths, 25.0%).

Table 7. Traumatic Work-Related Fatalities by Means of Death and Industry Sector, Michigan 2015

| Industry Sector (NAICS Code) | Aircraft (2.2%) | Animal (0.7%) | Asphyxiation (1.5%) | Drowning (1.5%) | Drug Overdose (2.2%) | Electrocution (1.5%) | Fall (13.2%) | Fire/Explosion (2.2%) | Homicide (16.2%) | Machine (11.0%) | Motor Vehicle (19.9%) | Struck-by (15.4%) | Suicide (8.8%) | Toxic Exposure (2.9%) | Unknown (0.7%) | Total |
|---|--------------------|------------------|------------------------|--------------------|-------------------------|-------------------------|-----------------|--------------------------|---------------------|--------------------|--------------------------|----------------------|-------------------|--------------------------|-------------------|------------|
| Agriculture, Forestry, Fishing & Hunting (11) | -- | 1 | -- | -- | -- | -- | 1 | -- | 2 | 9 | 3 | 2 | 1 | 2 | -- | 21 |
| Construction (23) | -- | -- | -- | 1 | 1 | 1 | 7 | 2 | 3 | -- | 5 | 6 | 1 | 1 | -- | 28 |
| Manufacturing (31-33) | -- | -- | -- | 1 | -- | -- | 1 | -- | 2 | 3 | -- | 6 | 2 | 1 | -- | 16 |
| Wholesale Trade (42) | -- | -- | -- | -- | -- | -- | 1 | -- | 1 | -- | 1 | -- | 1 | -- | -- | 4 |
| Retail Trade (44-45) | -- | -- | -- | -- | -- | -- | 1 | -- | 3 | -- | 3 | 1 | 1 | -- | -- | 9 |
| Transportation & Warehousing (48-49) | 1 | -- | 1 | -- | 1 | -- | 1 | -- | 2 | 1 | 8 | 1 | 2 | -- | -- | 18 |
| Finance & Insurance (52) | -- | -- | -- | -- | -- | -- | -- | -- | 1 | -- | -- | -- | -- | -- | -- | 1 |
| Real Estate & Rental & Leasing (53) | -- | -- | -- | -- | -- | -- | 1 | -- | 1 | 2 | -- | 1 | 1 | -- | -- | 6 |
| Professional, Scientific, & Technical Services (54) | -- | -- | -- | -- | -- | -- | 1 | -- | -- | -- | -- | -- | 1 | -- | -- | 2 |
| Administrative & Support & Waste Management & Remediation Services (56) | -- | -- | -- | -- | -- | 1 | 2 | 1 | 1 | -- | 3 | 2 | -- | -- | -- | 10 |
| Health Care & Social Assistance (62) | -- | -- | 1 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1 |
| Arts, Entertainment, & Recreation (71) | -- | -- | -- | -- | -- | -- | 1 | -- | 2 | -- | -- | 1 | -- | -- | 1 | 5 |
| Accommodation & Food Services (72) | -- | -- | -- | -- | -- | -- | 1 | -- | 2 | -- | 1 | -- | 1 | -- | -- | 5 |
| Other Services (ex. Public Administration) (81) | 1 | -- | -- | -- | 1 | -- | -- | -- | 1 | -- | -- | -- | -- | -- | -- | 3 |
| Public Administration (92) | 1 | -- | -- | -- | -- | -- | -- | -- | 1 | -- | 3 | 1 | 1 | -- | -- | 7 |
| Totals | 3 | 1 | 2 | 2 | 3 | 2 | 18 | 3 | 22 | 15 | 27 | 21 | 12 | 4 | 1 | 136 |

Means of Death by Cause

Aircraft

Three individuals died as a result of a plane crash. All of the individuals were piloting the respective planes. Two incidents occurred with a single-engine aircraft and one incident occurred with a twin-engine aircraft. One single- and the twin-engine aircraft crashes occurred while attempting to return to the airport to land and the other single-engine aircraft crashed during the landing attempt.

Animal

One herdsman died when he was struck multiple times by a bull.

Asphyxiation

Two individuals died from asphyxiation. One individual choked to death on a piece of food. One railroad contractor died when he was buried by grain and structural material when a wall of a grain storage building collapsed.

Drowning

Two individuals died from drowning. One individual, who was not wearing a life preserver and who could not swim, entered a lake while at a work-related party and one individual drowned in a well crotch during its repair.

Drug Overdose

Three individuals, all males, died due to a drug overdose. One individual was in his 20s and two were in their 50s; a truck driver, a heating and cooling technician and a car wash attendant, respectively. Drugs included methadone, morphine, codeine and marijuana.



[Case 5](#). A male railroad contractor buried by grain and structural material when the wall of a grain storage building collapsed.

Electrocution

Two individuals died from coming into contact with electrical current. One individual indirectly contacted an overhead power line: he was elevated in a boomed vehicle power-washing a silo when the boom contacted a 7,200-volt overhead power line. One individual directly contacted 480-volt energized wires (3-3/0 AWG and ground wire) in a newly installed junction box near the floor in a pump house for a fire-suppression system.



Case 12. Male master electrician electrocuted while working with 480-volt energized wires (3-3/0 AWG and ground wire) from a newly installed junction box near the floor.

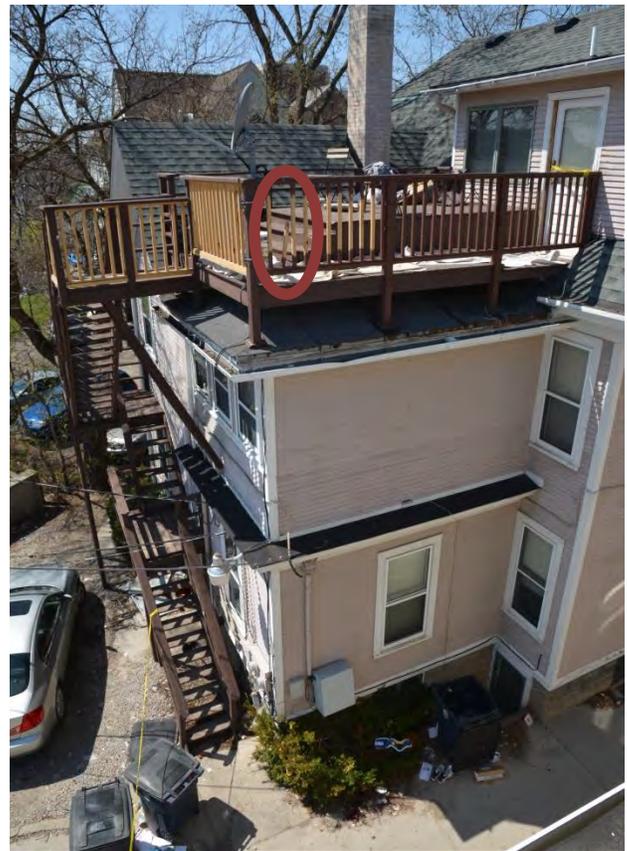
Fall

Falls accounted for 18 of the work-related fatalities. The height of the fall was known for 15 (83.3%) of the 18 incidents, which ranged from ground level to 30 feet. Of these, there were 8 (53.3%) fatal falls of 10-feet or less (5 falls were ground level falls), 2 (13.3%) falls from 11-20 feet, and 5 (33.3%) falls from 20-30 feet.

The reason for the fall was identified in 15 (83.3%) of the 18 incidents. The individual slipped/tripped/lost balance in 7 (46.7%) incidents and the structure gave way in 4 (22.2%) incidents. For 3 (20.0%) incidents, the cause of the fall was due to a medical reason, and for 1 (6.7%) incident, the cause of the fall was unknown.

The location of the fall was identified for all 18 fall-related deaths; from a ladder in 4 (22.2%) incidents, while standing on the ground in 5 (27.8%) incidents, and from a vehicle/machine/equipment in 4 (22.2%) incidents. One individual each fell from a tree, roof/roof edge, a high wire, the top of a flight of stairs, and structural steel.

The condition of the working surface was known in 14 (77.8%) of the 18 cases. The working surface was dry in 13 (92.9%) of those incidents and for one incident the work surface was described as damaged or worn. However, in several of the incidents in which the work surface was dry, other factors may have contributed to the fatal fall. In one incident, it appeared the decedent turned a cherry-picker basket 90 degrees and began to back the equipment away



Case 20. A male painter died from a fall from a second story roof while painting deck spindles.

from the home, traversing the slope rather than moving parallel to the slope while elevated with the boom at least partially extended. In one incident, one of the circus performers lost his balance on the thin wire and caused his coworkers, including the decedent, to fall to the ground. In one incident the dry surface was described as damaged/worn.

The worksite of the fatal falls was identified for all 18 falls. Five (27/8 %) occurred at construction sites – three residential and two commercial. Two (11.1) occurred at manufacturing facilities. Eleven distinct sites were the location of one fall each: a circus, a farm, a gas station, a home trimming a tree, a restaurant, a church, a courthouse, a parking lot, a warehouse, a condo complex and a greenhouse.

Fire/Explosion

Three individuals died from injury complications of a fire/explosion. One individual, a self-employed roofer, died when gasoline vapors ignited while he lit a cigarette; he had placed an open container of gasoline in the vehicle a day prior. A male sheet metal worker died from smoke and soot inhalation complications from a fire that started during a relining of an aggregate and sand hopper in a six-story aggregate silo. The third individual, a welder's helper, died from complications of burns sustained in a flash fire that occurred while welding previously-decommissioned piping at a tank farm facility.

Homicide

There were 22 work-related homicides; 21(95.5%) men and one (4.5%) woman.

Nine (40.9%) work-related homicide victims were Caucasian males. Nine (40.9%) individuals were African American (8 men, 88.9% and 1 women, 11.1%). The death certificate identified the following races for four individuals: Arab, Asian/Pacific, Hispanic, and Syrian.

Eighteen of the 22 (81.8%) homicides occurred among individuals born in the United States. The country of origin was identified for three homicides as Iraq, Bangladesh and Syria. The country of origin was unknown for one homicide.

Work-related homicides occurred primarily in Wayne County (12 of 22, 54.5%). Genesee, Macomb, Oakland and Presque Isle counties each had 2 (9.1%) homicides; Presque Isle County had two homicides occur during the same incident. Berrien and Ingham Counties had one (4.5%) homicide each.

There were 21 homicide incidents; one incident involved two individuals. The decedent was working alone in 16 (76.2%) homicides and with coworkers in 4 (19.0%) homicides. For one (4.8%) homicide, it is unknown if coworkers were present when the homicide occurred.

The average age of a homicide victim was 42.1 years. Ages ranged from 21 years of age to 69 years of age.

The most common day of the week among the 21 homicide incidents was Tuesday (6, 28.6%), followed by Saturday (4, 19.0%) and then Wednesday (3, 14.3%) and Thursday (3, 14.3%), then Sunday (2, 9.5%) and Monday (2, 9.5%), and last Friday (1, 4.8%).

The time of the incident was known/estimated for 20 of the 22 homicide cases; five occurred between 8 p.m. and midnight, four between noon and 3:59 p.m., three homicides each occurred between 4 a.m. and 7:59 a.m., 8 a.m. and 11:59 a.m., and 4 p.m. and 7:59 p.m., and two occurred between midnight and 3:59 a.m.

A gun was the cause of death in 19 (86.4%) of the 22 homicides. Two individuals were struck-by a vehicle and one individual was stabbed.

Machine

There were 15 machine-related fatalities. Ten of the 15 (66.7%) machine-related fatalities involved agricultural tractors. Of the 10 tractor-related fatalities, 8 (80.0%) occurred in Agriculture, and 2 (20.0%) occurred in Real Estate & Rental & Leasing (former farmers renting their land for agriculture).

Eight of the 9 (88.9%) machine-related fatalities in Agriculture involved a tractor. Four incidents involved the overturn of a tractor; none of the tractors were equipped with a rollover protection structure. In three of the tractor overturns, the decedent was pinned under the tractor, and in the fourth the decedent was thrown from the tractor. Four individuals died when they were run over by the tractor. In two of the run over-related deaths, the decedent fell from the tractor; in one, the decedent's jacket was caught by a tire, pulling him from the tractor seat, and in one, the decedent was starting the tractor while standing on the ground.

In one death, a farm worker in her teens was entangled in a hay elevator conveyor's chain and sprocket; the equipment was powered by a tractor.

The two tractor-related fatalities occurring outside of Agriculture involved one individual who was working under a tractor under power when the tractor fell onto him, pinning him under a tractor wheel and possibly entangling him in the power take-off shaft. In one incident, the decedent was struck and run over by the tractor when he started it while standing on the ground.



[Case 61](#). A farmer died when he was thrown from his John Deere Model 4030 tractor when it rolled over after leaving the roadway.

The four machine-related deaths not involving a tractor included: a waste treatment/energy center operator crushed between the plates of a filter press, a journeyman maintenance technician pinned between two parts while troubleshooting a robotic operation, a truck driver for a land-clearing company pinned when the old military 6X dump truck he was operating overturned, and a machine operator crushed between the table and machine framing during the machine cycle.

Motor Vehicle

There were 27 motor-vehicle-related fatalities in 26 collisions. One crash involved two truck drivers.

In total, there were 25 drivers and 2 pedestrians killed by a motor vehicle in 2015.

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.



[Case 69](#). Truck driver for a land clearing company died when the old military 6X dump truck he was operating overturned on a farm, pinning him.

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.
- ◆ **Head On-Left Turn:** two vehicles are approaching head on and at least one is attempting a left turn.
- ◆ **Angle:** direction of travel is basically perpendicular for both drivers and there is a side impact of approximately 90 degrees.
- ◆ **Rear End:** vehicles traveling in the same direction one behind the other and no turn is involved.
- ◆ **Sideswipe - Same:** vehicles traveling in same direction and made side contact.

Highlights of Motor Vehicle Incidents

Driver/Passenger/Pedestrian

- ◆ Drivers: 25 (92.6%) individuals
- ◆ Pedestrians: 2 (7.4%) individuals

Number of Units (26 incidents)

- ◆ 1 unit: 10 (38.5%) incidents
- ◆ 2 units: 12 (46.2%) incidents
- ◆ 3 units: 2 (7.7%) incidents
- ◆ 4 units: 1 (3.8%) incident
- ◆ 5+ units: 1 (3.8%) incident

Crash Type (26 incidents)

- ◆ Single motor vehicle: 12 (46.2%) incidents
- ◆ Head On: 5 (19.2%) incidents (2 drivers)
- ◆ Head On-Left Turn: 1 (3.8%) incident
- ◆ Angle: 2 (7.7%) incidents
- ◆ Rear End: 5 (19.2%) incidents
- ◆ Sideswipe-Same: 1 (3.8%) incident

Number of Roadway Lanes (26 incidents)

- ◆ 1 lane: 1 (3.8%) incident
- ◆ 2 lanes: 16 (61.5%) incidents
- ◆ 3 lanes: 3 (11.5%) incidents
- ◆ 4 lanes: 2 (7.7%) incidents
- ◆ 5 lanes: 4 (15.4%) incident

Amount of Light (26 incidents)

- ◆ Daylight: 17 (65.4%) incidents
- ◆ Dawn/Dusk: 1 (3.8%) incident
- ◆ Dark – Lighted: 1 (3.8%) incident
- ◆ Dark – Unlit: 7 (26.9%) incidents

Speed Limit (26 incidents)

- ◆ 30 mph: 1 (3.8%) incident
- ◆ 35 mph: 1 (3.8%) incident
- ◆ 45 mph: 1 (3.8%) incident
- ◆ 55 mph: 13 (50.0%) incidents
- ◆ 60 mph: 2 (7.7%) incidents
- ◆ 70 mph: 8 (30.8%) incidents

Weather (26 incidents)

- ◆ Clear: 11 (42.3%) incidents
- ◆ Cloudy: 10 (38.5%) incidents
- ◆ Rain: 3 (11.5%) incident
- ◆ Snow/Blowing Snow: 2 (7.7%) incidents

Surface Conditions (26 incidents)

- ◆ Dry: 15 (57.7%) incidents
- ◆ Wet: 8 (30.8%) incidents
- ◆ Icy: 1 (3.8%) incidents
- ◆ Snowy: 1 (3.8%) incident
- ◆ Slushy: 1 (3.8%) incident

Type of Trafficway (26 incidents)

- ◆ Not physically divided (2-way traffic): 16 (61.5%) incidents
- ◆ Divided highway, median strip, without traffic barrier: 5 (19.2%) incidents
- ◆ Divided highway, median strip, with traffic barrier: 4 (15.4%) incidents
- ◆ One-way traffic: 1 (3.8%) incident

Type of Vehicle (27, including vehicle striking pedestrian)

- ◆ Passenger car: 6 (22.2%) incidents
- ◆ Truck/Bus: 13 (48.1%) incidents
- ◆ Pickup Truck: 4 (14.8%) incidents
- ◆ Van: 2 (7.4%) incident
- ◆ Motorcycle: 2 (7.4%) incident

Hazardous Action, Driver is Decedent (23 of 25 known)

- ◆ None: 7 (30.4%) incidents
- ◆ Speed Too Fast: 4 (17.4%) incidents
- ◆ Failed to Yield: 2 (8.7%) incidents
- ◆ Disregard Traffic Control: 1 (4.3%) incident
- ◆ Drove Wrong Way: 1 (4.3%) incident
- ◆ Drove Left of Center: 1 (4.3%) incident
- ◆ Improper Lane Use: 1 (4.3%) incident
- ◆ Unable to Stop: 2 (8.7%) incidents
- ◆ Other: 1 (4.3%) incident
- ◆ Careless/Negligent: 3 (13.0%) incidents

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

- ◆ Careless/Negligent: 2 (100.0%) incident

Seat Belt Use was known for 19 individuals. Restraint use was not available for 2 individuals (motorcycles), not applicable for 2 pedestrians, and restraint available, but use unknown for 4 incidents

- ◆ Seat Belt Used: 12 (63.2%) incidents
- ◆ Seat Belt Not Used: 7 (36.8%) incidents

Roadway Area Where Fatal Incident Occurred (26 incidents)

- ◆ Freeway: 9 (34.6%) incidents
- ◆ Entrance/Exit Ramp: 2 (7.7%) incidents
- ◆ All other freeway areas: 7 (26.9%) incidents
- ◆ Non-Freeway Intersection: 5 (19.2%) incidents
- ◆ Within Intersection: 3 (11.5%) incidents
- ◆ Intersection-Other: 2 (7.7%) incident
- ◆ Other Non-Freeway Areas: 12 (46.2%) incidents
- ◆ Straight Roadway: 11 (42.3%) incidents
- ◆ Curved Roadway: 1 (3.8%) incidents

Most Harmful Event (26 incidents)

- ◆ Non-collision: 5 (19.2%) incidents
 - Ran Off Road Right: 1 (20.0%) incident
 - Overturn: 2 (40.0%) incidents
 - Fire/Explosion: 2 (40.0%) incidents
- ◆ Collision with non-fixed object: 15 (57.7%) incidents
 - Pedestrians: 2 (13.3%) incidents

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

- Motor vehicle in transport: 13 (86.7%) incidents
- ◆ Collision with Fixed object: 6 (23.1%)
 - Ditch: 2 (33.3%) incidents
 - Embankment: 1 (16.7%) incident
 - Tree: 3 (50.0%) incidents

Struck-by

Twenty-one individuals were fatally injured when struck-by an object. Eight (36.4%) incidents involved a motor vehicle; one of these involved a semi-truck (decedent was struck by a backing semi-tractor and trailer), two incidents involved dump trucks (decedent struck by falling dump bed, decedent run over by dump truck while attempting to repair brakes), one incident involved a backhoe loader (decedent struck by bucket), one incident involved a pickup truck (truck rolled onto and pinned decedent during repairs), one incident involved both a tow truck and a car (car struck tow truck and decedent (truck operator) while changing a tire on the side of road), one incident involved a van (decedent



[Case 115](#). Male landlord died when a wooden play structure post struck his upper body while removing a wooden swing set from the property he had just purchased.

struck by van while in construction zone), and the last involved a racecar (decedent's racecar struck by another during a race). Three (13.6%) incidents involved a tree and/or a tree branch striking the decedent. One (4.5%) individual each died as a result of being struck-by a: bundle of steel round stock, cabinet on a vehicle assembly line (possibly following being initially struck by a car or its lift gate on the line), collapsing floor, concrete beam, moving security gate, metal rack, wooden play structure post, collapsing excavation, collapsing trench wall, and a box of nuts and bolts (leading to a gangrenous finger and subsequent surgery, during which the decedent died from complications).

Suicide

Twelve individuals died from a fatal self-inflicted injury at work. Guns were involved in 7 (58.3%) of the deaths, while 3 (25.0%) related to self-asphyxiation and 2 (16.7%) to jumping from a height.

By industry sector, Manufacturing and Transportation and Warehousing had the highest number of suicides, at 2 each. Ten (83.3%) of the decedents were male, and the age range across all twelve decedents was 27 to 63 years of age; the average age of the decedent was 37 years old.

Toxic Exposure

Four individuals died from overexposure to an airborne contaminant. Two individuals, both working in Agriculture, died from overexposure to carbon monoxide (a farmer working on his tractor in a closed garage and a farm hand died from the exhaust of a propane-powered pressure washer). One individual died from complications of a 1989 exposure to unknown toxic gases. The fourth individual died from complication of exposure to methylene diphenyl diisocyanate (MDI).

Unknown

The medical examiner could not determine a cause of death for one individual, a carnival worker.

MIOSHA Fatality Investigations

The 136 individuals who died from of a work-related injury in 2015 worked for 134 employers. In 2015, MIOSHA personnel conducted a work-related fatality program-related compliance investigation at 29 (21.3%) of the 134 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 appeared to be related to one or more of the following conditions:

- The incident was found to have resulted from violations of MIOSHA safety and health standards or the "general duty" clause.
- The incident was considered 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.
- The information describing the incident is insufficient to make a clear distinction between a "Program-Related" and "non-Program-Related" incident, but the type and nature of the injury indicated that there was a high probability that the injury was the result of a failure

to adhere to one or more MIOSHA standards, the “general duty” clause, or good safety and health practice.

Table 8 shows the number of work-related fatalities in Michigan in 2015 by industry sector and the number of MIOSHA work-related fatality compliance inspections for each industry sector.

| Table 8. Work-Related Fatalities and Number of MIOSHA Work-Related Fatality Compliance Inspections, Michigan 2015 | | |
|--|--|--|
| Industry | Number of Work-Related Fatalities | Number of Work-Related Fatality MIOSHA Compliance Inspections (%) |
| Agriculture, Forestry, Fishing & Hunting (11) | 21 | 3 (14.3%) |
| Construction (23) | 28 | 9 (32.1%) |
| Manufacturing (31-33) | 16 | 10 (62.5%) |
| Wholesale Trade (42) | 4 | 0 |
| Retail Trade (44-45) | 9 | 1 (11.1%) |
| Transportation & Warehousing (48-49) | 18 | 2 (11.1%) |
| Finance & Insurance (52) | 1 | 0 |
| Real Estate & Rental & Leasing (53) | 6 | 0 |
| Professional, Scientific, & Technical Services (54) | 2 | 0 |
| Administrative & Support & Waste Management & Remediation Services (56) | 10 | 3 (30.0%) |
| Health Care & Social Assistance (62) | 1 | 0 |
| Arts, Entertainment, & Recreation (71) | 5 | 0 |
| Accommodation & Food Services (72) | 5 | 0 |
| Other Services (ex. Public Administration) (81) | 3 | 0 |
| Public Administration (92) | 7 | 1 (14.3%) |
| Total | 136 | 29 |

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 29 (31.0%) employers having a MIOSHA work-related fatality compliance inspection in 2015 were identified as having a MIOSHA work-related compliance inspection prior to 2015. Of the 9 companies which had a work-related fatality in 2015 and were previously inspected by MIOSHA, 3 were in Construction and 6 were in Manufacturing.

MIOSHA issued a violation citation to the firm at the conclusion of the fatality investigation in 27 of the 28 (96.4%) investigations (One of the 29 investigations has not yet been closed). Citation penalties assessed at the conclusion of the compliance inspection (not the penalties decided after appeal) ranged from a low of \$400 to a high of \$287,000.

MIFACE Contact with Companies

MIFACE sent letters to 43 companies/families that had a work-related fatality in 2015. We could not contact three companies/families because we were unable to find a phone number and/or a valid address. If no response was received by the company/family, MIFACE followed up by phone. Thirty-two (74.4%) declined and nine (20.9%) accepted the invitation to participate, and MIFACE is awaiting a company response for two inspections. MIFACE did not contact 93 employers due to the nature of the fatality (for example, work-related suicide, incident happened years ago, motor vehicle crash).

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 rate of fatal work-related injuries for Hispanic workers than for other racial/ethnic groups. As a result, Federal OSHA collects 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 is available to the OSHA Hispanic Worker Task Force. The Michigan FACE program supports the initiative and has utilized an Immigrant Workers/Limited English Speaking Workers investigation guide during appropriate on-site investigations.

There were 12 deaths of workers of Hispanic/Latino ethnicity in Michigan in 2015. The BLS Table 14, [Michigan Employment Status of the Civilian Non-institutional Population by Sex, Race, Hispanic or Latino](#)



[Case 13](#). Carpenter electrocuted when the arm of the 125-foot JLG he was operating contacted an energized 7,200-volt overhead power line while power washing a 60-foot tall silo.



[Case 104](#). Hispanic pipe layer died in a trench wall collapse.

[ethnicity, and Detailed Age, 2015 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 2015, the Hispanic/Latino fatality rate in Michigan was 5.1 per 100,000 Hispanic/Latino individuals; for males, the fatality rate was 7.9/100,000 and for Hispanic females, the rate was 1.0/100,000. For Caucasians, the rate was 2.9/100,000 (males (4.7/100,000) and females (0.80/100,000)), for African-Americans, the rate was 3.7/100,000 (males (7.6/100,000) and females (0.7/100,000)) and for Asians, the fatality rate was 0.8 deaths/100,000 workers.

Three of the twelve Hispanic/Latino individuals were in their 20s, two were in their 30s, 3 were in their 40s, and two were in their 50s. One worker was a teenager. The country of origin for seven Hispanic/Latino individuals was the United States, while five were born in Mexico. One individual worked in Agriculture, four worked in Construction, three worked in Manufacturing, one worked in Transportation and Warehousing, two worked in Administrative and Support and Waste Management and Remediation Services, and one worked in Public Administration.

Sensitivity of Injury at Work Box on Death Certificate

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

Table 9 shows that from 2001-2015, 13.1%-44.8% of the work-related deaths would have been missed if MIFACE had solely relied on the Injury at Work box being completed with “Yes”.

| Table 9. Sensitivity of Death Certificate Injury at Work Box Predicting Fatal Injury at Work, Michigan 2015 | | |
|--|-------------------------|-------------------------|
| 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%) |
| 2015 (136) | 89 (67.9%) | 42 (32.1%) |

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

In 2015, the Injury at Work box was misidentified most frequently in the designation of an injury at work in the Agricultural industry (13 of the 25 deaths) followed by five of 18 deaths in each of Transportation and Warehousing and Administration and Support and five of 10 deaths in Waste Management and Remediation Services. Work-related deaths involving motor vehicle incidents

and homicides were the causes of death most misidentified as No in the Injury at Work box (8 deaths each).

Number of 2015 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 134 work-related deaths in 2015 per the BLS website viewed on June 2, 2017. MIFACE identified two more deaths (136 total) for 2015 – this discrepancy is likely due to two deaths occurring late enough in the year that they were unable to be included in the annual Michigan CFOI statistics.

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 136 acute traumatic work-related deaths in 2015 is included in Appendix I.

Table 10 provides the narrative case number and cause of death by NAICS code found in the Appendix. Each combination of industry and cause of death is hyperlinked to the beginning of the corresponding narratives. Additionally, each cause of death label is hyperlinked to its corresponding heading in the Appendix.

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

Table 10. Traumatic Work-Related Fatality Narratives by Means of Death and Industry Sector, Michigan 2015

| Industry Sector (NAICS Code) | <u>Aircraft</u> (2.2%) | <u>Animal</u> (0.7%) | <u>Asphyxiation</u> (1.5%) | <u>Drowning</u> (1.5%) | <u>Drug Overdose</u> (2.2%) | <u>Electrocution</u> (1.5%) | <u>Fall</u> (13.2%) | <u>Fire/Explosion</u> (2.2%) | <u>Homicide</u> (16.2%) | <u>Machine</u> (10.3%) | <u>Motor Vehicle</u> (19.9%) | <u>Struck-by</u> (16.2%) | <u>Suicide</u> (8.8%) | <u>Toxic Exposure</u> (2.9%) | <u>Unknown</u> (0.7%) |
|---|---|---|---|---|--|--|--|---|--|---|---|---|--|---|--|
| Agriculture, Forestry, Fishing & Hunting (11) | -- | <u>4</u> | -- | -- | -- | -- | <u>14</u> | -- | <u>35-36</u> | <u>57-65</u> | <u>72-74</u> | <u>99-100</u> | <u>120</u> | <u>132-133</u> | -- |
| Utilities (22) | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Construction (23) | -- | -- | -- | <u>7</u> | <u>9</u> | <u>12</u> | <u>15-21</u> | <u>32-33</u> | <u>37-39</u> | -- | <u>75-79</u> | <u>101-106</u> | <u>121</u> | <u>134</u> | -- |
| Manufacturing (31-33) | -- | -- | -- | <u>8</u> | -- | -- | <u>22</u> | -- | <u>40-41</u> | <u>66-68</u> | -- | <u>107-112</u> | <u>122-123</u> | <u>135</u> | -- |
| Wholesale Trade (42) | -- | -- | -- | -- | -- | -- | <u>23</u> | -- | <u>42</u> | -- | <u>80-81</u> | -- | <u>124</u> | -- | -- |
| Retail Trade (44-45) | -- | -- | -- | -- | -- | -- | <u>24</u> | -- | <u>43-45</u> | -- | <u>82-83</u> | <u>113</u> | <u>125</u> | -- | -- |
| Transportation & Warehousing (48-49) | <u>1</u> | -- | <u>5</u> | -- | <u>10</u> | -- | <u>25</u> | -- | <u>46-47</u> | <u>69</u> | <u>84-91</u> | <u>114</u> | <u>126-127</u> | -- | -- |
| Information (51) | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Finance & Insurance (52) | -- | -- | -- | -- | -- | -- | -- | -- | <u>48</u> | -- | -- | -- | -- | -- | -- |
| Real Estate & Rental & Leasing (53) | -- | -- | -- | -- | -- | -- | <u>26</u> | -- | <u>49</u> | <u>70-71</u> | -- | <u>115</u> | <u>128</u> | -- | -- |
| Professional, Scientific, & Technical Services (54) | -- | -- | -- | -- | -- | -- | <u>27</u> | -- | -- | -- | -- | -- | <u>129</u> | -- | -- |
| Administrative & Support & Waste Management & Remediation Services (56) | -- | -- | -- | -- | -- | <u>13</u> | <u>28-29</u> | <u>34</u> | <u>50</u> | -- | <u>92-94</u> | <u>116-117</u> | -- | -- | -- |
| Education (61) | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Health Care & Social Assistance (62) | -- | -- | <u>6</u> | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Arts, Entertainment, & Recreation (71) | -- | -- | -- | -- | -- | -- | <u>30</u> | -- | <u>51-52</u> | -- | -- | <u>118</u> | -- | -- | <u>136</u> |
| Accommodation & Food Services (72) | -- | -- | -- | -- | -- | -- | <u>31</u> | -- | <u>53-54</u> | -- | <u>95</u> | -- | <u>130</u> | -- | -- |
| Other Services (ex. Public Administration) (81) | <u>2</u> | -- | -- | -- | <u>11</u> | -- | -- | -- | <u>55</u> | -- | -- | -- | -- | -- | -- |
| Public Administration (92) | <u>3</u> | -- | -- | -- | -- | -- | -- | -- | <u>56</u> | -- | <u>96-98</u> | <u>119</u> | <u>131</u> | -- | -- |

Discussion

Michigan was one of twenty-nine states (and the District of Columbia) which had a lower number of work-related fatal injuries in 2015 compared to 2014. There were 136 traumatic work-related fatalities in Michigan in 2015, a decrease of seven fatalities compared to 2014. The 2015 work-related fatality rate in Michigan was 3.0 per 100,000 workers. 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 134 deaths in 2015.

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 136 (3.0/100,000) in 2015. 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 2015, the number of work-related deaths averaged 2.62 fatalities per week 11.33 per month, although the deaths were not evenly distributed throughout the year. The month of the fatal incident was known in all of the 136 work-related fatalities; June was the most common month (18 fatal incidents) followed by September (15 fatal incidents) and then March and July (14 fatal incidents).

The largest number of work-related deaths was observed in Construction (28 deaths, 20.6%), followed by Agriculture (21, 15.4%). These two industries also showed the highest employment-based risk of death, with Agriculture (24.7/100,000 workers) leading Construction (18.9/100,000 workers). Transportation and Warehousing was third highest in both number of deaths (18, 13.2%) and risk (13.3/100,000 workers). Manufacturing, while having the fourth highest number of deaths (16, 11.8%), had a relatively low risk (2.7/100,000 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 84 (69.4%) individuals; 52 (61.9%) individuals had detectable levels of at least one of these substances. Twenty-four (46.2%) of the 52 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.



[Case 100](#). Logging business owner/operator died when a logging clam boom struck a nearby tree, causing two dead branches to fall and hit his head.

MIOSHA staff investigated 29 of the 136 (21.3%) deaths. The National Transportation Safety Board investigated two deaths (1.5%) and the Federal Aviation Administration investigated one death (0.07%). The remaining 104 (76.5%) work-related deaths were not investigated by any regulatory agency other than the police.

Six industry sectors had a decrease in the number of work-related deaths and incidence rate from 2014. The industry sector with the largest reduction in the number of work-related deaths were Other Services (excluding Public Administration) (10 fewer deaths), followed by Agriculture and Retail Trade (4 fewer deaths each) and Wholesale Trade and Health Care and Social Services (3 fewer deaths each). Additionally, three industry sectors (Utilities, Information, and Education) had work-related fatalities in 2014 but none in 2015. Seven industry sectors had an increase in the both number of work-related deaths and incidence rate. The industry sectors with the largest increase in the number of deaths compared to 2014 were Manufacturing (8 more deaths), Construction (5 more deaths), and Real Estate, Rental and Leasing (3 more deaths).

As stated previously, Agriculture had the second largest number of work-related deaths (21 deaths, 15.4%) and the highest incidence rate of 24.7/100,000 workers. The incidence rate was based on the total number of *operators* as identified in the 2012 USDA Agricultural Census, as discussed above. 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 \(USDA\)](#) indicated that hired workers worked an average of 38.8 hours per week in the region. The data included field crops, other crops including nursery or greenhouse crops and livestock or poultry. The data excluded 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 2015, 4 fatalities among hired laborers working in field crops, other crops or livestock/poultry were identified. Utilizing USDA Farm Labor Report's 38.8 hours per week average, the 2015 hours-based fatality incidence rate for hired workers in Michigan was 4.9 fatal injuries/100,000 full-time equivalent workers.

The decrease in the number of deaths in Agriculture from 2014 was due to a drop in fatalities in Crop Production and Forestry and Logging (4 fewer deaths each); the number of deaths which could not be assigned an industry sector remained constant (2 deaths), although the overall decrease in Agriculture was countered by an increase in fatalities in Animal Production (1 more death, Support Activities (1 more death) and in the number of Agriculture deaths that could not be otherwise classified (2 more deaths) number of deaths increased in Animal Production. The average age of those who died working in Agriculture (55.3 years, with a range of 14-86 years) was younger in 2015 than in previous years. **Table 11** shows the average age at the time of death for the past 15 years for those employed in Agriculture. In 11 of the 15 previous years, the average age of the individual was in their 50s or 60s.

| Year | Age (in years) | Year | Age (in years) |
|------|----------------|------|----------------|
| 2001 | 47.4 | 2009 | 51.5 |
| 2002 | 48.0 | 2010 | 53.0 |
| 2003 | 58.1 | 2011 | 56.6 |
| 2004 | 59.7 | 2012 | 52.2 |
| 2005 | 54.9 | 2013 | 56.6 |
| 2006 | 49.9 | 2014 | 46.8 |
| 2007 | 54.2 | 2015 | 55.3 |
| 2008 | 67.9 | | |

Nationally, in 2015, workers age 55 and older incurred 34.8% of all fatal work-related injuries. Michigan had a slightly higher fatal work-related injury percentage in this age group, at 38.2% of decedents being 55 or older. The two industry sectors comprising the most 55+ year old fatal injuries were Agriculture (13 deaths) and Construction (6 deaths).

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.

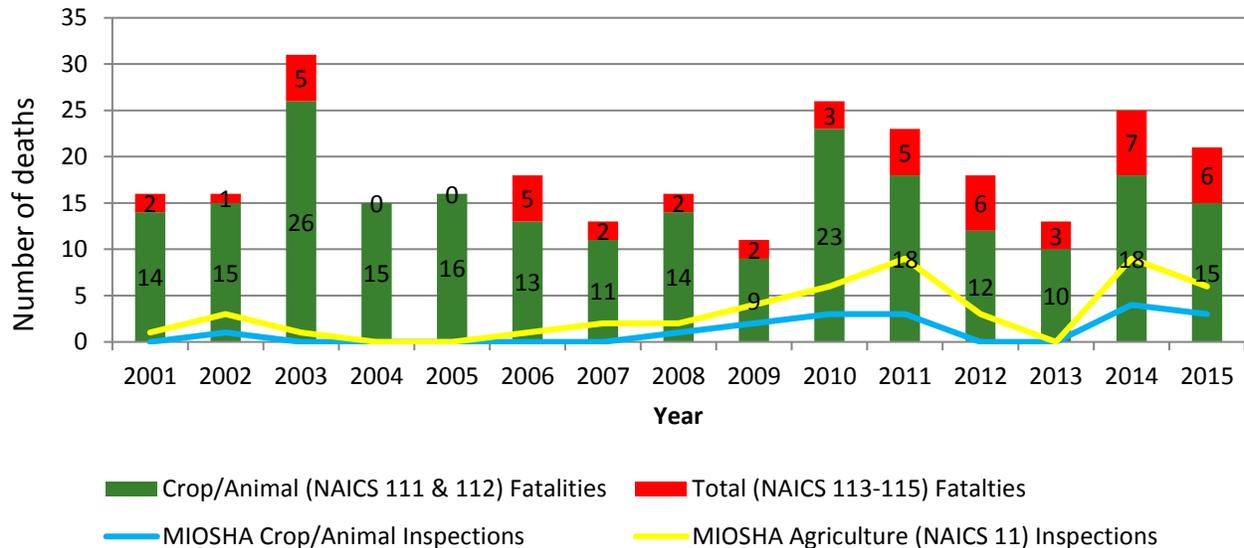
The MIOSHA Act defines Agriculture as “agricultural operations as the work activity designated in major groups 01 and 02 of the Standard Industrial Classification (SIC) manual, United States Bureau of the Budget, 1972 edition. Agricultural operations include any practices performed by a farmer or on 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:

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

It is important to note that immediate family members of farm employers are not counted when determining the number of employees. 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 2015, MIOSHA has conducted 31 Agricultural (NAICS 11) work-related fatality inspections; 21 of the inspections were in Crop Production and Animal Production. Ten MIOSHA fatality inspections occurred in the Forestry & Logging subsector.

Figure 6. Number of Agriculture Work-related Fatalities and MIOSHA Inspections, Michigan 2001-2015



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 2001-2015. The number of motor vehicle-related deaths remained fairly stable during the 15 years of data collection, as did the number of work-related fatal falls and struck-by incidents (with the exception of the past three years). Machine-related deaths have largely trended downward since 2001.

Table 13 shows the number of motor vehicle-related work-related deaths by industry sector occurring between the years of 2001-2015. A closer examination of the industries in which a motor vehicle-related work-related death occurred yielded interesting information. Not unsurprisingly, motor vehicle-related deaths are prominent in the Transportation industry. What was surprising was the percentage of the deaths caused by motor vehicles in other industry sectors. Both Information and Finance and Insurance have had at least half of their deaths caused by a motor vehicle. Professional/Scientific and Technical Services, Public Administration and Education also had a marked percentage of work-related deaths involving a motor vehicle. While safety initiatives addressing other issues, such as violence prevention, are of continued importance, 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.

Table 12. Cause of Death by Year, Michigan 2001-2015

| Year (# deaths) | Electrocution | Fall | Machine | Other/unknown | Motor Vehicle | Homicide | Drowning | Suicide | Toxic Exposure | Struck-by | Fire/Explosion | Heat/Cold | Animal | Aircraft | Asphyxiation | Drug Overdose | Infectious Disease |
|----------------------------|----------------------|-------------|----------------|----------------------|----------------------|-----------------|-----------------|----------------|-----------------------|------------------|-----------------------|------------------|---------------|-----------------|---------------------|----------------------|---------------------------|
| 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 (135) | 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 | |
| 2015 (136) | 5 | 18 | 15 | 1 | 27 | 22 | 2 | 12 | 4 | 21 | 3 | | 1 | 3 | 2 | 3 | |
| TOTALS | 86 | 307 | 267 | 19 | 438 | 282 | 20 | 151 | 44 | 265 | 42 | 10 | 19 | 49 | 20 | 32 | 1 |

| Table 13. Number and Percent of Motor Vehicle-Related Work-Related Deaths by Industry Sector, Michigan 2001-2015 | | |
|---|--------------------------------|------------------------|
| Industry (total # deaths) | # Motor Vehicle-related deaths | % of total # of deaths |
| Agriculture (279) | 24 | 8.6 |
| Mining (16) | 3 | 18.8 |
| Utilities (17) | 5 | 29.4 |
| Construction (416) | 59 | 14.2 |
| Manufacturing (214) | 17 | 7.9 |
| Wholesale Trade (60) | 22 | 36.7 |
| Retail Trade (148) | 25 | 16.9 |
| Transportation/Warehousing (253) | 110 | 43.5 |
| Information (28) | 16 | 57.1 |
| Finance/Insurance (13) | 6 | 46.2 |
| Real Estate/Rental/Leasing (28) | 2 | 7.1 |
| Professional/Scientific/Technical Services (34) | 14 | 41.2 |
| Administrative/Support/Waste Management/Remediation (127) | 30 | 23.6 |
| Education (33) | 11 | 33.3 |
| Health Care/Social Assistance (69) | 20 | 29.0 |
| Arts/Entertainment/Recreation (58) | 9 | 15.5 |
| Accommodation/Food Service (68) | 4 | 5.9 |
| Other Services (102) | 23 | 22.5 |
| Public Administration (99) | 38 | 38.4 |

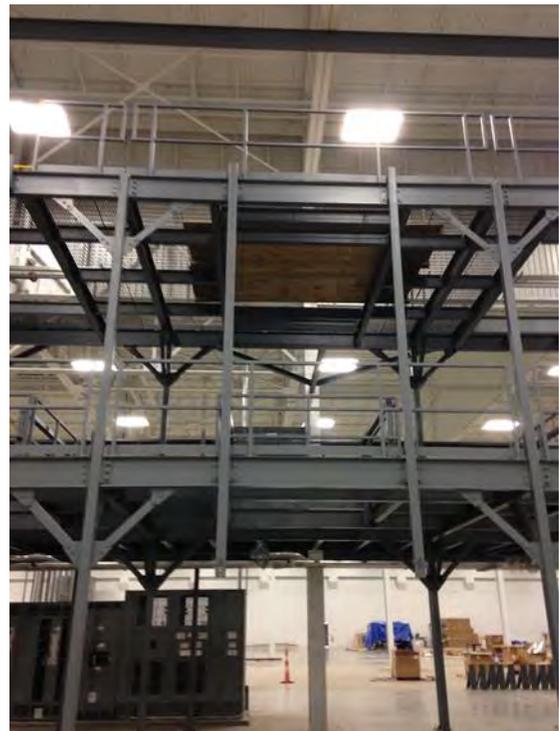
Both nationally and in Michigan, falls continue to be a top cause of death, particularly in Construction. The national Campaign to Prevent Falls in Construction is a joint effort by government, labor, and management to address this leading cause of construction industry fatalities. **Table 14** shows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

| Table 14. Number of Construction Deaths and Number and Percent of Fatal Falls by Year, Michigan 2001-2015 | | | | | |
|---|-------------------------------|---------------------------|------|-------------------------------|---------------------------|
| Year | Number of Construction Deaths | Number of Fatal Falls (%) | Year | Number of Construction Deaths | Number of Fatal Falls (%) |
| 2001 | 37 | 15 (40.5%) | 2009 | 19 | 5 (26.3%) |
| 2002 | 37 | 12 (32.4%) | 2010 | 22 | 7 (31.8%) |
| 2003 | 35 | 9 (25.7%) | 2011 | 26 | 11 (42.3%) |
| 2004 | 32 | 12 (37.5%) | 2012 | 20 | 4 (20.0%) |
| 2005 | 24 | 14 (58.3%) | 2013 | 25 | 10 (40.0%) |
| 2006 | 42 | 13 (31.0%) | 2014 | 23 | 9 (39.1%) |
| 2007 | 18 | 7 (38.9%) | 2015 | 28 | 7 (25.0%) |
| 2008 | 28 | 11 (39.3%) | | | |

Between 2001 and 2015, the number of fatal falls in Construction ranged from a low of four 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. Only one (14.3%) of the seven fatal falls in Construction in 2015 occurred during roofing activities, compared to five of nine (55.6%) fatal construction falls involving roofing activities in 2014; the other falls occurred from a ladder or roof (unknown from which he fell), a tree, standing height, tractor/forklift elevated box, machine and a floor hole on a machine support tower. The downward number of falls related to roofing maybe secondary to the National and Michigan campaigns to reduce falls in construction, which has emphasized ways to reduce falls related to roofing.

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.



[Case 21](#). Maintenance manager died when he fell 20'6" through an unguarded 5'6" by 6'7" hole for machinery in a tower assembly.

Michigan experienced a 15.8% increase in the number of work-related homicides compared to the previous year. This year continues a trend of increasing work-related homicides year by year, with

the number of work-related homicides in Michigan increased by 3 deaths - 22 in 2015 compared to 19 in 2014, which in turn reflected an increase from 16 work-related homicides in 2013. Unlike national trends, in which a majority of work-related homicide victims are women, 21 of the 22 (95.5%) victims of homicide in Michigan in 2015 were male. In Michigan, as in 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 9.4. Although not directly comparable, Michigan's employment-based fatality rate for individuals aged 65 and over was 10.3/100,000 in 2015. While the number of employed individuals 65 years of age and older was the second smallest employed population at only 16.0% of Michigan's civilian non-institutional population of that age, this age group had the highest fatality rate of all age groups by far (See **Table 15**).

| | Employment | | | |
|--------------|--------------------------|--|----|------|
| | Number (in thousands) | % of Civilian non- institutional Population | | |
| 16-19 | 172 | 34.8 | 2 | 1.2 |
| 20-24 | 449 | 65.4 | 9 | 2.0 |
| 25-34 | 902 | 75.1 | 20 | 2.2 |
| 35-44 | 929 | 76.7 | 24 | 2.6 |
| 45-54 | 1,056 | 76.9 | 28 | 2.7 |
| 55-64 | 740 | 55.3 | 26 | 3.5 |
| 65 and older | 252 | 16.0 | 26 | 10.3 |

In Michigan, from 2010-2015, the number of individuals 65+ years of age who are employed rose from 164,000 in 2010 to 252,000 in 2015, an increase of 54%. The workforce age 65 and older continues to grow as individuals put off retirement and part-time workers enter the workforce due to economic or other reasons. Older workers have unique health and safety challenges, including resistance to change, medical issues, strength issues, as well a wide range of other concerns, all likely contributing to the higher work-related fatality rate in this age group. Federal [OSHA](#) and [NIOSH](#), among other agencies, have developed resources which can help employers address the challenges faced by older workers and provide a safe working environment for this population group.

BLS uses the number of hours worked in an industry and profession to calculate an hours-based fatality incidence rate. The 2015 annual national and Michigan hours-based fatality rate was the same at 3.1/100,000 FTE. Michigan's employment-based rate was 3.0/100,000 per total workforce.

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 have otherwise fluctuated from 134-155 deaths per year with a rate 3.0- 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 such 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 2001-2015

| | 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 |
| 2015 | 21 | 28 | 16 | 18 | 9 | 10 |

Importance of Using Multiple Data Sources

MIFACE used many data sources to ascertain if a fatal injury occurred “on the job”. Reliance on just the information in the Injury at Work box on the individual’s death certificate would have missed 42 (32.1%) of the work-related deaths in 2015, particularly with causes of death such as motor vehicle crashes and homicides. That MIFACE is able to capture these work-related fatalities that would otherwise be missed when relying solely on the Injury at Work box supports the utility, and need, for surveillance programs that collate fatality information from multiple sources.

Prevention Material Dissemination

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

In 2015, 10 Investigation Reports, 23 MIFACE Summaries of MIOSHA Investigations, 1 Hazard Alert, and the MIFACE 2015 Data Fact sheet were posted on the MSU OEM website and distributed to stakeholders. MIFACE Summaries of MIOSHA Investigations included a summary of the work-related fatality and the citations issued to the employer by MIOSHA compliance personnel at the conclusion of the fatality investigation. Hazard Alerts are 1-page documents that review work-

related fatalities and provide prevention recommendations that target specific industrial sectors or repeated work-related fatality incidents. The MIFACE Data Fact Sheet summarizes information received regarding the state's work-related deaths and was updated periodically when new information was received. The most current 2015 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 2015, fourteen MIFACE presentations were given to trade groups ranging from health and safety professionals in construction, agriculture and water treatment facilities. A special effort in conjunction with the Michigan Farm Bureau to provide educational safety sessions to farmers rural emergency responders was ongoing. In 2015, nine agricultural health and safety presentations were given; more than 700 individuals attended the training sessions.

A MIFACE Investigation report, *Painter Killed When Elevated Scissor Lift Hit Pavement Depression* (MIFACE Investigation Report #[13MI091](#)) was highlighted in the July/August 2015 edition of the Accident Reconstruction Journal. Two MIFACE reports were highlighted in the National Safety Council, Safety and Health Magazine in the July and October 2015 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 and throughout the United States. These deaths are not random events, and information about the settings and circumstances in which work-related deaths occur is necessary to prevent their occurrence in the future. While seven fewer deaths occurred in Michigan in 2015 than in 2014, the numbers and rates of these acute traumatic fatalities have fluctuated from year to year, and there is not a clear downward trend over multiple years. 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 sharing this information with stakeholders, from individuals to groups, employees to employers, makes these information-gathering efforts worthwhile. If what we learn from any of these deaths can help prevent further tragedies, then the surveillance program has been successful in its goal. An awareness of the hazards of one's job and an attitude of safety-mindfulness on the part of labor and management is critical to prevent future fatal events.

Each of the 136 deaths in this report could have been prevented, whether through installation of engineering controls, development and implementation of health and safety plans, changes to work practice, or the identification and assistance of individuals seeking and receiving mental health counseling so they can better cope with both work and personal stressors. Efforts to prevent future work-related deaths will also be useful to prevent the much larger number of work-related

injuries (~330,000) that are estimated to occur each year in Michigan (330,000 is based on previous studies that the BLS estimate of 109,700 represents about 33% of the actual number of nonfatal injuries in Michigan in 2015).

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, whenever possible, recommend change in practices and 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 provided constructive comments on each MIFACE Report and Hazard Alert, who assisted us by providing thoughts on developing MIFACE policies and educational outreach activities, and their promotion of the MIFACE program to their employees and constituents.

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

APPENDIX I

AIRCRAFT (3)

Case 1. A female aviation industry manager in her 70s died of complications sustained in a 1989 airplane crash. The pilot and copilot died at the time of the crash and another passenger died shortly thereafter. The decedent was the fourth passenger in the twin-engine Beechcraft Baron aircraft. The National Safety Transportation Board Final Report: “During the initial climb after takeoff, one of the crew members reported that the right engine lost power and that they would return for a landing. The aircraft was observed to circle to the left with the right prop feathered. During the turn to the airport, the aircraft descended and crashed in a swampy area that was surrounded by trees. A post-impact fire erupted and destroyed the aircraft.” The National Transportation Safety Board determined the probable cause(s) of this accident to be: “The flight crew inadvertently shut down the left engine after the right engine lost power and the copilot failed to maintain control of the aircraft while maneuvering the aircraft back toward the runway. Factors related to the accident were: improper positioning of the fuel selector (probably) by the copilot and improper monitoring by the other pilot, which resulted in fuel starvation to the right engine.”

Case 2. A male minister in his 40s died when his homebuilt One Easy single-engine plane crashed and erupted into flames. The NTSB report: A witness recorded the airplane taxi from the ramp to the taxiway and the video showed that the right side of the canopy appeared to be bouncing open slightly as the airplane taxied. A witness reported that during departure, the airplane rocked side-to-side and the controller reported that the airplane did not track a straight line during the takeoff and was flying erratically once airborne. Another witness reported that the canopy was open and the pilot was clearly visible with no glass over his head during the takeoff. An airport security video captured the airplane on the downwind leg when it made a 180 degree turn back to the departure runway, banked in excess of 90 degrees, then rapidly dropped and impacted terrain. However, the video did not provide a detailed view of the canopy. A post-crash fire erupted. The fire consumed a majority of the composite airplane; therefore, a detailed examination of the canopy hinge and locking system was not possible. However, the erratic flying and turn toward the airport just after takeoff is consistent with the pilot's loss of control while trying to make an emergency return to the airport after the canopy opened in flight. The NTSB determined the probable cause of this accident: “The pilot's loss of airplane control due to his diverted attention to the canopy opening in flight.”

Case 3. A male conservation officer in his 50s died when his Piper PA32R-300 single-engine plane, crashed as he was flying the plane to a conference. He communicated with a colleague via text message and indicated he would arrive at approximately 2325. The NTSB report: “The private pilot was completing a long cross-county flight during dark, night visual meteorological conditions. While on a visual approach to the runway, the airplane impacted trees and terrain less than a mile from the end of the runway. The pilot had not logged night flight experience in several years and had not logged any night flight experience in the make and model of the accident airplane. Additionally, he had not logged a flight into the airport in his logbook. The airport's tree obstructions and nonstandard precision approach path indicator with a 4.0-degree glide path were noted in the airport facility directory. However, it was the pilot's first flight into the airport; thus, it is likely that his unfamiliarity with the airport environment, including the trees close proximity

to the airport and the nonstandard glide path, and the dark, night conditions led to his failure to maintain clearance from the trees. The witness marks on the trees and the damage to the airplane were consistent with the airplane being in a relatively wings-level descent when it impacted the tops of the trees. The condition of the landing gear and flaps were consistent with the airplane being configured to land. There were no mechanical anomalies with the airplane, engine or related systems that would have precluded normal operation at the time of the accident.” The National Transportation Safety Board determined the probable cause(s) of this accident: “The pilot’s failure to maintain clearance from the trees during the approach in dark, night conditions which resulted in controlled flight into trees and terrain.”

ANIMAL (1)

Case 4. A male herdsman in his 60s died when he was struck multiple times in the chest by a bull. The decedent was one of three workers loading a 1,800-pound Holstein bull onto a trailer. The farm was planning to sell the bull at auction because it had been exhibiting aggressive traits. At another location, a “bait” cow had been loaded onto the trailer and transported to the incident location to entice the bull into the trailer. One worker’s job was to close the chute and trailer doors. The decedent had a cane and his co-worker had a cattle prod and they were responsible for herding the bull through the 8-to-10-foot wide and 20-foot long loading chute and onto the 8-foot wide by 25-foot long trailer. The trailer was backed to the corral’s chute. The trailer door and the chute door were open. The decedent and his coworker directed the bull to the trailer. The bull was just about to enter the trailer and then turned and ran back to the barn. The barn had multiple sections. The east section where the incident occurred had approximately 30 steel pens, 15 on each side of the room. On the west side was a standard barrier approximately 45 inches high located directly behind the pens with openings between the mid-rail and top rail as well as between the mid-rail and floor. The decedent went into the barn alone to get the bull out while his coworker stayed outside the barn. He yelled to his coworker that the bull was angry. The bull turned on him and trapped him with his back against the standard railing. The bull’s head struck the decedent’s chest multiple times, at times lifting the decedent from the ground. The coworker ran in and positioned himself between the decedent and the bull, using his cattle prod to keep the bull away. The bull ran out of the barn and his coworker locked the barn door. Emergency response was called. He was declared dead at the scene. MIFACE Summary of MIOSHA Investigation [#405](#).



Case 4. Herdsman died when he was struck multiple times in the chest by a bull.

ASPHYXIATION (2)

Case 5. A male railroad contractor in his 20s died when he was buried by grain and structural material when the wall of a grain storage building collapsed. A rail spur was positioned approximately 15 feet north of a grain storage building. The decedent was on the ground between a railroad tamper and the storage building checking the level of the rails as the tamper moved west. The tamper operator indicated there was a loud “groan” and saw a cloud of dust flying at him which caused him to jump off the tamper and run to the north, away from the dust cloud. When the dust cleared, he looked for the decedent, but could not find him. The north side of the building had collapsed and the grain stored within the building poured out. Emergency response was called, and the decedent was found buried/entrapped in grain and structural material.

Case 6. A male paid trainee in his 50s at a vocational rehabilitation center died when he choked on a sandwich. He motioned for help from the manager, who administered back blows and the Heimlich maneuver. This did not resolve the choking, and the decedent stopped breathing and collapsed. CPR was administered. The decedent was transported to a local hospital where he died three days after the incident.

DROWNING (2)

Case 7. A male construction company owner in his 50s died while working in a well crotch that serviced a mobile home. The decedent was contacted by the homeowner to work on his water line because he was having trouble with freezing pipes. The well crotch was under the mobile home. After assessing the problem by lying on the ground with his upper body in the crotch, the decedent mentioned to the mobile home owner that he had to insulate and install heat tape on the water lines. The homeowner fell asleep for several hours. When he awoke, the decedent's truck was still running. The homeowner went outside to speak with the decedent, and found him head down in the well crotch. The homeowner called for emergency response. Emergency response found the decedent head down in the well crotch with water and ice around his waist.

Case 8. A male project manager in his 30s drowned after entering a lake. The decedent was attending a team building party at a coworker's residence. He was witnessed by coworkers to go down a staircase and enter the waist-deep water without a life jacket and walk along the lake retaining wall. When a team picture was taken, it was discovered that the decedent was not among his coworkers. Emergency response was called. Divers found the decedent approximately 15 feet away from the staircase, 10 feet away from the retaining wall and in 7-foot-deep water. Coworkers indicated that the decedent could not swim.

DRUG OVERDOSE (3)

Case 9. A male heating and cooling technician in his 50s died from respiratory complications of a drug overdose.

Case 10. A male box truck driver in his 20s was found deceased from a drug overdose in the

makeshift sleeping compartment in his truck.

Case 11. A male car wash attendant in his 50s died from a drug overdose.

ELECTROCUTION (2)

Case 12. A male master electrician in his 40s was electrocuted while working with 480-volt energized wires (3-3/0 AWG and ground wire) from a newly installed junction box near the floor. A pump house for a fire suppression system was under construction for a newly constructed warehouse. The owner and the decedent had pulled the wire into the pump house several weeks prior to the incident. The electrical wire was not completely terminated at the cabinet and left hanging on the wall because the concrete floor had not yet been poured. With the electrical service unterminated and hanging on the wall, the firm called the electrical inspector to approve the work. The electrical inspector approved the service work and contacted the utility company to energize the service. Work by other contractors proceeded inside the pump house for approximately one week near the energized electrical service hanging on the wall. On the day of the incident, the company owner dropped off parts and materials to the decedent to complete the work. While pushing the energized wire into the conduit, the decedent contacted the live electrical conductors and became immobilized. Two sprinkler fitters working nearby heard a noise and saw the decedent immobilized. They used a wooden pallet which was in the pump house to push the decedent away from the energized cabinet/conductors. An apprentice electrician used expired electrical-rated gloves from the decedent's work truck to drag him away from the electrical wire. Emergency response was summoned and the decedent transported to a nearby hospital where he was declared dead. MIFACE Summary of MIOSHA Investigation [#382](#).

Case 13. A male carpenter in his 30s was electrocuted when the arm of the 125-foot JLG he was operating contacted an energized 7,200-volt overhead power line while power washing a 60-foot tall silo. The decedent was elevated approximately 65 feet. The JLG was positioned approximately 25 feet away from the power lines located across the street from the silo. The top of the basket was approximately 5 feet above the east roof edge of the silo. While the decedent was maneuvering the JLG into position, the arm of the boom contacted the top 7,200-volt power line approximately 6 feet below the elbow of the arm. A truck driver making a delivery saw the decedent working in the basket. The truck driver heard a noise and turned to see that the JLG had contacted the power line. The driver witnessed a bright light and then the bottom of the JLG started to burn. He called the fire department. He then called up to the decedent to ask if he was alright, and the decedent responded to call for help. The truck driver saw the decedent climb from the inside of the basket to the outside and back in again. It is postulated that the decedent jumped from the basket to the silo roof in an attempt to escape the burning JLG. While on the roof, an electric arc struck the decedent's leg. While waiting for the line to be de-energized, the decedent was witnessed to be partially hanging off of the roof. It appeared to emergency providers that he was caught on something on the roof. He eventually fell from the roof and was declared dead at the scene. The decedent was not wearing a fall harness. MIFACE Summary of MIOSHA Investigation [#403](#).

FALL (18)

Case 14. A male farmer in his 50s died from a 4- to 6-foot fall while performing repairs on a vacuum truck. An employee nearby witnessed the decedent working from the fifth step of a folded 6-foot Type II aluminum stepladder leaned against the back of the truck performing some work on the top portion of the truck. The employee heard a sound and noticed that the decedent was not on the top of the ladder anymore so he walked over to check on him. The decedent was lying on his back on the cement, unresponsive. The ladder had fallen and landed partially over him. The decedent's weight exceeded the duty rating (225 pounds) of the ladder. The decedent may have fallen from the fifth step of the ladder or from the vehicle's rear standing



Case 14. Farmer died from a 4- to 6-foot fall while performing repairs on a vacuum truck.

area located approximately four feet above the ground. Responding police found that the left leg of the stepladder had a tear approximately 4 inches long down the middle of the ladder leg.

Case 15. A male residential construction firm owner in his 50s died when he fell 20 feet from a ladder or from a roof to a concrete surface.

Case 16. A male home improvement company owner in his 60s died when the tree he was climbing to trim fell over. He was approximately 20 feet above the ground when the tree fell.

Case 17. A male pavement quality manager in his 40s died from complications of head injuries sustained when he fell from standing height to concrete. The reason for the fall was unknown.

Case 18. A male farmer/greenhouse co-owner in his 60s died when he and the unsecured produce box raised by a tractor/forklift fell approximately seven feet to a concrete floor. The decedent and three other employees were installing new metal brackets and associated steel hardware for a conveyor inside an enclosed steel-framed greenhouse under construction. Two old farm tractors had been converted to "fork trucks". The decedent was elevated approximately 7 feet while standing inside a plastic container approximately 48-inches long by 40-inches wide by 31-inches deep. The container had sleeves underneath to capture the forks and restrict side-to-side and upward tipping, but the container was turned 90-degrees opposite to the sleeves and resting on top of the forks without any restraint system. The decedent was working to anchor the trolley system from the ceiling to the south wall. Another employee was positioned to the north of the decedent and was elevated by the second tractor/forklift in a platform. A third coworker climbed a ladder near the decedent to give him some sheet metal screws. He descended the ladder and then witnessed the decedent leaning toward his coworker trying to reach some tools. As he was leaning over the container, the container shifted off the tractor/forklift forks, causing the basket and the

decident to fall to the cement floor. The decident sustained a fatal head injury. MIFACE Summary of MIOSHA Investigation [#392](#).

Case 19. A male plasterer/drywaller in his 40s died when the S85 Genie he was operating overturned. The decident positioned the Genie with the wheels parallel to the nine to ten degree downward slope at the back of a new home under construction. This placed the counterweight downhill when he elevated the work platform approximately 30 feet and extended the boom 20 to 30 feet to perform prep work on the home's chimney. Another worker on site heard beeping and then a crash. It appeared the decident turned the basket 90 degrees and began to back the Genie away from the home, traversing the slope rather than parallel to the slope while elevated with the boom at least partially extended. The Genie rolled to its side, ejecting the decident 25 feet from the basket and 105 feet from the home. The decident was not utilizing fall protection.

Case 20. A male painter in his 20s died from a fall from a second story roof while painting deck spindles. A deck had been constructed over the second story roof of a residential home. The deck was approximately 24-feet 6-inches above grade. Approximately 6- to 8-inches of shingled roof was present between the deck edge and the gutter. The deck railing had been partially rebuilt a few months prior to the incident. The spindles/balusters had been installed between the upper and lower railing. The spindles were held to the railings by small staple-type nails. The decident had stained/painted the upper and lower railings, most likely while standing on the deck. The incident occurred while he was staining/painting a section of spindles. Several coworkers witnessed the decident working outside of the rails and told him he should use a ladder to paint the outside of the spindles. Several ladders were available at the incident site, but were too short; a ladder that was long enough was at another location. The decident was not utilizing fall protection equipment when he climbed over the railing and stood on the second story sloped roof, which was 21-feet 3-inches above grade. It appeared he was holding onto a deck spindle with a knot in the wood while reaching for his paint brush. The spindle broke at the knot and the decident lost his balance/footing and fell to the pavement below. The top of the spindle was found on the ground near him; the bottom of the spindle did not become unsecured from the base of the railing. Emergency response was summoned and transported the decident to a nearby hospital where he died several hours later. Responding police matched the two spindle pieces to determine that the spindle piece found on the ground was the mate to the lower spindle that was still attached to the deck. MIFACE Summary of MIOSHA Investigation [#373](#).

Case 21. A male maintenance manager in his 50s died when he fell 20'6" through an unguarded 5'6" by 6'7" hole for machinery in a tower assembly. The tower assembly had three elevations; ground floor (first elevation), first floor (second elevation) and second floor (third elevation). The decident was one of three persons representing three different contractors having a meeting at the third elevation walking surface to discuss mechanical piping and ducting that was to be installed for machinery. Responding police interviews stated that the decident had walked behind some machinery and was looking up, walking backward when he fell through the unguarded hole. Another developed scenario was that the decident was on his knees taking measurements around the incident hole opening for the installation of rings that the machine would be placed on, and when he got up, he either lost his balance or he walked backwards into the hole. He attempted to catch himself but was unsuccessful and fell 20'6" to the concrete floor below. The decident's employer had installed some covers over open third elevation holes adjacent to where machines

were being installed. Emergency response was called and transported the decedent to a nearby hospital where he was declared dead. MIFACE Summary of MIOSHA Investigation [#383](#).

Case 22. A male production supervisor in his 30s died when he fell between 15 – 17 feet to packed dirt. New offices were under construction at the facility. The decedent and a coworker climbed up metal bracing to access an unguarded extended metal deck platform located 15 feet above the ground. After accessing the platform, they walked to its edge and around a vertical I-beam and climbed up two to three feet and then climbed over a horizontal beam to a plywood floor of their new office space located 17 feet above the ground. After assessing the progress of the new office space, his coworker climbed down to the expanded metal deck platform and then climbed down the structure and



Case 22. Production supervisor died when he fell between 15 – 17 feet to packed dirt.

looked back. He witnessed the decedent falling to the ground. The decedent and his coworker were not wearing fall protection. MIFACE Summary of MIOSHA Investigation [#386](#).

Case 23. A male milling supervisor in his 70s fell from a man lift elevator into the elevator's 4-foot-by-4-foot pit 15 years ago (in 2000). He was found lying on his back in the pit with his legs outside of the pit. He died in 2015 from complications of the fall injuries sustained at the time of the incident.

Case 24. A male gas station attendant in his 80s tripped on a mat and fell, stating he injured his shoulder. Several days later, he fell striking his head. The cause of death as listed on the death certificate was arteriosclerotic heart disease with the manner of death as accident.

Case 25. A Hispanic male warehouse distribution center worker in his 50s was driving a mid-rider" forklift when he had a witnessed collapse. He fell from the forklift's driver seat to the concrete floor and sustained a severe head injury causing his death. The cause of the collapse could not be determined by the medical examiner.

Case 26. A male rental equipment storeowner in his 50s died from head injuries sustained when he fell from standing height during an alcohol withdrawal seizure. He was in his business's parking lot when the incident occurred.

Case 27. A male attorney in his 70s died from complications of a fall at a courthouse. He was walking and missed a step up in elevation causing him to fall, injuring his hip and femur.

Case 28. A male church volunteer in his 60s died from a 15-foot fall from a ladder to concrete while trimming a limb from a tree on church property.

Case 29. A male furnace duct cleaner in his 70s died from a fall down the basement stairs at a condominium complex.

Case 30. A male circus performer in his 70s died from injury complications of a 25-foot fall sustained in 1962.

Case 31. A male cook in his 20s had a witnessed seizure at work in 2014. The seizure caused him to fall and strike his head on a concrete floor. He died nine months later from complications of the head injury.

FIRE/EXPLOSION (3)

Case 32. A male self-employed roofer in his 40s died when gasoline vapors ignited while he lit a cigarette. The decedent was driving his work van when a family member flagged him down. A day prior to the incident, the decedent filled a bucket with gasoline and placed the bucket inside the van. He stopped in a parking lot and conversed with his family member who stood outside of the van. While they were conversing, his family member handed him a lighter. His family member relayed to investigating agencies that while he was lighting his cigarette, the vehicle exploded. The family member was able to extricate the decedent from the van. He sustained fatal burn injuries.

Case 33. A male sheet metal laborer in his 30s died from smoke and soot inhalation complications as a result of a fire. The decedent's employer was subcontracted by Firm A to reline an aggregate and sand hopper in a six-story aggregate silo. The silo had four separate aggregate bins. Two of the bins held sand and the other two bins held stone. The bins were fed by a 178-foot conveyor, which had a catwalk alongside of it. The decedent and three coworkers were inside the aggregate bins prepping the worn metal by using hand-held grinders and welding ¼-inch 3-foot by 4-foot steel plate in place using a stick welder. An oxyacetylene torch was also present. Two coworkers were welding the steel plate in one hopper while the decedent and his coworker were grinding or prepping walls in another hopper. One of the welders felt heat near his leg and yelled to his coworker who looked up and saw a wall of fire. The fire department's investigation determined that by either a spark, radiant heat and/or conductive heat from the adjacent welding operations the flame-retardant insulation between the hopper and the building structure ignited. The fire then burned through a compressed gas line further feeding the fire. The coworker working with the decedent heard one of the welders yell to get out. One of the welders attempted to get out of the stone bin via a fixed ladder, but was forced back into the hopper due to the heat. This coworker notified the owner of Firm A of the fire, made a second attempt to exit, and was successful. Firm A's owner arrived using the conveyor catwalk to access a cupola space to yell exit directions to the fixed ladder to the three workers still inside of the hoppers. Two of the remaining three welders were able to exit via the fixed ladder and to safety via the conveyor catwalk. The decedent was overcome by smoke at the base of the fixed ladder. He died one week after the incident from complications of smoke and soot inhalation. The space in which the four coworkers were working had not been identified as a permit-required confined space. A hot work permit program was not in place nor was a fire watch utilized. MIFACE Summary of MIOSHA Investigation [#380](#).

Case 34. A male welder’s helper in his 30s died from complications resulting from burns sustained in a flash fire that occurred during welding of previously decommissioned piping at a tank farm facility. The decedent was a member of a 4-person crew. The work activity involved cutting the pipe to install a new t-shaped section with flanges to re-route the flow of new material. The crew had installed a plug in an attempt to stop diesel fuel from reaching the work section. Throughout the work, the piping remained connected to a manifold through which ethanol had flowed. To “clean” the pipe prior to reconstruction activities, the crew used a vacuum truck to pull a foam plug (drying pig) through the pipe rather than one designed for purging. No nitrogen was used to propel the drying pig through the piping or the manifold, or to establish an inert atmosphere inside the pipe. This combined failure of incorrect procedures



Case 34. Welder’s helper died from complications resulting from burns sustained in a flash fire that occurred during welding of previously decommissioned piping at a tank farm facility.

and use of equipment resulted in inadequate purging of the pipe and manifold. The crew used a saw to “cold cut” a 10-inch diameter section of pipe and removed a 2-foot portion. A new flange was put in place and tack-welded on the downstream side of the remaining piping. The crew then tested the atmosphere, inserted a plumber’s plug, and struck multiple arcs to tack-weld the new flange on the upstream side of the cut section. It was at that point that the fire/explosion occurred. The decedent was standing a few feet from the pipe opening and was heavily enveloped in the exhausting flames and vapor. He died several days later from burn complications. MIFACE Summary of MIOSHA Investigation [#391](#).

HOMICIDE (22)

Case 35 & 36. Two male farmers aged 60 years and aged 48 years died from gunshot wounds when their business partner shot them in their home.

Case 37. A male construction firm owner in his 40s died from a gunshot wound.

Case 38. A male maintenance laborer in his 50s died from a gunshot wound.

Case 39. A male plumber in his 50s died from multiple gunshot wounds.

Case 40. A male delivery truck driver in his 60s died from medical complications of a 1980 gunshot wound sustained during a robbery.

Case 41. A male machine operator in his 20s died when he was struck by and run over by a coworker's vehicle in the parking lot of the business in which both worked.

Case 42. A male warehouse manager in his 50s died from a gunshot wound during an argument. The decedent saw another individual kick a dog and confronted this individual. Investigators found that the assailant noted a bulge in the decedent's pocket and concluded that the decedent was armed (which he was). The assailant indicated that he did not see a weapon. The assailant shot the decedent with a 380 automatic pistol during the argument.

Case 43. A male convenience store owner in his 60s died from gunshot wounds sustained during a robbery.

Case 44. A male party storeowner in his 50s died from a gunshot wound during a robbery.

Case 45. A male resale shop owner in his 40s died from gunshot wounds.

Case 46. A male cab driver in his 40s died from a gunshot wound during a robbery.

Case 47. A male tow truck driver in his 20s died from a gunshot wound. The decedent stopped to assist an individual who appeared to be in trouble when he was ambushed by two individuals.

Case 48. A male pawnshop owner in his 20s died from gunshot wounds during a robbery.

Case 49. A male landlord in his 60s died from gunshot wounds.

Case 50. A male security guard in his 30s died from a gunshot wound sustained while he was providing security at a bar.

Case 51. A female telemarketer in her 20s died from gunshot wounds sustained in the parking lot of her employer. Her former boyfriend killed her.

Case 52. A male food server in his 20s died from a gunshot wound.

Case 53. A male pizza delivery driver in his 20s died from a stab wound.

Case 54. A male pizza delivery driver in his 20s died from gunshot wounds during a delivery to an abandoned house.

Case 55. A male automobile painter in his 40s died from a gunshot wound sustained while driving to pick up a down payment for work to be performed.

Case 56. A male firefighter in his 30s died when he was struck by a vehicle while on duty performing fundraising activities.

MACHINE (15)

Case 57. A male farmer in his 50s fell from a tractor and was run over by the tractor and attached brush hog. He died several months later from injury complications.

Case 58. A male farmer in his 80s died when he was pinned under an overturned Case International 585 loader tractor. The decedent had been operating the tractor in a wet, muddy field. The left side tractor tires were in the field area and the right side tires in the grassy area of a wooded tree line. The tractor came to a washout at the top of a drainage ditch. Tire tracks showed the tractor going off the edge and into the drainage ditch. The tractor overturned and the decedent was pinned under the tractor. The tractor was not equipped with rollover protection.

Case 59. A male farmer in his 80s died when he fell from his Ford 5600 series tractor and the tractor ran over him. The decedent was driving the tractor on a two-lane roadway when for reasons unknown, he lost control of the tractor, drove it across the centerline, and entered an extremely deep, steeply sloped ditch. When the tractor entered the ditch, the decedent fell from the tractor and was run over. Responding police described the tractor as “an open cab with sun roof/roll over protection.”

Case 60. A male farmer in his 60s died in a tractor rollover. The decedent and a coworker were clearing treetops out of shooting lanes in preparation of rifle season. The decedent was attempting to pull a large tree out of the shooting lane. He hooked a chain to the tractor below the 3-point hitch and to the top of the tree. While pulling the tree, the Ford tractor (year 1963 or 1964) overturned to the rear. The decedent was pinned between the tractor seat and the ground. The tractor was not equipped with rollover over protection.

Case 61. A male farmer in his 70s died when he was thrown from his John Deere Model 4030 tractor when it rolled over. The decedent was traveling westbound on a dirt road when the tractor left the roadway to the right. The decedent overcorrected, and then the tractor left the roadway to the left. After leaving the roadway, the tractor collided with a ditch, and then rolled onto its side. The decedent was thrown from the tractor. The tractor was not equipped with rollover protection.

Case 62. A female student in her 20s died when the Ford 801 Powermaster tractor she was using overturned to the rear while attempting to pull out a tractor stuck in a farm field. A family member attached a chain to the rear of the Ford tractor to the front of the stuck tractor. The family member saw the front of the Ford tractor rise off the ground and overturn to the rear, pinning her. The family member dismounted and attempted, unsuccessfully, to push the Ford tractor off the decedent. The family member called for emergency response and then used a 4-wheeler to get back to the family home, retrieved a chain, and then drove a pickup truck to the incident site. Using the chain and pickup truck, the family member pulled the tractor off the decedent; the tractor was pulled over to the side. Emergency response arrived, provided care, and the decedent was transported to a hospital in a nearby county where she died. The tractor was not equipped with rollover protection.

Case 63. A male farmer in his 70s died when he was crushed run/over by a tractor tire. The decedent was one of three individuals working with some calves and cows. While two individuals

were putting away gates in a nearby pole barn, the decedent indicated he was going to feed some calves. The decedent's tractor had front forks used to spear round hay bales. He started the tractor while standing on the ground on the left side of the tractor. The tractor was in gear and it moved forward, running him over. His coworkers heard him yell, and then ran to him. The forks had penetrated the wall of the pole barn and the rear tires continued to spin. The decedent was ejected from under the spinning tire. One worker jumped up onto the tractor and turned it off while the other worker called for emergency response. He was declared dead at the scene.

Case 64. A female farm worker in her teens was entangled in a hay elevator conveyor's chain and sprocket. The decedent was working with family members on the family dairy farm. The decedent was throwing hay bales from a trailer onto a steel table which would gravity slide the bales onto the elevator to carry the bales up to the loft of the barn. The 20- to 25-foot long elevator conveyor's chain and sprocket was powered by a Case International tractor's power take off (PTO) shaft. The PTO knuckle that was coupled to the chain and sprocket drive of the elevator's conveyor had been guarded with a 3- to 4-foot long, 8"-diameter section of drainpipe. The elevator conveyor's chain and sprocket were unguarded. According to witnesses, the decedent had overthrown a hay bale and it had to be manually placed onto the conveyor. The decedent jumped down from the trailer, and walked around to the side where the tractor's PTO and conveyor's chain and sprocket were located. While aligning the bale onto the elevator, her dress and eventually her hair became entangled in the conveyor's chain and sprocket. She then became entangled in the PTO shaft. A family member turned off the tractor. Other family members unsuccessfully attempted to free her and called for emergency response. Emergency response arrived and she was declared dead at the scene. MIFACE Summary of MIOSHA Investigation [#376](#).

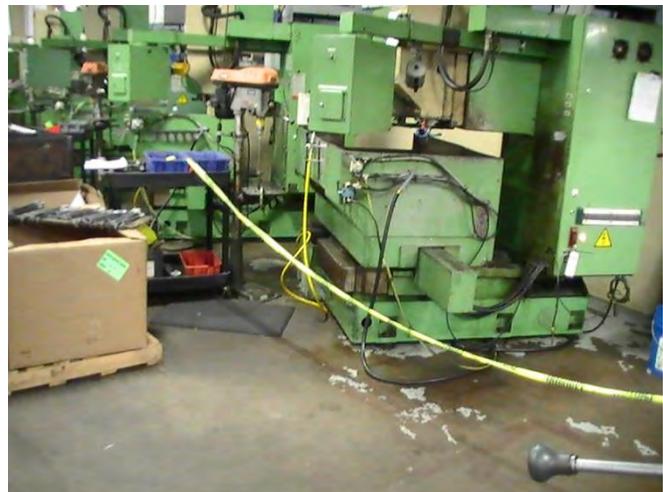
Case 65. A male dairy farmer in his 80s died when his jacket caught on one of the tractor's rear wheels, pulling him from the seat. The tractor then ran over him. He died several weeks later from complications of the injuries received at the time of the incident.

Case 66. A male waste treatment/energy center operator in his 50s died when he was crushed between the plates of a filter press. The hydraulic filter press measured 49 inches from the floor and had 61 plates. Plate closing pressure was approximately 300-500 pounds. The press had a light curtain. The sensor height was approximately 16 inches from the floor and approximately 18 inches from the rim of the unit. The light curtain did not shut off the power to the unit when the decedent crossed the sensor path. The instructions for cleaning the filter cake that had not fallen from the screen were for the worker to stand outside of the filter press and to use a tool with a long wooden handle and a plastic scraper to knock off or scrape the remaining filter cake from the screen. A pendant control was near the press to control the movement of each plate/screen prior to using the tool to remove the material. The decedent was in the process of cleaning the screens/plates of the press using the required tool, but had either leaned into/between the plates or slipped/tripped and fell in between the plates. He was crushed between two plates when they closed. MIFACE Summary of MIOSHA Investigation [#388](#).

Case 67. A female journeyman maintenance technician in her 50s died when she was pinned between two parts while troubleshooting a robotic operation. A weld line had a series of robotic cells, the area where the robot(s) performed work. The robot in Cell 1 placed the part to be welded in a fixture in Cell 2. Cell 2, which had four robots (2 on each side of the line), welded the part, and

the robot in Cell 3 removed the part from Cell 2. Between each cell were safety doors that were interlocked with each other and slid up (closed) and down (open) so the robot could take/place parts between the Cells. Door programming was supposed to ensure that the robot in Cell 1 and the robot in Cell 3 could not be in Cell 2 at the same time. The doors stay up (closed) when the robots do not enter the neighboring Cells. Each robotic cell had an interlocked access gate and a procedure for entry when performing maintenance. To access the robot, the safety gate would be opened, the lockout lock placed, and then access to the robot in the cell could be made. The robots in the neighboring cells would have power but be non-functioning. This procedure was described for work to be performed in Cell 2. There was a control box where the robot would be placed in maintenance mode, finish their operation cycle, and then return to home position. On the day of the incident, there was a problem with the robot in Cell 3. The decedent used Cell 3's access gate to enter Cell 3 and took the robot's teach pendant control with her into Cell 2. She did not use Cell 2's safety gate (the gate was closed with interlock in place) to access Cell 2. Additionally, the safety gate for Cell 1 was also closed with interlock in place. The robots in Cell 1 and Cell 3 were not locked out. The safety doors between Cell 1 and Cell 2 and between Cell 2 and Cell 3 were down. To access Cell 2, the decedent apparently stepped over the lowered safety door between Cell 2 and Cell 3. The decedent was standing between two robots in Cell 2 (approximately one foot away from them and 10 feet away from the robots in Cell 1 and Cell 3) while working on the Cell 3's robot. A robot carrying a part from Cell 1 entered into Cell 2's space while Cell 3's robot was in Cell 2 and struck her head, pinning/crushing it between the part being transported and the metal fixture/part into which it was trying to place the transported part. MIFACE Summary of MIOSHA Investigation [#404](#).

Case 68. A male machine operator in his 50s was crushed between the table and machine frame during the machine cycle while operating a Mori Seiki Model MV-Junior CNC machine. The parts to be machined were located inside a 28-inch high on sides, 57-inch long, and approximately 49-inch deep table. The table moved on an "x" axis (left to right) and a "y" axis (front to back). Part loading and unloading occurred at the front of the machine upon the completion of the machining cycle. Upon the completion of a tool change or the initiation of the machine cycle, the table moved backward along the "y" axis to perform the machining operation. The backside of the table was approximately 14 inches from the machine frame during the tool change position. When the machining cycle started, the gap between the table and the machine frame closed to within approximately 4 inches. Each hour, an operator must note the number of parts machined by reading a parts counter located on the side of the electrical cabinet/machine column. The incident was unwitnessed. Employees interviewed by the MIOSHA compliance officer indicated they stood approximately 4 feet away from the counter to read it. A possible incident scenario was that the



Case 68. Machine operator in his 50s was crushed between the table and machine frame during the machine cycle while operating a Mori Seiki Model MV-Junior CNC machine.

decident was taking a count of the parts, which placed him between the backside of the machine table and the machine column. He was pinned between the moving table and the machine frame. MIFACE Summary of MIOSHA Inspection [#379](#).

Case 69. A male truck driver in his 20s for a land clearing company died when the old military 6X dump truck he was operating overturned on a farm, pinning him. The decedent had driven the manual 4-wheel drive truck up a hill to be loaded with rocks during the cleaning of a hedgerow. The decedent had turned the truck off while it was being loaded. The dump bed was approximately one-half full of rocks at the time of the incident. At some point during the loading activity, for reasons unknown, the truck began rolling backward down the hill. The excavator operator who was loading the truck tried to slow the downhill roll by swinging the excavator arm into the path of the truck; he was not in time. It appeared the decedent turned the wheel near the bottom of the hill and, as he did, the truck tipped and rolled onto the cab, pinning him inside the cab. MIFACE Summary of MIOSHA Investigation [#378](#).

Case 70. A male dairy farmer in his 60s died when he was pinned under a John Deere 2240 tractor wheel. The decedent rented 88 acres for soybeans. The decedent was using the 4-wheel drive tractor, equipped with a bucket, to clear fence line at the fields he rented. It was cold, and the decedent was wearing a heavy winter coat, gloves and a dew rag on his head. He had cleaned several fence lines and was using the tractor/bucket to move brush, etc. He had backed the tractor into the fencerow and appeared to be attempting to pull a large tree when the tractor became stuck. His work practice according to family members was to set the emergency brake without turning the tractor off and then dismount. The decedent left the tractor running and in gear. He dismounted and went under the tractor in an attempt to free it. It is postulated that a log inhibited the tractor movement. He appeared to be cutting a log that must have appeared to be part of the problem when the tractor "fell". The tractor wheel began to spin, pulling in and pinning the decedent. The decedent, based on his injuries and damage to his clothing, may also have been entangled in the spinning PTO. A family member found him, ran back to the farmhouse, and called for emergency response. A bow saw was found under his body.

Case 71. A male farm landlord in his 60s died when a tractor and its attached mower deck crushed his chest and head. The tractor was used to maintain land he rented to area farmers. The decedent had been working under the tractor. He reached over the tractor and started it. The tractor was in reverse gear. The decedent was struck by the tractor wheel and mower deck as the tractor backed up and struck a tree. A family member who was present at the time retrieved a jack and raised the tractor up to assist emergency responders extricate the decedent. He died several days later from medical complications of the injury.

MOTOR VEHICLE (27)

Case 72. A male tree trimmer/construction laborer in his 30s died when he was ejected from the van he was driving. The decedent was transporting three coworkers back to the main office. The van was traveling northbound on a dark, unlit, slushy 2-lane roadway with a posted speed limit of 70 mph. The median in the area of the crash was open with a steep grade leading downhill away from both inside lanes of the freeway. It was snowing at the time of the incident. The decedent had

passed a slower moving vehicle while in the left lane. As he was moving back into the right lane, the van started to fishtail and he lost control. The van ran off the roadway to the left, and overturned several times, coming to rest at the bottom of the embankment. The decedent was not wearing a seatbelt/shoulder harness and was ejected from the vehicle as it overturned. The airbags did not deploy.

Case 73. A female sheep farmer in her 60s died when she was struck by a backing pickup truck. The incident occurred on the shoulder of a 2-lane, dry roadway with an un-posted speed limit of 55 mph. The decedent was a passenger in the pickup which was transporting straw bales. Several straw bales fell from the truck and the driver pulled the vehicle to the shoulder. The decedent exited the truck and walked back to pick up the bales. The driver backed the pickup truck closer to the bales. The police report noted "that the truck bed was full of bales and obstructed the view through the back window and also to an extent blocked the side mirrors." The backing pickup truck struck and knocked the decedent to the ground and drove over her. The driver, realizing he had struck something pulled forward, inadvertently running over her a second time. She was declared dead at the scene.

Case 74. A male crop harvesting firm owner in his 50s died when his pickup truck was struck by a car that did not stop at the stop sign at an intersection. The decedent was traveling southbound and had the right of way. The westbound vehicle did not slow down, ran the stop sign and struck the decedent's pickup truck on the passenger side. Both vehicles came to rest in a ditch in the southwest corner of the intersection. The decedent was not wearing his seatbelt/shoulder harness. The pickup truck's airbag did not deploy. The driver of the vehicle striking the decedent at the time of the incident, had her driving privileges suspended indefinitely pending a reexamination at the Secretary of State.

Case 75. A male road commission engineering intern in his teens died when his pickup truck was struck by a semi-tractor under tow. The decedent was driving a pickup northbound on dry, 2-lane roadway with a posted speed limit of 55 mph. A southbound semi-tractor (#1) was "towing" another semi-tractor (#2). The semi-tractor #2 was attached to semi-tractor #1 using a Pro-Tote system, two safety chains and two towing chains. While semi-tractor #1 was traveling southbound, the semi-tractor #2's front axle broke away from a weld, causing the driver of semi-tractor #1 to lose control. The semi-tractor #2 crossed over the centerline, striking the decedent's pickup head on. The decedent was wearing a seatbelt/shoulder harness. The pickup's airbags deployed.

Case 76. A male truck driver in his 40s died when he lost control of his box/delivery truck, crossed the median, and entered a ditch causing the truck to roll and eject him from the cab. The decedent was traveling northbound on a dry, 2-lane roadway with a posted speed limit of 55 mph. When the truck hit the ditch, it rolled over onto the passenger side and slid to rest. The decedent was trapped under the front of the vehicle. Toxicological analysis of the decedent's blood showed the decedent had a high level of methanol in his bloodstream at the time of the crash. The decedent was not wearing a seatbelt/shoulder harness. The vehicle's airbag did not deploy.

Case 77. A male master plumber in his 50s died when his work van struck the rear of a semi-truck that was having mechanical issues. Both vehicles were traveling westbound on a dry, 5-lane roadway with a posted speed limit of 70 mph. There was heavy traffic. The decedent's vehicle was

traveling behind the semi when the semi stopped on the roadway. The decedent was unable to stop in time and his work van struck the rear of the semi-trailer. The decedent was not wearing a seatbelt/shoulder harness. The van's airbags deployed.

Case 78. A male driver in his 30s was hauling building scrap to a landfill when his pickup truck and gooseneck trailer left the roadway, entered a ditch and then struck a tree. The decedent was traveling southbound on an icy, 4-lane roadway with a posted speed limit of 70 mph. The decedent had just changed lanes on the icy roadway when he lost control and slid off the west side of the road. The pickup truck rolled onto its side as it went through a ditch. The trailer remained upright. The roof of the pickup struck a tree, causing it to collapse and partially eject him. The decedent was not wearing a seatbelt. The truck airbags deployed.

Case 79. A male construction equipment operator in his 60s died when his dump truck left the roadway and struck an embankment. The decedent was traveling westbound on a dry, 2-lane highway with a posted speed limit of 55 mph. His right front tire failed (exploded), causing him to lose control of the truck. The truck crossed the centerline of the eastbound travel lane and then ultimately traveled down an embankment and struck multiple trees. The truck came to rest on another embankment, which caused significant damage to the front and the cab area of the truck. The decedent was not wearing his seatbelt/shoulder harness at the time of the crash. The truck was not equipped with airbags.

Case 80 & 81. Two male truck drivers, one in his 50s (Driver 1) and one in his 30s (Driver 2) were killed when Driver 1 crossed the centerline of a road and struck Driver 2's box truck head on. Driver 1 was traveling westbound on a dry, 2-lane roadway with a posted speed limit of 55.mph. For reasons unknown, Driver 1's GMC flatbed truck left the roadway to the right and the truck's right side tires struck a slight embankment near a culvert. At this point, Driver 1 lost control of the vehicle. When he attempted to correct, the vehicle crossed the centerline and struck Driver 2's eastbound box truck. The flatbed truck then struck a utility pole and became entangled in electrical wires. Both truck drivers were not wearing a seatbelt/harness. The airbags did not deploy in either vehicle. Police seized Driver 1's cell phone as it appeared that there was an in-progress text message in the phone that had not yet been sent.

Case 82. A male motorcycle repairer in his 50s died when he ran a red light at an intersection and struck a dump truck making a left turn. The crash occurred within a 6-lane intersection on a dry roadway with a posted speed of 35 mph. The decedent was traveling westbound when the light turned red. A dump truck, facing eastbound, had the right of way with a green turn arrow to make a left turn to travel north. The decedent failed to stop at the light, and at the last minute, tried to avoid the collision with the dump truck by swerving to his left. He was unable to avoid the collision with the rear passenger side of the dump truck. The decedent was wearing a motorcycle helmet at the time of the crash.

Case 83. A male auto parts salesperson in his 20s died when his passenger car was struck by a pickup truck which had crossed the centerline. The decedent's vehicle was traveling southbound on a dry, 2-lane roadway with a posted speed limit of 55 mph. A pickup truck traveling northbound, and had been witnessed weaving in and out of the lane, struck the decedent's vehicle head on, primarily on the driver's side front corner. The decedent's vehicle landed upside down in a ditch.

The pickup truck continued in the northbound lane and struck a southbound vehicle. The pickup truck came to rest upside down in a ditch. The reasons for the weaving of the pickup truck driver were unknown; toxicology results were not conclusive as the blood was drawn after the driver was given medication. The decedent was wearing a safety belt/shoulder harness. The vehicle's airbag deployed.

Case 84. A male truck driver in his 50s died when the semi he was driving struck the rear of a car hauler. The incident occurred on an eastbound, snow-covered, 2-lane expressway with a posted speed limit of 70 mph. There was blowing snow, at times with white-out conditions at the time of the crash. Prior to the decedent's crash, two other vehicles had crashed. One vehicle partially blocked the right lane and the other vehicle partially blocked the left lane, leaving debris in the roadway. Other eastbound vehicles began to slow down, and these vehicles began crashing, which in turn blocked the roadway, with the crashes continuing as vehicles entered the scene. The decedent's vehicle was involved in one of the secondary crashes. Unable to stop, his semi crashed into the rear of a car hauler, which resulted in the upper level of the car hauler to enter the semi's cab. The semi eventually burst into flames. It is unknown if the decedent was wearing a seat belt. The semi was not equipped with an airbag.

Case 85. A male semi-truck driver in his 30s died when he struck the rear of a dump truck hauling an arrow board. The incident occurred on a wet, 3-lane roadway with a posted speed limit of 70 mph. The decedent was traveling in the far right lane of the 3-lane expressway. A convoy of road commission vehicles was working in the right lane. A road commission truck (Vehicle 1) was at the back of the convoy on the right shoulder with its arrow board illuminated, indicating that traffic was to move left. The second vehicle, a dump truck (Vehicle 2) was stationary applying the truck's brake in the far right lane with its arrow board illuminated indicating that traffic was to move to the middle lane. The decedent passed Vehicle 1 and continued traveling approximately 1/4 mile and then struck Vehicle 2. There were no signs of braking or swerving by the decedent. He was wearing a seatbelt/shoulder harness. The semi-tractor's airbag deployed.

Case 86. A male semi-truck driver in his 30s died when his semi left the roadway, struck the guardrail, and then overturned into a ditch. The decedent was driving in a steady rain and had exited the highway to a wet highway ramp with a posted speed of 60 mph. Responding police indicated the decedent's speed was too fast causing him to lose control as he exited. The decedent was wearing a seatbelt only. The semi-tractor was not equipped with an airbag.

Case 87. A male semi-truck driver in his 60s died when his semi left the roadway and struck several trees. The decedent was traveling northbound on a straight, dry, dark, 2-lane roadway with a posted speed limit of 60 mph. For reasons unknown, the semi left the roadway and struck multiple trees in the heavily wooded median. Responding police found no evidence that the decedent applied the vehicle brakes. The decedent was not wearing a seatbelt/shoulder harness. The braking airbags did not deploy.

Case 88. A male truck driver in his 30s died when the semi he was driving overturned. The decedent was traveling eastbound on a wet, 2-lane roadway with an un-posted speed limit of 55 mph. The decedent approached a sharp southern bend in the road. The semi, hauling a trailer and a pup trailer loaded with fly ash crossed the centerline as the semi failed to negotiate the southern

turn in the roadway. The decedent's semi, while on the dirt portion of the shoulder, attempted to re-enter the roadway. The decedent was unable to re-enter the roadway and entered a ditch, causing the semi and both trailers to overturn. He was pinned in the semi-tractor. The decedent was wearing his seatbelt/shoulder harness. The cab was not equipped with an airbag.

Case 89. A male truck driver in his 50s died when he lost control of his gasoline tanker truck, drove through the median wall, overturned and caught fire. The decedent was traveling southbound in the center lane of a 3-lane expressway with a posted speed limit of 70 mph. At the time of the incident, it was raining and the pavement was wet. The driver was transporting approximately 8,000 gallons of gasoline. While attempting to change lanes, he lost control of the truck due to the wet roads and the trailer hydroplaned to the driver's left. After crashing through the median wall, the front of the semi was approximately halfway into the left northbound lane and the overturned tanker was partially resting on the median wall. The police investigation determined the collision with the median wall caused the explosion. The decedent was wearing a safety belt/shoulder harness. The semi-tractor's airbag deployed.

Case 90. A male taxi driver in his 50s died when his taxi was struck head on by a vehicle traveling the wrong way on an expressway. The decedent was traveling northbound on a dark, unlit 4-lane expressway with a posted speed limit of 70 mph. Another vehicle was traveling southbound in the northbound lane and struck the decedent's vehicle head on. The decedent was wearing his seatbelt/shoulder harness. The vehicle's airbags deployed.

Case 91. A male vehicle transport driver in his 70s died when he did not yield the right of way and was broadsided by a pickup truck at an intersection. The decedent was traveling eastbound on a dry, 2-lane roadway with a posted speed of 55 mph. The east-west roadway had stop signs and the north-south roadway had the right of way (no stop signs). The decedent stopped at the intersection's stop sign and then drove into the intersection. His vehicle was struck broadside on the driver's side by a southbound pickup truck. The decedent was wearing a seatbelt/shoulder harness. The vehicle's airbags did not deploy.

Case 92. A male tow truck driver in his 20s died when he was struck by a passenger car driven by a male landscaping business owner in his 30s, who also died in the incident. The tow truck driver was changing a tire on a disabled vehicle parked on the left shoulder of an expressway exit ramp. The decedent parked the tow truck behind the disabled vehicle with its right rear wheels resting on the left fog line or slightly into the left lane of travel. The landscape business owner's passenger car struck the rear right corner of the tow truck and then struck the tow truck driver in addition to the disabled vehicle. The tow truck's emergency lights were activated. The landscape owner was wearing a shoulder harness/seatbelt. His vehicle's airbag deployed.

Case 93. A Hispanic male landscaping laborer in his 20s died from injuries sustained when the box truck he was driving to the jobsite left the roadway and struck mailboxes on the side of the road and then came to rest on an embankment. A coworker was sleeping in the passenger seat. The decedent was traveling northbound on a wet, 2-lane roadway with a posted speed limit of 55 mph. For reasons unknown, the decedent's truck crossed the centerline, crossed over the southbound lane, struck a tree, then some mailboxes, and finally came to rest on an embankment. It is unknown if the decedent was wearing a seatbelt/shoulder harness. The truck's airbag did not deploy.

Case 94. A male farmer/snow plow business owner in his 60s died when his pickup truck struck a tree. The incident occurred on a wet, 2-lane roadway with a posted speed limit of 55 mph. The roadway edges and fog lines were covered by one to two inches of slushy snow. The decedent was traveling to pick up parts for the snow plowing business when the incident occurred. For reasons unknown, the pickup truck left the roadway. Responding police investigation found that the pickup was perpendicular to the roadway's direction of travel as it left the roadway. The pickup struck a tree on the driver's side door, causing the pickup to wrap around the tree. The decedent was wearing his seatbelt/shoulder harness. The pickup's airbag deployed.

Case 95. A female pizza delivery driver in her 40s died when her vehicle was struck in the rear by another vehicle. There was one lane for westbound traffic and two lanes for eastbound traffic. The decedent had been traveling westbound. She stopped in the roadway to make a left turn onto another street. The intersection was dark with ambient lighting from homes bordering the street. An oncoming westbound vehicle failed to stop and struck the right rear of the decedent's vehicle, causing the vehicle to overturn to its right side and then burst into flames, trapping her inside. The decedent was wearing her seat belt/shoulder harness. The vehicle's airbags deployed. The driver of the vehicle striking the decedent's vehicle had a blood alcohol level of 0.24% at the time of the crash.

Case 96. A female accounting specialist in her 50s died when she was struck by a semi-trailer while crossing a street. The incident occurred at an intersection. The decedent was walking north across an east-west roadway. The driver of the semi-tractor trailer was traveling south and was in the process of making a left turn to access the eastbound roadway. The semi driver's light was green. The decedent entered the crosswalk to cross the east-west roadway when the incident occurred. The semi driver made a wide turn and then straightened out the turn. He had completed his turn when he felt a bump and then looked in his left rear view mirror and saw the decedent in the roadway. The driver indicated he did not see the decedent crossing the street.

Case 97. A male state trooper in his 30s died when he was struck by a utility trailer being pulled by a truck causing him to be ejected from his motorcycle and entangled in the trailer. The incident occurred on a dry, dark, unlit 5-lane roadway with a posted speed limit of 55 mph. The decedent was traveling behind the truck/trailer in the right lane on his motorcycle. The utility trailer did not have working lights. The truck/trailer driver made an abrupt turn from the right lane crossing the paved and grassy area of the gore to enter an exit ramp. The abrupt turn resulted in the decedent's motorcycle striking the utility trailer. The decedent was ejected from the motorcycle and he landed between the car and the trailer. He became entangled on the trailer and was dragged several miles until the vehicle/trailer stopped in a rest area where the trooper was discovered.

Case 98. A female attorney in her 30s died when the vehicle she was driving crossed the centerline and struck an eastbound vehicle head-on. It was raining heavily at the time of the crash. The decedent was westbound on a wet, 2-lane roadway with a posted speed limit of 55 mph. The decedent was wearing her seat belt. The vehicle's airbag deployed. Responding police found that the two tires still with air pressure (two were flat) were overinflated by one pound. Additionally, one of the flat tires had a gash in the sidewall from the tread block to just above the bead and scuffing was present on the edge of the rim, in-line with the gash. Police could not find any object

in the area that could have caused the gash in the tire. The responding police report indicated potential contributory factors for why the decedent's vehicle entered the eastbound lane: hydroplaning resulting in loss of control, tire failure resulting in loss of control; or swerving in an attempt to avoid an oncoming vehicle.

STRUCK-BY (21)

Case 99. A male farmer in his 70s died when an unsupported dump bed fell and pinned him between the bed and the frame of the trailer to which it was mounted. The trailer had a dump truck- type dump bed with a lifting mechanism mounted on it. The incident was unwitnessed. His spouse stated to the responding police department that her husband indicated he was going out to do some work; he did not indicate what work he was going to do. After several hours, she decided to check on him and found him pinned by the dump bed against the trailer frame. The dump box had fallen from a raised position to a level position, coming to rest on the decedent's neck. Emergency responders found a welding cutting torch "on", with no flame and an air compressor close to where the decedent was working.



Case 99. Farmer died when unsupported dump bed fell and pinned him between the bed and the frame of the trailer to which it was mounted.

Case 100. A male self-employed logging business owner/operator in his 20s died when a logging clam boom struck a nearby tree, causing two dead branches to fall, striking the top of his head. He was in the seat of the log loader unloading firewood.

Case 101. A male construction laborer in his 30s died when the excavation he was working in collapsed. The decedent was assisting a friend in replacing a bad sewer line at the home his friend owned as a rental property. A 6-foot deep trench had been dug along the west side of the home the day before the incident. The decedent and another friend were in the trench when the incident occurred. The west masonry block wall supporting the porch slab tipped over and into the excavation. The decedent was buried/crushed by the cinder blocks and soil. Approximately two hours after the collapse, his coworker was extricated by the fire department and transported to a nearby hospital for treatment of a fractured clavicle and ribs. The decedent was declared dead at the scene.

Case 102. A Hispanic male laborer in his 40s died when he was struck by a van entering a highway work zone. The decedent and coworker were on break from sealing pavement cracks in the right lane of a 3-lane expressway and standing behind/near their parked “kettle truck” when they were struck by the van. The work zone started with signage, then orange/white barrels forming a taper and an arrow board on the right shoulder closing the far right lane of the expressway. Tall orange/white cones were placed on the division lines dividing the center and right lane. The total length of the work zone was approximately two miles. The work



Case 102. Hispanic laborer died when he was struck by a van entering a highway work zone.

operation was performed at night. The incident area was lit by overhead streetlamp lighting and the lighting on the kettle truck. The decedent’s coworker stated to the MIOSHA compliance officer that when he had checked prior to the incident, the two highway entrance ramps nearest the work zone area had been closed; one ramp approximately one mile away and one ramp near the work zone. The driver of the vehicle striking the decedent lived near the closest ramp to the incident scene. The responding police indicated that because of the low lighting, the driver of the van may not have been able to see the truck due to its being covered in tar. The driver of the van did not apply his brakes before striking both of the workers and the kettle truck. The responding police estimated the van to be traveling a minimum speed of 60 mph before the collision. The location where the van entered the work zone was unknown, although a witness reported that the van was driving in the closed work zone lane in an area past the entrance ramp that was closest to the work zone. Both workers were wearing high visibility vests at the time of the incident. MIFACE Summary of MIOSHA Investigation [#390](#).

Case 103. A male tree helper/grounds person in his 50s died when he was struck by a tree branch during a tree trimming operation at a golf course. The decedent was a member of a three-person crew; his coworkers included a “spotter” who was responsible for keeping golfers away from the area and the loader operator. The loader involved in the incident was a John Deere Loader Model 644 E. The work operation was trimming an approximate 50-foot-tall tree on the 8th-hole green. The work crew had trimmed branches on the left side of the tree earlier in the day; the branches dropped directly to the ground because they fell into the out of bounds territory or in the fairway rough. After lunch, the crew moved to the right side of the tree. The 8- to 12-inch diameter tree branch extended out and 30 feet above the 8th-hole green. Not wanting to damage the green when the limb was cut, a chain was attached to the limb and the bucket. The decedent was standing in the bucket which was elevated 10-12 feet. He was using a 16- to 18-inch Husqvarna 450 chainsaw to trim the tree limb. Apparently, the chain was under tension. After cutting approximately three-quarters of the way through the tree limb, the limb and tree bark broke away from the tree, and swung back towards the loader. The decedent turned toward the side of the bucket, and the tree limb struck him in the back. He then fell from the elevated bucket. The spotter and the loader operator summoned emergency responders. While awaiting emergency responder arrival, the

crewmembers performed CPR. The decedent was declared dead at the scene. MIFACE Summary of MIOSHA Investigation [#393](#).

Case 104. A Hispanic male pipe layer in his 40s died in a trench wall collapse. The construction site had a high water table. The incident location was a section of a 175-foot long trench, part of which had been filled in. The 25-foot long trench in the incident area was approximately 7-feet wide at its top, 6 ½-feet deep and 4-feet wide at its base. An 18-inch bench had been cut on the north and south sides of the trench approximately 18 inches below the top of the trench (approximately 5-feet up from the base of the trench). The trench had a 1 ½-foot seam of wet sand at its base, and then 5 feet of wet clay. A sand/clay ramp located on the east side of the trench provided access. The excavator operator noticed moisture in the trench and asked the decedent if he would like to utilize the trench box which was located on the site; the decedent declined. The decedent and his coworker were preparing to install drain tile pipe when the competent person, who had just arrived at the excavation after performing other site work, noticed the impending wall collapse. He yelled to the two workers to get out of the trench. Both ran toward the ramp. One worker was able to exit safely. The decedent was struck by the falling earth. The falling clay caused a shovel to strike his right side, pinning him against the opposite side of the excavation and burying him to his waist. His coworkers entered the trench and manually dug him out. They carried him out of the trench and called for emergency response. Emergency responders transported him to a local hospital where he was declared dead in the emergency room. MIFACE Summary of MIOSHA Investigation [#394](#).

Case 105. A male carpenter foreman/supervisor in his 30s died when a floor collapsed during demolition activities. The brick building involved in the incident had previously been damaged by weather and fire. The demolition activities were divided into activity areas (bays). The work crew had dismantled a nearby bay (Bay A), but, due to space limitations, stacked all the wood from Bay A onto the floor in the bay where the incident occurred (Bay B). The rough sawn wood floor joists of Bay B were damaged and “sitting” unsecured by bolts or hangers in a “groove” in the brick along the wall. The floor boards were saturated with water and damaged. Two individuals were dismantling the floor, working 7-feet above the basement floor using a saw, pry bar and other equipment. They handed/dropped the demolished flooring into the basement. The work crew did not move the stacked lumber prior to beginning the demolition of the floor. The decedent who had been up on the floor jumped down and with a coworker, began work in the basement level stacking the discarded wood. The decedent used a sledge hammer (maul) to strike Bay B’s flooring 6x6 vertical supports while the work continued on the floor above him. He struck and knocked down one vertical support, and when he struck the 2nd vertical support located near the stacked wood, the floor collapsed on top of him. His coworker was able to run to safety.



Case 105. Carpenter foreman/supervisor died when a floor collapsed during demolition activities.

Emergency response was summoned and the decedent declared dead. MIFACE Summary of MIOSHA Investigation [#384](#).

Case 106. A male site preparation contractor labor/operator in his 40s died when he was struck by a JCB 214e Series 4 backhoe loader bucket when the backhoe loader slid down the bank of an excavation. The firm had been contracted to construct bio swales between parking lots. Approximately 2,000 feet of bio-swale construction had been completed using a front end loader to drop the stones utilized for the bio-swale base. The front-end loader was taken out of service for maintenance and a backhoe loader was used to drop the stone. The decedent and two coworkers, one of whom was the backhoe loader driver were continuing the construction of the bio-swale. The bio-swale had been excavated and the fabric lain within the excavation. The backhoe loader driver drove to the edge of the excavation and dropped



Case 106. Site preparation contractor labor/operator died when he was struck by a JCB 214e Series 4 backhoe loader bucket.

a load of stone. While attempting to back away from the edge, the front tires slid down the bank of the excavation. The decedent was leveling the stone in the path of the sliding backhoe loader. The backhoe loader operator yelled to him, but the decedent was unable to react in time. The bucket of the backhoe loader struck him and came to rest on the opposite edge of the excavation. The front axle of the backhoe loader pinned the decedent. Emergency response was called. While emergency response was *en route*, coworkers attached a chain to the tractor and a nearby bulldozer to minimize further movement of the backhoe loader. MIFACE Summary of MIOSHA Investigation [#387](#).

Case 107. A male laborer in his 50s died when he was crushed by a concrete I-beam that tipped and fell onto him. The decedent's coworkers had opened a mold producing a 110 ¼ foot long, 90,500 pound concrete bridge I-beam. The I-beam was 25-inches wide at its base and 54 inches high. The beam's steel cables were cut, and then the I-beam was lifted from the form area using two 25-ton cranes and placed on the floor on two wood blocks, one at each end of the beam. One employee placed the south end of the beam on a wood block that extended outward on each side of the base of the I-beam. Another employee placed the north end of the beam on wood block of insufficient size; the 23-inch long, 6-inch wide by 6-inch tall



Case 107. Laborer was crushed by a concrete I-beam that tipped and fell onto him.

block was not long enough to span the width of the beam. The floor had many scattered steel cables from the I-beam. The decedent had picked up some of the steel cables and was on the east side of the I-beam, on his way (most likely) to retrieve a rag or broom to clean the form when the north piece of wood cracked and partially split, causing the beam to tip onto its side. The decedent was crushed against the mold support system by the tipping beam. MIFACE Summary of MIOSHA Investigation [#395](#).

Case 108. A male crane operator trainee in his 60s died when he was struck by a 9,400-pound bundle of steel round stock. The decedent was utilizing a 20-ton Shawbox overhead crane with a wireless remote pendant. He used two slings for the 20-foot long, 18-24-inch diameter bundle. The round stock bundle was on a “sled” on a powered conveyor approximately 2 feet above the floor. While standing approximately 2 feet east from the load and between the conveyor and a guardrail, he initiated the lift. The decedent apparently, unknowingly, activated the east bridge directional button causing the bridge to move. The lift was now on an angle (in a drag position). Witnesses noted that the hook was not centered over the load and tried to warn him. After he realized he was activating the wrong button and before he repositioned the crane bridge above the load, he activated the upward lift button. As the load lifted, it started to swing and struck his head and upper torso. The force of the strike knocked him into a guardrail and then into previously placed steel stock. MIFACE Summary of MIOSHA Investigation [#385](#).

Case 109. A female business owner in her 60s died due to asphyxia when she was wedged between an electrical box and the business’s stationary security chain link fence after being pinned by a moving motorized security gate. The decedent was leaving the business for the evening and rather than using the motorized gate control located in a building adjacent to the security fence to open the closed gate, she drove her car to the gate entrance. She exited her car, leaving it running, to manually key open the gate. The keyed control box was located on the opposite side of the gate, facing outward (facing away from her). She inserted the keys and when the motorized gate began to move, she was struck by the leading edge of the sliding gate and was pinned by the sliding gate in the 10-inch distance between an electrical box and the stationary fence. It is unknown if she stepped onto the bottom of the gate or fence and reached over it or if she reached through the chain link fence to insert the keys. The sliding gate was open a few feet when an employee beginning work the next day found her. Emergency response was summoned and she was declared dead. The gate did not have a safety device, slip clutch, or sensor to stop the leading edge if an individual/equipment was struck by it. MIFACE Summary of MIOSHA Investigation [#381](#).

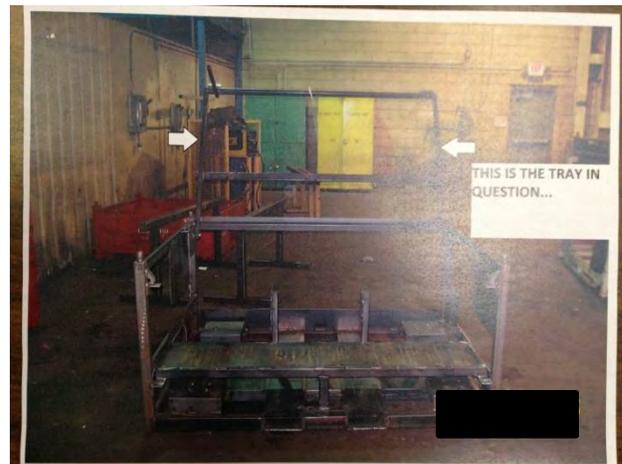
Case 110. A female loader crew leader in her 40s died when she was struck and run over by a backing semi-tractor and trailer with a wagon-type tarp pulled back into position (Semi #1). The trailer was loaded with steel coils. A second semi-tractor/trailer (Semi #2) was waiting outside the building to be directed by the decedent into the loading area. The independent owner/operator driving Semi #1 was blocked from driving forward to the exit by a crane operator moving a roll of steel. The decedent was wearing a high visibility vest and was standing behind and almost to the center of Semi #1’s trailer using hand signals to direct both semi drivers. Without waiting for

backing instruction from the decedent and apparently not knowing she was behind the trailer, Semi #1's driver began to back the semi. Semi #2's driver saw the decedent in the path of travel and began honking his horn to warn both the decedent and Semi #1's driver. The decedent was unable to get out of the way in time, and was struck and dragged approximately 10 feet by the backing semi-trailer. Both drivers exited their vehicles; Driver #2 told Driver #1 to not move the truck. Driver #2 ran back to his truck to get his cell phone. Driver #1 re-entered his truck and began to again back the vehicle. Driver #2 again honked his horn to stop Driver #1. Driver #1 exited his truck and ran to the shipping office. Emergency response was summoned and the decedent was declared dead. Subsequent investigation by police found that Driver #1's passenger side mirror was not adjusted properly; it was turned in to the point that while sitting in the driver's seat, the driver would not have been able to see the decedent behind the trailer. MIFACE Summary of MIOSHA Investigation [#377](#).



Case 110. Loader crew leader was struck and run over by a backing semi-tractor and trailer with a wagon-type tarp pulled back into position.

Case 111. A male welding foreman in his 50s was struck by the “door” of the empty metal rack that was being flipped by a powered industrial truck (PIT) operator. The metal rack had an unsecured top tray (door). The decedent had his back to the PIT operator. The PIT operator sounded the horn and then yelled to the decedent that he was about to flip the metal rack. As the PIT operator flipped the rack, the decedent stepped back, and the unsecured rack door flipped downward, striking him on his lower back. Several days later, the decedent sought medical attention because of difficulty breathing. He was hospitalized and died several weeks later. The cause of death on the death certificate was blunt trauma to the back. MIFACE Summary of MIOSHA Inspection [#406](#).



Case 111. Welding foreman was struck by the “door” of the empty metal rack that was being flipped by a powered industrial truck (PIT) operator.

Case 112. A male assembly line team leader in his 40s died from head injuries sustained when his head struck a cabinet while working near a “chain on edge” vehicle conveyor assembly line. At the time of the incident, his job task was to make repairs to the lift gate of a vehicle. The assembly line was elevated 15-20 feet in the air and the work area was also elevated. There were three different elevated work areas; the upper area was accessed by two stairs, the middle area was the designated crossover area between sides of the assembly line, and the third area (where the decedent was working on the rear fascia/lift gate)

was approximately 12-18 inches lower than the designated crossover area. Located on the marked (yellow-striped) area indicating the pedestrian crossover was a 35-inch tall cabinet. The sequence of events which caused the injury leading to his death was unknown. The information supplied to the medical examiner at time of autopsy was "Mr. was working on an assembly line (moving conveyor) and while at said line trying to make repairs he was thrown into a tool box where he sustained initial trauma and then fell to the ground." The medical examiner report stated "The location, physical findings and extent of bleeding ... indicate that the initial trauma created a chain of events that ultimately led to his demise." One of the many possible incident scenarios was that he was using the vehicle for support as he was stepping up onto the middle section when the conveyor/car moved forward, causing him to be propelled forward, hitting his head on the cabinet. After the injury, the decedent was found lying on pedestrian crossover area with his head toward the cabinet and his feet near the stairs to the upper level. The lift gate on one vehicle was raised. A nearby coworker stopped the assembly line and summoned help. CPR was initiated by plant personnel while waiting for emergency responders. The decedent was declared dead at the hospital. MIFACE Summary of MIOSHA Inspection [#389](#).

Case 113. A female industrial salesperson in her 30s died from surgical complications during general anesthesia for an amputation injury. Several months earlier, the decedent bumped/struck her finger on a box of nuts and bolts while trying to remove some product. The tip of her finger turned black, and then another month passed and her entire finger became gangrenous. During the surgery to amputate her finger, she experienced complications related to the general anesthesia, which caused her death.

Case 114. A male tow truck driver in his 20s died when he was struck by a passenger car driven by a male landscaping business owner in his 30s, who also died in the incident. The tow truck driver was changing a tire on a disabled vehicle parked on the left shoulder of an expressway exit ramp. The decedent parked the tow truck behind the disabled vehicle with its right rear wheels resting on the left fog line or slightly into the left lane of travel. The landscape business owner's passenger car struck the rear right corner of the tow truck and then struck the tow truck driver in addition to the disabled vehicle. The tow truck's emergency lights were activated. The landscape owner was wearing a shoulder harness/seatbelt. His vehicle's airbag deployed.

Case 115. A male landlord in his 80s died when a wooden play structure post struck his upper body while removing a wooden swing set from the property he had just purchased. The decedent was using a tractor with a bucket. The responding police report described the swing set as 15 feet wide by 8 feet tall. Each side of the swing set had an "A frame" support. The swings were supported by a 4x4 center post. It appeared the decedent used the bucket to raise the swing set out of the ground. As the swing set was being balanced on the bucket, one side of the swing set broke apart and fell off the bucket due to rotted/dried out wood. The load became unbalanced, and the center beam fell from the bucket and struck the decedent.

Case 116. A male landscaping business owner in his 40s died when he was pinned by the Ford F-150 pickup truck equipped with a snow plow he was repairing. The decedent indicated to a friend at a business that his truck needed to be repaired. The friend permitted the decedent to pull the truck to the back of the building. His friend retrieved some cardboard for the decedent to lie on and then went back inside the building. The decedent placed a piece of wood behind a rear tire to

chock it. The decedent was under the truck working when the truck rolled. His head, neck and shoulder area was lodged up to and under the passenger side front tire. His friend found him and called for emergency response. Emergency responders found the truck running and in reverse. With difficulty, the truck was placed back into park. The engine was shut off. He died several weeks later from the injuries sustained at the time of the incident.

Case 117. A male landscape worker in his 40s died when he was struck by a tree trunk he had felled. The decedent was standing in the crotch of a 50-foot-tall willow tree which had four multi-stemmed trunk sections. One of the tree sections had already been removed. The incident occurred during the removal of the second trunk section. This section was approximately 30 inches in diameter and still had its branches. The decedent was using a gas-powered chain saw with a 16-inch bar. He was standing in the crotch of the tree approximately 7 feet above the ground. The decedent had not notched the trunk which had a very slight lean away from him prior to making the back cut. While making the back cut, the tree splintered (barber-chaired) and kicked back, landing on his chest, pinning him in the crotch of the tree. MIFACE Summary of MIOSHA Investigation [#375](#).

Case 118. A male racecar driver in his 60s died when his racecar was struck during the race by another race car. The decedent began the race in the lead and went into the first turn "low". The other race cars went into the first turn "high". As the racers went from turn 1 to turn 2, the decedent began to drift "high" and another race car struck his car, causing the car to crash into a tire barrier. After the crash, the decedent was conscious and talking and then had a heart attack, which ultimately caused his death. A motor vehicle accident was listed as contributory. The medical examiner indicated that the cause of death was Indeterminate.

Case 119. A male truck driver in his 40s died when he was run over by a 2006 Mack dump truck while tapping the brake drum to free the passenger-side rear brake for another truck driver. The 2006 Mack dump truck had five total axles (1 at the front and 4 at the rear). The front two axles on the rear dump area of the truck were recessed, not touching the ground. The dump truck was empty and weighed approximately 16,470 pounds. The truck's driver indicated that he noticed that the brake on the driver's side was frozen so the driver rocked the truck back and forth in an attempt to release the brake. The brake released and the driver began to drive out of the yard and into the employee parking lot when it became apparent to him that the right passenger side rear quad tire brake was sticking. The driver attempted to rock the vehicle a couple of times to release the brake, but it did not release. He stopped the truck to obtain some help unlocking the brake. Prior to dismounting from the cab, he applied the air brake. He left the truck running and in gear. The truck did not have a park setting. The driver retrieved a small sledge hammer and then went into the nearby office and asked the decedent, who was just coming off his shift, to help free the

brake. The decedent instructed the driver to chock the tire and take off the air brake. The truck was positioned on a slight incline. The driver chocked the back of the front passenger side tire, expecting the truck to roll back against the chock when the brake was freed. The decedent was on his back in front of the back tires while tapping on the brake drum with the hammer, waiting for it to “pop”. The truck driver, who was not sure of the procedure for “freeing” a brake using this method, stood between the rear quad tires to watch the decedent. After tapping the brake, the decedent asked the driver if there was a “pop”. Not hearing a “pop”, the decedent tapped on the brake drum a few more times. The



Case 119. Truck driver died when he was run over by a 2006 Mack dump truck while tapping the brake drum to free the passenger-side rear brake for another truck driver.

brake freed, but because the truck was in gear, it rolled forward. The rear tires ran over the decedent and truck driver’s leg as he attempted to stop the truck’s forward movement. The truck came to rest across the street against a concrete block wall. The truck driver summoned help, and while waiting for emergency response to arrive, the decedent’s coworkers provided CPR. Emergency response transported him to a local hospital where he was declared dead. The Michigan State Police’s post-crash inspection did not identify any violations for the Mack truck involved in the incident. MIFACE Summary of MIOSHA Inspection [#374](#).

SUICIDE (12)

Case 120. A male farmer in his 30s died from a self-inflicted gunshot wound.

Case 121. A male construction worker in his 40s intentionally jumped from a 50-foot-high scaffold to the ground.

Case 122. A male injection molding firm owner in his 50s died from a self-inflicted hanging.

Case 123. A male toolmaker in his 50s died from a self-inflicted gunshot wound.

Case 124. A male equipment repairman in his 40s died from a self-inflicted gunshot wound.

Case 125. A female sales clerk in her 40s died from a self-inflicted gunshot wound.

Case 126. A male seaman in his 40s drowned after jumping from a freighter. He was not wearing

a life jacket.

Case 127. A male truck driver in his 60s died from a self-inflicted gunshot wound.

Case 128. A female real estate property manager in her 60s died from a self-inflicted gunshot wound.

Case 129. A male custom curtain manufacturing firm owner/operator in his 60s died from self-inflicted carbon monoxide poisoning from a running vehicle in a closed garage.

Case 130. A male advertising designer in his 40s died from a self-inflicted asphyxiation; he was found with a bag over his head connected to a helium tank.

Case 131. A male Coast Guard employee in his 20s died due to a self-inflicted gunshot wound.

TOXIC EXPOSURE (4)

Case 132. A male farmer in his 70s died from exposure to carbon monoxide while working on his tractor in a closed garage.

Case 133. A female farm hand in her teens at a hog-raising operation died from exposure to carbon monoxide from a propane-powered pressure washer. The pressure washer was located in a small room inside of a 14-foot by 17-foot office building with an 8-foot ceiling. Also located within the building was a change room where the decedent was required to shower and change clothes prior to entering the hog barn. The owner had recently hired an outside firm to install a new pressure washer to replace a faulty pressure washer. The pressure washer was installed close to the shower area that the decedent had entered. At the time of the incident, the farm owner was in the hog barn, pressure washing the barn in preparation for a new hog shipment. When the decedent did not come into the barn as expected, the farm owner looked for her. He found her fully clothed, face up in the shower area. The farm owner attempted to get a response from the decedent. Unable to get a response, he ran to the office to get his phone and called 911 and exited the building to obtain help from a truck driver who was vacuuming out old feed. Resuscitation efforts were initiated and when emergency responders arrived they assumed care. Based on the carboxyhemoglobin level in the decedent's blood (47.8%), calculations estimated that the decedent's exposure for 60 minutes was 2772 ppm, with an 8-hour time weighted average of 346 ppm. MIFACE Summary of MIOSHA Investigation [#407](#).

Case 134. A male heavy equipment operator in his 50s died as a result of complications of a reported exposure to toxic gases in 1989.

Case 135. A male factory laborer in his 40s was assisting with the removal of a hose connection from a non-pressurized pump using a wrench and pipe. The firm at which the decedent worked makes foam polyether/poly urethane foam parts, which contain MDI and polyol. Each chemical was stored in a separate 2550-pound tote. A hose was connected to the tote and then connected to a pump. The valve was opened and the chemical was pumped into a 60-gallon tank. The materials

were drawn in and mixed and then dispensed into a tray mold that formed the part. The decedent and coworker removed the hoses from the pump, which had an estimated pint of product residual between the tote and the tank. After removal of the hoses, the decedent went to the bathroom. His coworker also went to the bathroom and noted the decedent coughing. The decedent indicated he was "okay". Another worker checked on the decedent and found him collapsed in the bathroom.

UNKNOWN (1)

Case 136. A female carnival worker in her 30s was found unresponsive in a trailer at a carnival campground.